Exxon Valdez Oil Spill
Restoration Project Final Report

Sound Waste Management Plan

Restoration Project 95115
Final Report

Prince William Sound Economic Development Council
P.O. Box 2353
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Study History: Restoration Project 95115 represents the initial phase of the Sound Waste Management Plan project. An additional proposal (Restoration Project 97115) has been submitted to the *Exxon Valdez* Oil Spill Trustee Council to assist with the second phase of the project which involves implementation of Phase I recommendations. Interim reports developed as part of Restoration Project 95115, including an inventory of waste streams and waste management practices in each of the communities, are included in the technical appendix to the final project report.

Abstract: This project was designed to address marine pollution that is generated from land-based sources within the Prince William Sound communities of Cordova, Valdez, Whittier, Tatitlek, and Chenega Bay. The project recommends ways to improve the management of three different waste streams generated within the communities and which are a chronic source of marine pollution: used oil, household hazardous waste, and solid waste. By assuring that these wastes are properly handled and do not contaminate the marine environment, this project will reduce the stress on recovering resources and services. The recommendations, some of which have already been implemented, include: creation of a comprehensive used oil management system in each community, construction of Environmental Operation Stations to improve the overall management of solid and oily wastes, and the development of a regional household hazardous waste program. The Sound Waste Management Plan takes an innovative approach to waste management and is based on the premise that by working together as a region, Prince William Sound communities can improve waste management practices at a lower cost, and through a greater variety of means, than if each tried to make changes independently.

Key Words: Prince William Sound, waste management, used oil, chronic marine pollution.

Citation: Prince William Sound Economic Development Council. 1996. Sound waste management plan, *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 95115), Valdez, Alaska.

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SOUND WASTE MANAGEMENT PLAN EXECUTIVE SUMMARY

Prince William Sound communities face serious environmental management issues. In most communities:

- landfills are filling up or are located in areas of possible ground-water and surface-water contamination;
- inadequate facilities exist to manage used oil, increasing the potential for spills and illegal dumping;
- hazardous household wastes are disposed of in community landfills where they may leach out into surrounding land and water; and
- communities are out of compliance with state environmental regulations.

The **Sound Waste Management Plan** was developed to find solutions to these and other environmental management problems in the communities in order to prevent environmental contamination, safeguard public health, and promote economic development.

The **Sound Waste Management Plan** is the first collaborative planning effort among the communities of Chenega Bay, Cordova, Tatitlek, Valdez, and Whittier. It will result in significant improvements in communities' waste management practices, including producing less waste, increasing waste recycling, and assuring safe waste disposal. Prince William Sound communities will be committing significant labor and other resources to implement the Sound Waste Management Plan, and will also pursue funding from outside sources for a portion of the capital costs required to implement the Plan.

The **Sound Waste Management Plan** recommends the following five major improvements in waste management practices.

Recommendation #1: Create a comprehensive used oil management system in each community. Facilities and equipment should be upgraded or purchased as needed to enable communities to safely manage used oil of all types (engine oil, oily bilge water, and oil-contaminated materials) at all stages of management, including collection, storage, transportation, and recycling the used oil by burning it for energy recovery.

Recommendation #2: Establish a regional household hazardous waste collection and training program. Communities should work together and in coordination with the Alaska Department of Environmental Conservation (DEC) to establish a Prince William Sound Household Hazardous Waste Management Program. The regional program would ensure that household hazardous wastes (paints, lead-acid batteries, solvents, etc.) are routinely collected and disposed of properly, and that costs to communities are greatly reduced through training and technical assistance provided by DEC.

Recommendation #3: Institute community-sponsored drop-off recycling programs for cardboard and aluminum. Communities should move from their current sporadic, volunteer-led recycling efforts to institution of community-sponsored recycling programs. To maximize revenues, the programs should focus initially on collecting the highest market-value materials—cardboard and aluminum—and expand to other materials as feasible. To minimize program costs, priority should be given to collecting recyclable materials during the summer months, when businesses and residents generate the largest volume of materials.

Recommendation #4: Construct EnVironmental Operation Stations in each community. EnVironmental Operation Stations (EVOS) should be constructed in each community to centralize and integrate recycling, household hazardous waste, and used oil management operations. An EVOS is a 20' by 20' building which would provide the physical, sheltered space necessary to collect and store materials. An EVOS would provide a convenient "one-stop" drop-off location in each community to maximize recycling and proper waste disposal by residents and businesses.

Recommendation #5: Determine how and where municipal solid waste will be disposed of over the long term. Each community should initiate discussions with its city/village councils and residents to determine how best to manage municipal solid waste over the next five to twenty years. Most communities are facing this decision with some urgency, either due to a lack of compliance with regulations or upcoming expiration of their disposal permits. The decision-making process should be built on the comparative analysis of seven waste disposal alternatives which is contained in the Sound Waste Management Plan.

Implementation of these five recommendations will significantly and cost-effectively improve the way waste is managed within Prince William Sound communities. The recommended actions will maximize health and environmental protection by decreasing oily and solid wastes entering Prince William Sound; minimize costs through coordinating as a region and obtaining partial funding from outside sources for the recommendations; and create a practical waste management system that can be sustained over time.

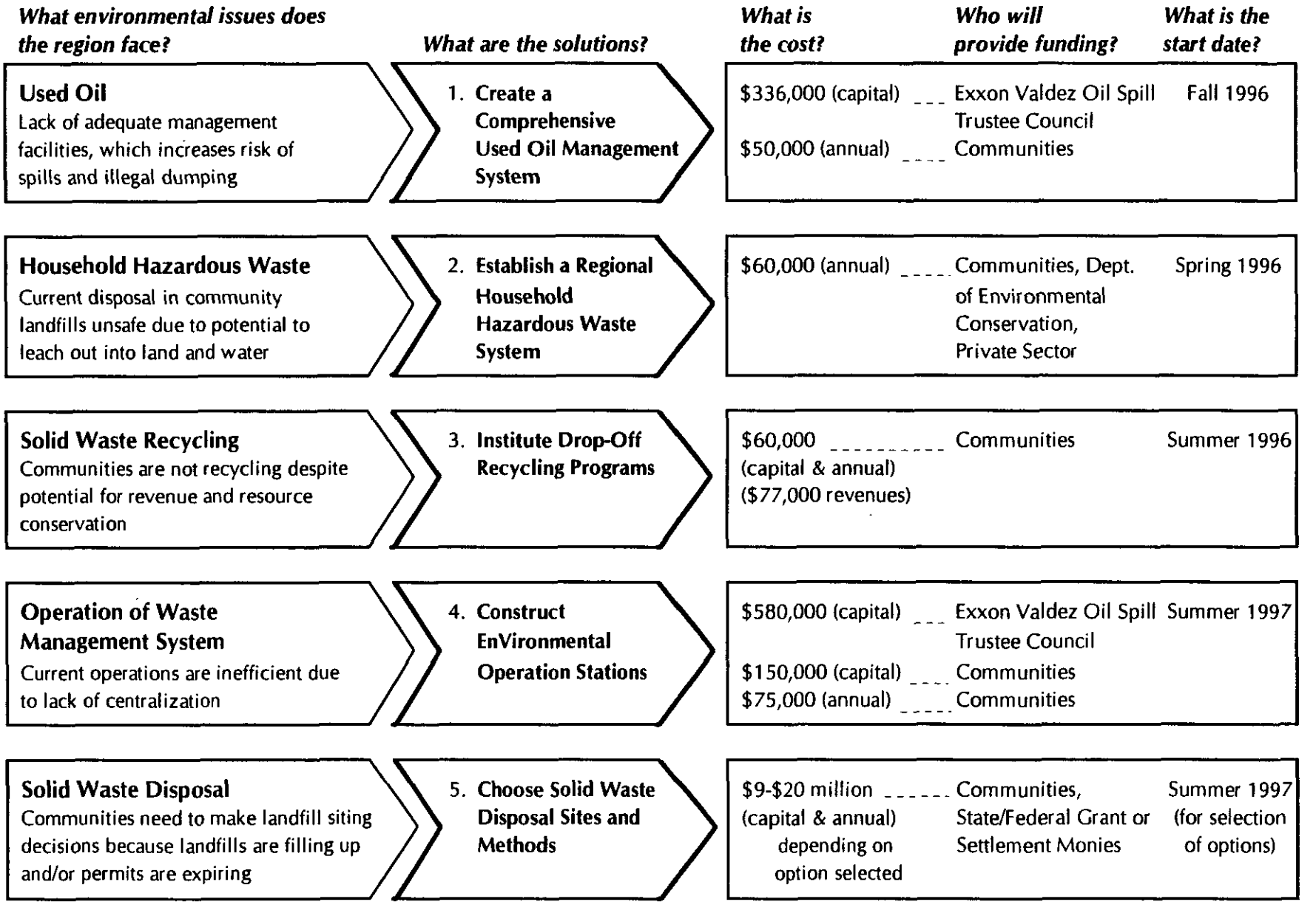
The total capital costs to implement the first four recommendations are approximately $1,000,000 for the region. The annual costs total approximately $200,000 for the region. The estimated costs to implement the fifth recommendation (construction and annual operation of a solid waste disposal site) range from $9,000,000 to $20,000,000 for the region over a twenty year period, depending on the disposal site option chosen by each community.

Communities plan to undertake a public review process in the Spring and Summer of 1996 to discuss the recommendations among city/village councils and residents. Once the review process is complete, funding will be pursued with implementation of the recommendations to be completed by mid-1997. Potential funding sources include the communities, *Exxon Valdez* Oil Spill Trustee Council, the Alaska Department of Environmental Conservation, the Legislature, and private businesses. (The attached table shows the Sound Waste Management Plan recommendations, associated costs and potential funding sources).

The Sound Waste Management Plan was developed through a regional planning process coordinated by the Prince William Sound Economic Development Council. Public officials and private sector representatives from each of the communities met monthly over the course of a year to develop the Sound Waste Management Plan. The *Exxon Valdez* Oil Spill Trustee Council funded the planning process, and the Alaska Department of Environmental Conservation encouraged and participated in the planning process, based on the importance of protecting Prince William Sound from on-going land-based sources of marine pollution.

Many improvements in waste management practices have already been made as a result of the cooperative planning process and many more are anticipated. Communication among communities has also been enhanced, helping to make positive changes in the communities possible. Prince William Sound communities plan to continue working together as a region to successfully and creatively address environmental management issues.

SOUND WASTE MANAGEMENT PLAN RECOMMENDATIONS



The communities are: Chenega Bay, Cordova, Tatitlek, Valdez, and Whittier

Costs shown are for the region as a whole.

I. INTRODUCTION: SETTING THE STAGE

The communities of Prince William Sound face an increasingly large and complex set of environmental problems. Used oil, garbage, sewage, hazardous waste, scrap metal, and fish wastes are only a few of the commonly generated wastes which communities must manage carefully to prevent contamination of the environment and to safeguard public health.

Proper waste management is also increasingly recognized as important for economic development: a community must offer a good "quality of life" to attract new businesses and residents—which includes having the infrastructure necessary to maintain a clean environment.

Prince William Sound communities face some pressing environmental management problems. In most communities:

- landfills are filling up or are located in areas of possible ground- and surface-water contamination;
- inadequate facilities exist to manage used oil;
- hazardous household wastes are disposed of in community landfills where they may leach out into surrounding land and water; and
- communities are out of compliance with state environmental regulations.

Each community has tried to address these and other problems independently, but has been stymied in its efforts by the high cost of proper waste management and by local conditions—geology, climate, and infrastructure—which limit the effectiveness of conventional solutions.

What is the Sound Waste Management Plan?

The **Sound Waste Management Plan** is an **action plan** for how Prince William Sound communities can improve their waste management practices, through producing less waste, recycling waste, and assuring safe disposal of the waste. The primary objective of the plan is to achieve practical results in improving waste management.

The **Sound Waste Management Plan** takes an **innovative approach** to waste management. It is based on the premise that by working together as a region, Prince William Sound communities can improve waste management practices at a lower cost, and through a greater variety of means, than if each tried to make changes independently.

In coming together to develop the Sound Waste Management Plan, communities needed answers to many critical questions:

- what are the major sources of pollution in our communities?
- which of these should be addressed first?
- what are the most feasible waste management alternatives and how much will they cost?
- given rising landfill disposal costs and new, tougher disposal regulations, can we cost-effectively increase the use of alternative management techniques (e.g., recycling)?
- how can we improve our local infrastructure—such as providing training to staff and upgrading our facilities—to improve our waste management capability?

- how can we pay for the desired alternatives—are there a variety of funding sources (community, state, private sector) that can be used to minimize the burden on any one source?
- what will the environmental and other benefits be of making waste management improvements?

The Sound Waste Management Plan was designed to answer these and other questions, and to engage communities in a proactive approach to environmental management. Many improvements in waste management practices have already occurred as a result of the cooperative planning process and many more are anticipated. Communities have also enhanced their communication with each other and gained an appreciation for the similarities and differences in environmental management issues facing each of them.

The Sound Waste Management Plan was funded by the *Exxon Valdez* Oil Spill Trustee Council. The Trustee Council administers funds dedicated to restoring the resources and services injured by the 1989 *Exxon Valdez* oil spill. The Trustee Council funded the Sound Waste Management Plan in part to assure that marine pollution from communities or other sources do not further degrade the marine habitat of Prince William Sound. By assuring that wastes are properly handled and do not contaminate the marine environment, the Trustee Council hopes to ensure that the natural recovery of the resources and services will continue without interference.

Developing the Sound Waste Management Plan

Grass roots participation. A committee comprised of representatives from each of the five Prince William Sound communities—Chenega Bay, Cordova, Tatitlek, Valdez, and Whittier—developed the Plan. Committee representatives included city/village council members, city department directors, state environmental agency officials, and private business representatives. The committee met monthly over the course of a year to identify mutual goals, set project direction, review alternative solutions, and make decisions. A technical consultant provided information and analytic support to the committee. The Prince William Sound Economic Development Council coordinated the overall effort.

Analysis. The recommendations contained in the plan are based on a solid foundation of community-specific information. An inventory was conducted in each community to collect up-to-date information about waste generation, waste management, and community needs and priorities. (The inventory is contained in Appendix B.) The Exxon Valdez Oil Spill Trustee Council provided funding for a contractor to gather the information and to develop and analyze alternative waste management solutions.

Action. In developing the Plan, emphasis has been placed on achieving practical results. The plan prioritizes and targets for action three waste streams deemed to be of the greatest concern based on the waste management inventory—used oil, household hazardous waste, and solid waste. The Plan recommends actions and funding strategies for improving management of those waste streams, and for improving communities' waste management systems as a whole.

In the Remainder of This Report....

The remainder of this report contains three sections: key findings, plan recommendations, and a brief conclusion.

- The Key Findings section identifies current pollution and waste management issues in the communities.
- The Plan Recommendations section presents the recommended waste management improvements, and estimates their costs and potential funding sources.
- The Conclusion section describes implementation timeframes and describes the next phase of the Sound Waste Management Plan.

Attachments to this report include a council resolution, signed by each community, endorsing the Plan and a regional agreement on household hazardous waste between the communities and the Alaska Department of Environmental Conservation. Appendices to this report, contained in a separate volume, provide additional information and detailed analyses used to develop the Plan.

II. KEY FINDINGS

Communities' most pressing waste management problems are described below. The recommendations for solving these problems are contained in the next section of the Plan.

Waste Management System Findings

- Communities **rely too heavily on disposal** as the primary waste management method. Communities should use a wider range of methods - including household hazardous waste management, used oil recycling, and solid waste recycling - to help ensure compliance with regulations, protect human health and the environment, and minimize long-term liability.

- Community staff **lack the full complement of training** they need to ensure compliance with regulations and to minimize the potential for adverse environmental impacts. In particular, staff have not been trained sufficiently in used oil and hazardous waste handling, where regulations are complex and the consequences of mishandling (spills, leaks, etc.) can be serious.

Waste Stream-Specific Findings

Priority Waste Streams

Of approximately 20 different wastes generated in the communities, three are a priority for communities to address:

- used oil;
- household hazardous waste; and
- municipal solid waste.

These are deemed a priority for improvement either because of the potential environmental and public health risks they pose, and/or because good opportunities exist to dramatically improve their management through relatively modest changes in waste management practices. Table 1 shows the community priority level assigned to each of the twenty waste streams.

The wastes were assigned priority levels depending on the degree to which the following criteria applied:

- potential for adverse environmental impacts
- existence of alternatives
- regulatory compliance issue

TABLE 1: COMMUNITY PRIORITIES

Top Priority Waste Streams	Used oil Municipal solid waste Household hazardous waste
Second Priority Waste Streams	Scrap metal Sewage sludge Fish waste Stormwater runoff Tires Sport fish waste
Lower Priority Waste Streams	Plastics Construction and demolition debris Glass Asbestos Tank scale Incinerator ash Contaminated soil Floating processor waste Remote sites Medical clinic waste Industrial hazardous waste

- chronic, on-going concern
- regional management potential
- insufficient management capacity
- economic feasibility of alternatives

The specific issues associated with each priority waste stream are described below.

Used Oil

Inadequate facilities exist to manage used oil in the communities. This increases the likelihood that spills and leaks will occur and that used oil will be illegally disposed of on land or water. In Tatitlek and Chenega Bay, used oil is being stored in old drums and tanks because no management system exists. Cordova, Valdez, and Whittier consistently face a shortage of capacity to recycle all of the used oil they receive. To upgrade their facilities, communities need to ensure that they have adequate collection, storage, testing, and recycling capacity for used oil. Table 2 identifies each community's used oil facility needs.

TABLE 2: USED OIL MANAGEMENT NEEDS

	Adequacy of Existing System				
Elements of a Comprehensive System	Cordova	Valdez	Whittier	Tatitlek	Ch. Bay
Collection Facility					
· Sizable entry funnel with screen, lid	👍	👍	👎	👎	👎
· Double-Wall tank or bermed area	👍	👍	👎	👎	👎
· "Used Oil" Signage	👍	👍	👍	👎	👎
Processing and Transfer to Storage					
· Clor-D-Tec Test	👍	👎	👎	👎	👎
· Standardized Pump - Vacuum	👎	👎	👎	👎	👎
· Oil/Water Separator	👎	👎	👎	👎	👎
· Filter System	👎	👎	👎	👎	👎
Storage					
· 12-month volume capacity	👎	👎	👎	n/a	n/a
· Double-Wall Tank or Diked	👍	👍	👍	n/a	n/a
· "Used Oil" Signage	👍	👍	👍	n/a	n/a
· Lab Test when @ Capacity	👍	👎	👍	n/a	n/a
Burn for Energy Recovery					
· Sufficient Capacity to Burn Used Oil	👎	👎	👎	👎	👎
Other Issues					
· Oily Bilge Water Management System	👎	👎	👎	👎	👎
· Oily Materials Incinerator	👍	👎	👎	👎	👎
· Filter Crusher	👎	👎	👎	n/a	n/a

👍 = Adequate

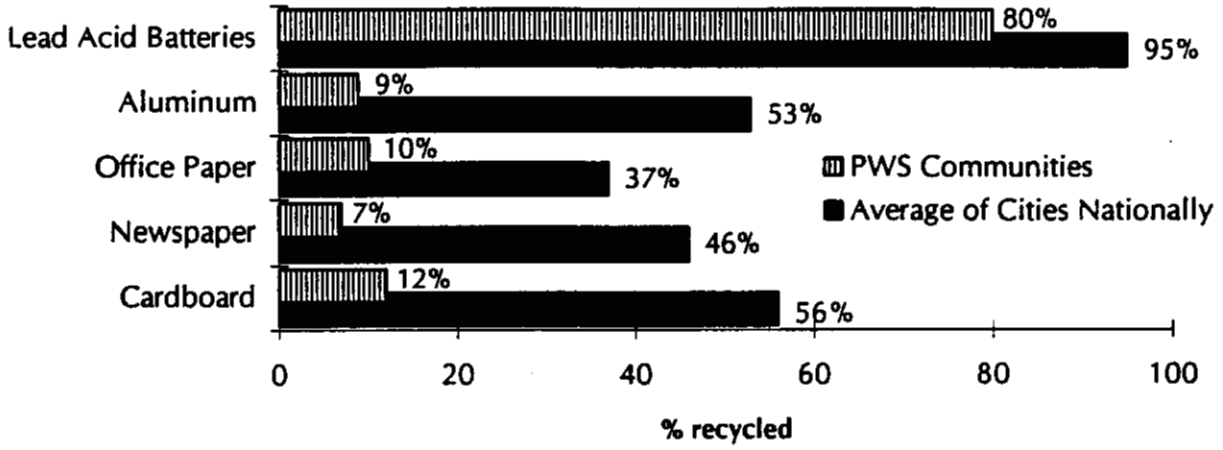
👎 = Requires modification

n/a = Component not needed given local conditions

Household Hazardous Waste (HHW)
HHW consists of paints, lead-acid batteries, solvents, and other household materials that contain hazardous constituents. These wastes should not be disposed of in the community landfill, where they have the potential to leach out and contaminate surrounding land and water. None of the Prince William Sound communities, with the exception of Valdez, have programs to manage their HHW. A barrier to improved HHW management is the high cost of disposal of the waste in special hazardous waste landfills and the current lack of local personnel trained in HHW management.

Solid Waste Recycling
Recyclable materials—cardboard, office and other types of paper, and aluminum cans—constitute approximately 40% of municipal solid waste.[1] Prince William Sound communities have conducted only a limited amount of recycling, relying primarily on periodic volunteer efforts which tend to dissipate over time. Based on an analysis of recycling revenues and costs, the communities have the potential to "break even" or make revenue on recycling certain materials (aluminum, cardboard, office paper). Table 3 shows Prince William Sound recycling rates compared to the average of cities nationally.

TABLE 3: PWS COMMUNITY VS. NATIONAL RECYCLING RATES [1]

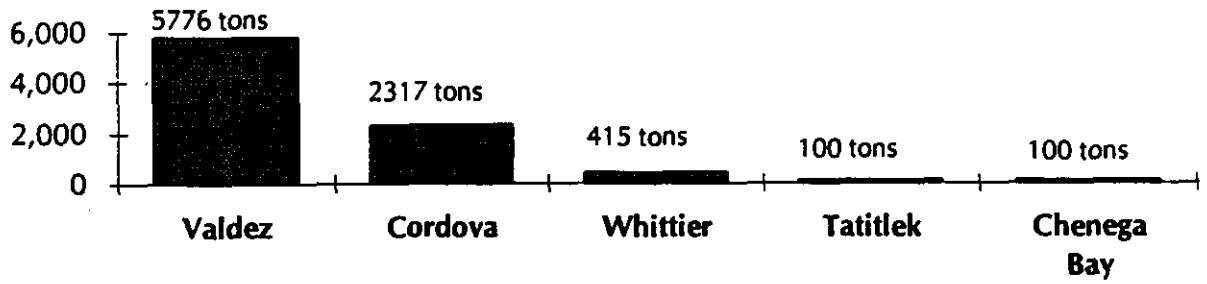


Solid Waste Disposal
With heavy precipitation, poor soils, and the potential for seismic upsets, the Prince William Sound region is not an optimal location for solid waste landfill sites. Some the communities face serious problems: Cordova's current landfill includes diked off tideland areas, with the lower portion of the landfill inundated by the tide. In Chenega, a salmon spawning stream runs through the landfill and fishing in the stream is prohibited. Communities are at a crossroads: non-compliance with current regulations, new tougher regulations coming on line, and the upcoming expiration of some communities' landfill permits (for which they may not be able to be repermitted at the current sites)

[1] Information on national recycling rates and composition of municipal solid waste stream from Characterization of Municipal Solid Waste in the U.S.: 1994 Update, U.S. Environmental Protection Agency.

have forced communities to step back and reevaluate their current disposal methods and locations. Current solid waste management costs in communities range from $135-$175 per ton (including collection). Communities will have to pay more to upgrade their practices and/or change their current disposal site locations. Table 4 shows the current volume of solid waste generated by each community in the region.

TABLE 4: SOLID WASTE GENERATION IN PRINCE WILLIAM SOUND (1994)



Total 1994 MSW generation: 8,700 tons

III. RECOMMENDATIONS

The following recommendations constitute the region's plan for improving waste management in Prince William Sound. Taken together, the recommendations will:

- maximize health and environmental protection by shifting communities from a primary reliance on disposal to a more integrated approach to waste management;

- minimize waste management costs through regional cooperation; and

- create a waste management system that can be sustained over time, through increased training of staff, public education, and implementation of practical solutions.

The Plan's recommendations, presented in greater detail in subsequent pages, are as follows.

Recommendation #1: create a comprehensive used oil management system in each community by upgrading facilities as needed to manage all sources of used oil (engine oil, oily bilge water, and oily materials) at all stages of management (collection, storage, and burning for energy recovery).

Recommendation #2: establish a regional household hazardous waste collection and training program, in coordination with the Alaska Department of Environmental Conservation;

Recommendation #3: institute community-sponsored drop-off recycling programs for cardboard and aluminum.

Recommendation #4: establish EnVironmental Operation Stations in each community, to centralize and integrate used oil, household hazardous waste, and recycling operations.

Recommendation #5: determine how and where municipal solid waste will be disposed of over the next five to twenty years, through initiating discussions with city/village councils and residents, and using the disposal options analysis and recommendations developed by the Sound Waste Management Plan committee.

Each of the recommendations is presented in detail in the following pages. Information provided for each recommendation includes: a project description; estimated project costs; funding sources; implementation timeframes; and the benefits expected from the project.

Recommendation #1: Comprehensive Used Oil Management System

Project Description. A comprehensive used oil management system should be instituted in each community consisting of equipment sufficient for:

- "cradle to grave" management—collection, storage, filtering, transfer, and burning used oil for energy recovery; and
- managing all sources of used oil—including engine oil, oily bilge water and oil-contaminated materials.

Table 5 identifies the specific types of equipment needed and the functions they will serve. The equipment requirements for each community vary depending on local conditions. For example, in the villages a relatively small amount of used oil is generated and a basic set of equipment (e.g., for collection and burning for energy recovery) is primarily what is needed to manage used oil in a safe and efficient manner. Other communities have basic equipment but need additional equipment to improve management of the larger volumes of used oil they generate.

Project Cost

capital $336,000
annual $50,000

The total capital cost of this project is approximately $336,000 broken out as follows:

Cordova	$81,500
Valdez	$75,500
Whittier	$88,500
Chenega Bay	$45,500
Tatitlek	$45,500

The recommended equipment and associated costs for each community are shown on Table 6. The costs are based on price quotes obtained from equipment vendors in December 1995 (shipping costs are not included). Costs may be reduced somewhat if communities coordinate the purchase of the equipment (to obtain a large volume discount) and establish a regional contract for maintenance of the equipment.

Proposed Funding Sources

Capital Costs ..... Exxon Valdez Oil Spill Trustee Council
Annual O&M ..... Communities

A proposal will be submitted to the Exxon Valdez Oil Spill Trustee Council (EVOS) for the $336,000 in capital costs. The communities will be responsible for the annual operation and maintenance of the equipment estimated to be $20,000 in Cordova; $20,000 in Valdez; $5,000 in Whittier; $2,500 in Tatitlek and $2,500 in Chenega Bay.

Project Implementation. If funding is obtained, the project will be implemented in the Fall of 1996. Communities will work together to plan the purchase and installation of the equipment.

Project Benefits. The comprehensive used oil management system will:

- provide adequate capacity for managing all of the used oil that is generated;
- minimize the potential for spills and leaks;
- maximize the amount of used oil that is recycled; and
- reduce costs by decreasing the amount of new fuel to be purchased.

TABLE 5: PROPOSED USED OIL MANAGEMENT SYSTEM

Double Walled Collection Tank	Convenient and safe interim storage/collection point.
Storage Tank	Provides a minimum one-year capacity of used oil.
Vacuum Pumper System	Efficient, clean, maintenance-friendly for transfer of used oil from collection tank and bilges to storage tank and to recycling site(s).
Oily Water Separator	Device to remove oils from bilge water and other oil-contaminated water.
Filter System	Installed in-line to remove impurities prior to burning.
Used Oil Burner for Energy Recovery	Recovers energy from used oil in the form of heat (for buildings, etc.)
Filter Crusher	Maximizes residual oil removal from filters.
Oily Material Burner	Efficient and cost effective device for oily material destruction. Heat recovery possible.
Bilge Water Buffer Tank	Utilized to control flow of bilge water through oily water separator for maximum efficiency.

TABLE 6: USED OIL SYSTEM COSTS

Component	Specification	Cost	Equipment Needed in Community				
			Tatititlek	Ch. Bay	Cordova	Valdez	Whittier
Double Walled Collection Tank	500 gallons 1,000 gallons 2,000 gallons	$3,000 $4,500 $5,500	$3,000	$3,000			$3,000
Storage Tank	1,000 gallons 5,000 gallons 10,000 gallons	$4,500 $11,000 $17,000			$4,500	$4,500 $11,000	$4,500 $11,000
Vacuum Pumper System	1,000 gallons	$18,000			$18,000	$18,000	$18,000
with hose	2,000 feet	$2,000	$2,000	$2,000		$2,000	
fixed piping	1,000 feet	$10,000			$10,000		
portable unit	100 gallons	$12,000	$12,000	$12,000			$12,000
Oily Water Separator	400 gallons	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Filter System		$500	$500	$500	$500	$500	$500
Used Oil Burner for Energy Recovery	125,000 btu 175,000 btu 350,000 btu	$3,500 $4,500 $6,500	$3,500	$3,500	 $4,500 $6,500	 $9,000	 $9,000
Filter Crusher		$2,500			$2,500	$2,500	$2,500
Oily Material Burner		$3,500	$3,500	$3,500	$14,000	$7,000	$7,000
Bilge Water Buffer Tank	500 gallons	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
TOTAL:			**$45,500**	**$45,500**	**$81,500**	**$75,500**	**$88,500**
TOTAL (all equipment):					**$336,500**		

Recommendation #2: Regional Household Hazardous Waste Management System

Project Description. A Prince William Sound Household Hazardous Waste (HHW) program should be established to properly manage household wastes containing hazardous constituents including solvents, paints, batteries, and other commonly used items. The regional program would be a coordinated effort among Prince William Sound communities, with extensive training and technical assistance to be provided by the Alaska Department of Environmental Conservation (DEC). The program would be comprised of four main components: training, collection and packaging, recycling, and disposal. Table 7 shows the components of the program and details of their operation. The regional program would be formalized through a Regional Partnership Agreement between Prince William Sound Communities and DEC.

Project Cost

Annual Cost to All Communities $40,000/yr
Value of Technical Assistance by DEC . $20,000/yr

The total regional cost to communities of this project is estimated to be $40,000 per year. The breakout for each community is as follows:

Cordova	$13,000
Valdez	$18,000
Whittier	$5,000
Chenega Bay	$2,000
Tatitlek	$2,000

Community costs are comprised of waste shipment costs, waste disposal costs, contractor costs, and some training costs.[2] The regional partnership approach to HHW management will reduce program costs to communities in a variety of ways, including equipment sharing, consolidating waste shipments, and using trained DEC and local personnel to reduce the need for professional contractor assistance.

Proposed Funding Sources. Communities will fund waste shipment, waste disposal, and some training costs. DEC will fund additional field technical assistance and training (at least one DEC staff member will assist in each community for 2-3 days), and assist with regional coordination. Funds will be requested from private businesses to assist with funding villages' disposal costs.

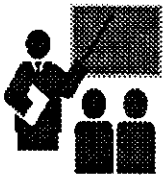
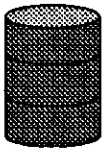
Project Implementation. The program will be implemented through a Regional Partnership Agreement with DEC and communities, expected to be signed in February 1996. The first collection is anticipated to take place in the fall of 1996. (The draft regional agreement is contained in Appendix D).

Project Benefits. The regional program will help keep HHW out of community landfills to:

- decrease the potential of landfills becoming "Superfund" sites;
- help prevent ground- and surface-water contamination; and
- increase compliance with regulations

[2] The following assumptions were used to estimate community costs. Contractor costs of $1,000 per day (two days each in Cordova and Valdez and one day in Whittier); waste shipping and disposal costs of $500 per drum (estimated 31 drums in Valdez, 21 drums in Cordova, 7 drums in Whittier, 3 in Chenega Bay, and 3 in Tatitlek), and approximately $500 per community for training.

TABLE 7: REGIONAL HOUSEHOLD HAZARDOUS WASTE (HHW) SYSTEM

Training		Communities obtain 40-hour classroom HAZWOPER training DEC provides additional HHW Collection Training to community staff in how to identify, sort, and package HHW: · 24-hour field training · 8-hour refresher training after initial year This training enables community staff to assist at HHW collection events.
Collection and Packaging		Communities collect HHW year-round and store or hold a weekend collection event for residents once per year.
		The DEC Wastemobile, containing waste testing and packaging equipment, comes to community once per year (during the collection event) to package and ship collected HHW. The Wastemobile is transported at a reduced rate on the Alaska Marine Highway.
		DEC and trained community staff work together to package the HHW (a professional HHW contractor may also be involved).
Recycling		Communities recycle as much of the collected waste as they can (e.g., used oil, batteries) · larger communities will accept recyclable materials from the villages at no charge to reduce village costs · information will be provided to residents on how to reduce their use of hazardous household materials in the future
Disposal		The remaining HHW is shipped on a commercial barge to a regulated hazardous waste site for safe disposal.

Recommendation #3: Drop-off Recycling Program for Cardboard, Paper, Aluminum

Project Description. Communities should institute city-sponsored recycling programs. The recycling programs should be structured to maximize revenues and minimize costs by:

- initially collecting only higher value materials—aluminum and cardboard;
- collecting materials through a drop-off system, where collection dumpsters are placed in several locations and residents and businesses deposit materials in the dumpsters (rather than door-to-door collection); and
- increasing collection during the summer months, when businesses and residents generate larger volumes of materials.

City-sponsored programs will be a significant change from the sporadic volunteer-led efforts that have characterized recycling efforts to date. Cordova and Valdez would provide dedicated staff time (approximately .5 FTE) to the program to ensure that enough materials are recycled to maximize revenues and cover program costs.

Project Costs and Revenues

Cordova annual net revenue $1,000
Valdez annual net revenue $16,000

Estimated recycling costs and revenues are shown in Table 8 for Cordova and Valdez.[3] In both communities the potential exists for recycling to cover program costs and provide a modest amount of revenue. Actual net program revenues or costs will depend on market prices which exist at the time the materials are sold and on the communities' ability to collect the estimated amount of materials.[4] Both cities' programs are based on recovery rates of approximately 25% of generated cardboard and 45% of generated aluminum.[5] (Appendix E contains detailed information on recycling costs and revenues). Whittier will continue with its current school and volunteer sponsored recycling programs, and also anticipates beginning a pilot program in the harbor district paid for by harbor district users.

Funding Sources. The programs would be funded by the revenues from sale of the materials and by the community (e.g., for capital costs).

Project Implementation. Valdez has secured its staff resources and is beginning to implement its program. In Cordova, the proposal will be brought before the city council in early 1996. The Cities will expand their programs to include additional materials as feasible.

Project Benefits. Communities' recycling programs will:

- conserve landfill space;
- conserve natural resources;
- generate revenues; and
- offer a service which typically has strong public support.

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[3] Tatitlek and Chenega Bay are expected to begin with an informal drop-off program (with no dedicated staff), and therefore no measurable revenues or operation costs are estimated for them. The capital costs of their program (a drop-off depot) are covered in Recommendation #4.

[4] As market prices fluctuate, communities plan to be able to stockpile materials to take advantage of favorable prices.

[5] The net revenues in Cordova will be lower than in Valdez because, while the programs' fixed costs are similar, Cordova generates less waste and the recovery percentages therefore represent a smaller quantity of materials.

TABLE 8: RECYCLING COSTS AND REVENUE

	Valdez	Cordova
Costs [1]		
Capital Costs	$5,700 [2]	$1,800 [3]
Annual		
· O&M [4]	$33,000	$22,000
TOTAL COSTS/YR:	**$39,000**	**$24,000**
Total Revenues per Year [5]	**$55,000**	**$25,000**
Net Revenue per year	**$16,000**	**$1,000**

[1] Costs are presented in present value terms. 1995 dollars and an 8% discount rate were used to determine the present value.

[2] Annualized from total of $60,000 for 60 collection dumpsters ($1000/dumpster). This was done to accurately compare annual costs and revenues. Twenty yearly payments of $5,700 with a discount rate of 8% is equivalent to a present value of $60,000.

[3] Annualized from total of $25,000 for 25 collection dumpsters.

[4] O&M includes $15,000 for labor (.5 FTE at $15/hr) plus funding for public education (Valdez: $5000 and Cordova: $2000). Also includes transportation costs, estimated to be $13,000 in Valdez and $5,000 in Cordova (assumes shipping cost of $1000/container to Seattle, 18 tons per full container).

[5] Revenues are based on $125/ton for cardboard (200 tons recycled in Valdez, 86 tons in Cordova) and $1200/ton for aluminum (25 tons in recycled in Valdez, 12 tons in Cordova).

Recommendation #4: EnVironmental Operation Stations

Project Description. Each community should construct an EnVironmental Operation Station to integrate its recycling, household hazardous waste, and used oil operations. An EnVironmental Operation Station would provide:

- the physical, sheltered space necessary to manage and store collected materials;
- a convenient "one-stop" location, to encourage drop-off of wastes by residents.

Table 9 shows preliminary construction costs in each community. The EnVironmental Operation Stations would be designed as 20' by 20' building modules which could be duplicated or expanded without detailed design. Although the design of the EnVironmental Operation Stations would vary slightly in each community (e.g., each community would determine eave height, roofing cover, and roof pitch), the basic design and look of the Stations would be similar to enable residents of the Sound to use the Stations in each of the communities.

Project Cost

Capital Costs $580,000
Capital Assets (land) $150,000
Annual Costs $75,000

The total capital cost of this project excluding land value, is estimated to be $580,000. The breakout of costs by communities is as follows:

Chenega Bay	$40,000
Tatitlek	$40,000
Cordova	$200,000
Valdez	$200,000
Whittier	$100,000

Cost estimates include materials, shipping, and construction. The costs for each community differs depending on the facilities already existing in the community (e.g., the villages recently constructed household hazardous waste stations) and on the volume of wastes generated (which determines the number and design of necessary structures). The costs will vary from approximately $50.00 to $200.00 per square foot, mostly due to anticipated code interpretations.

Funding Sources. A proposal will be submitted to the Exxon Valdez Oil Spill Trustee Council for the capital costs listed above. Communities, however, will provide match in the form of land at a value of $150,000 (Cordova: $90,000, Whittier: $35,000, Valdez: $20,000, and $2,500 each in Tatitlek and Chenega Bay) and annual operation and maintenance of the stations at a value of $75,000 (Cordova: $40,000, Valdez: $22,000, Whittier: $6,000, and $3,000 each in Chenega Bay and Tatitlek).

Project Implementation. Preliminary scoping designs for the stations have been developed. Final engineering designs will be developed during 1996. If funding is obtained, the stations would be constructed in the summer of 1997.

Project Benefits. The EnVironmental Operation Stations will:

- minimize operational costs of waste management by centralizing operations;
- maximize public participation, by offering a convenient and user-friendly "one stop" service; and
- reduce the potential for environmental contamination, by assuring safe waste management.

TABLE 9: ENVIRONMENTAL OPERATION STATIONS [1]

Location	Recycle	Used Oil	HHW [2]	TOTAL
CHENEGA BAY				
# of modules	1	1		2
Cost	$20,000	$20,000		$40,000
TATITLEK				
# of modules	1	1		2
Cost	$20,000	$20,000		$40,000
WHITTIER				
# of modules		1		1
Cost	$20,000 [3]	$80,000		$100,000
CORDOVA				
# of modules	2	1	1	4
Cost	$40,000	$80,000	$80,000	$200,000
VALDEZ				
# of modules	2	1	1	4
Cost	$40,000	$80,000	$80,000	$200,000
$$ TOTAL	$140,000	$280,000	$160,000	$580,000
MODULE TOTAL	6	5	2	13

[1] Cost estimate based on $50/sf minimum, $200/sf maximum. Cost estimates are for modules each measuring 20'x20'. Cost estimates variable mostly due to anticipated code interpretations.

[2] Chenega Bay and Tatitlek will have HHW storage depots beginning in 1996. Whittier will hold an annual HHW collection event, but will ship the HHW for disposal at the end of the event and therefore will not need an EVOS station to store the waste.

[3] Whittier will use three separate recycling collection dumpsters (at $7000) instead of a central collection station.

Recommendation #5: Solid Waste Disposal Sites and Methods

Project Description. Communities should initiate a dialogue with their city/village councils and the general public to determine how best to manage municipal solid waste over the long term. Most communities are facing this decision with some urgency, either due to lack of compliance with regulations or upcoming expiration of their current disposal permits in the near term (for which they may not be able to be repermitted at the current sites).

As a foundation on which to build the decision-making process, the Sound Waste Management Plan identifies and analyzes a wide range of solid waste options:

- seven options are assessed for each community—ranging from the current disposal system, to constructing a regional disposal facility, to shipping solid waste out of state;
- capital and annual costs of the options are estimated; and
- two to three options are recommended most highly for each community on the basis of cost.[6]

Costs of Options. To provide a full perspective on the estimated costs of the disposal options, costs are assessed in three different ways:

- **total costs** over the life of the disposal option (a twenty year planning horizon was used)[7];
- **annualized costs**, which is what the option would cost if it were paid for in equal annual payments over the life of the project; and
- **cost per ton**, which divides the annualized costs by the tons of solid waste generated annually.

The range of costs for each community is summarized below. The range shows the lowest cost and the highest cost disposal option analyzed for each community.

Range of Costs for Solid Waste Disposal Options

	Cordova	Valdez	Chenega and Tatitlek
Total Costs	$3-7 million	$6-13 million	$300,000-600,000
Annualized Costs	$250,000-700,000	$550,000-$1.2 million	$30,000-60,000
Costs Per Ton	$110-305	$95-220	$300-600

[6] Solid waste disposal cost estimates were not developed for Whittier, because the city recently made the long-term decision to privatize its solid waste collection and to dispose of its solid waste at the Anchorage landfill.

[7] All costs are expressed in present value terms, using 1995 dollars and an 8% discount rate. Calculating the present value (discounting) is the standard method for expressing a set of costs (e.g., various amounts of capital and annual costs of occurring at different times over the life of the project) to a single figure to enable comparison among options. In other words, the calculation of present value takes explicit account of the timing of costs and benefits. The total cost (present value) of the options estimates the total amount the option would cost if it were all paid for today, all at once. The annualized cost of the options is the same amount expressed in terms of annual equivalent payments spread out over the 20 year life of the project; it has the same present value as the total cost figure. (Note that multiplying the annualized figure by the number of years—20—will not equal the total estimated costs because of the discounting procedure described above.)

Tables 10 - 15 on the following pages show the estimated costs for each of the seven options in each community. (The supporting information used to develop the cost estimates is contained in Appendix E.) As shown on the following tables, all communities will have to pay more than they are currently paying in order to come into compliance with regulations, meet the conditions of their permit, or generally improve their waste management practices. A brief description of the information contained in the tables is provided below.

Cordova and Valdez. Estimated solid waste management costs for Cordova are shown in Tables 10 and 11 and estimated costs for Valdez are shown in Tables 12 and 13. Solid waste management costs are comprised of waste collection costs and waste disposal costs.[8] The first table for each community shows the costs of each of the seven options in terms of both total estimated costs over a twenty year period and the annual per ton costs. The options which are most preferable in terms of cost are highlighted on the table. In Cordova the preferred options are vertical expansion of the existing balefill; construction of a balefill at 17 mile (with no liner); and shipping waste to Glennallen. In Valdez the preferred options are: vertical expansion of the existing balefill and shipping the waste to Glennallen. The second table for each community provides information on the preferred options, including listing advantages and disadvantages of each preferred option.

Tatitlek and Chenega Bay. Estimated solid waste disposal costs for Tatitlek and Chenega Bay are shown in Tables 14 and 15. (Collection costs are not shown because residents are responsible for hauling their solid waste to the landfill.) Table 14 shows both the total costs of the options over a twenty-year period and the annual cost per ton of each option. Preferred options are highlighted and are interrelated: 1) bringing the existing landfill into compliance with regulations (e.g., including covering and fencing the existing site); and 2) operate the site in the future in compliance with regulations (e.g., through proper maintenance of the landfill).

Table 15 shows additional information on the villages' preferred options. In particular, costs are broken out in terms of the labor and materials that the villages are able to contribute towards funding the options and the amount of funding which will be needed from outside sources. In addition, the costs for operating the landfill in compliance in the future are shown in terms of the dollars needed for operation and maintenance over the next five years only (rather than the full twenty year period) to minimize the amount of funding which the villages must secure in the near term.

Funding Sources. Valdez will continue to fund the operation of their solid waste management systems. Cordova will pursue funding from the Legislature (primarily from the recent Cordova Road Settlement monies) to supplement community funding. Tatitlek and Chenega Bay will pursue state and federal grants to fund a portion of the capital costs needed to implement their preferred option.

Project Implementation. During the first half of 1996, community representatives plan to hold workshops and make presentations to their city/village councils and the broader community to determine their long-term solid waste systems.

Project Benefits. Initiating a decision-making process for solid waste disposal issues will ensure:

- a proactive, rather than crisis-driven approach to solid waste management;
- increased compliance with regulations; and
- that the best decision for the community and the environment is reached.

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[8] Recycling costs are not included here but are included under recommendation #3.

TABLE 10: COSTS OF SOLID WASTE MANAGEMENT OPTIONS
CORDOVA

☐ = *preferred MSW management option*

TOTAL COSTS (present value) [1]	OPTION 1: Vertical Expansion of Balefill	OPTION 2A: Construct Balefill at 17 Mile (w/liner)	OPTION 2B: Construct balefill at 17 Mile (no liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$2,747,000**	**$5,325,000**	**$4,173,000**	**$6,120,000 - 6,438,000**	**$7,084,000 - 7,509,000**	**$7,258,000**	**$6,827,000**	**$7,209,000**	**$6,769,000**
Collection	$1,547,000 (same cost for all options)								
TOTAL	$4,294,000	$6,872,000	$5,720,000	$7,667,000 7,985,000	$8,631,000 - $9,056,000	$8,805,000	$8,374,000	$8,756,000	$8,316,000

ANNUAL COSTS/TON [2] **(1995 dollars)**	OPTION 1: Vertical Expansion of Balefill	OPTION 2A: Construct Balefill at 17 Mile (w/liner)	OPTION 2B: Construct balefill at 17 Mile (no liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$112**	**$217**	**$170**	**$249 - 262**	**$288 - 306**	**$295**	**$277**	**$293**	**$276**
Collection	$63 (same cost across all options)								
TOTAL	$175	$280	$233	$312 - 325	$351 - 369	$358	$340	$356	$339

[1] Present value calculations are in 1995 $s and are based on an 8% discount rate and 20-year timeframe.
[2] Cost per ton estimates are based on 1994 solid waste generation of 2317 tons.

TABLE 11: COMPARISON OF LEADING SOLID WASTE MANAGEMENT OPTIONS [1]

CORDOVA

OPTION 1: Vertical Expansion of Balefill – no modifications

Estimated Costs of Disposal *(collection not included)*	Total Costs (present value) [2]	$2,750,000
	Annualized Costs (present value) [2]	$260,000
	Annual Cost/Ton (present value) [3]	$112
Advantages	· permit in place · socio status quo · proximity to users	
Disadvantages	· uncertainty of permit extension · potential groundwater contamination, stream intrusion, and seismic upset	

OPTION 2B: Construct Local Landfill at 17 Mile – without liner

Estimated Costs of Disposal *(collection not included)*	Total Costs (present value) [2]	$4,170,000
	Annualized Costs (present value) [2]	$390,000
	Annual Cost/Ton (present value) [3]	$170
Advantages	· encourages recycling · protected from stream intrusion	
Disadvantages	· potential groundwater contamination and seismic upset · distance from town	

OPTION 3: Regional Landfill - Glennallen [4]

Estimated Costs of Disposal *(collection not included)*	Total Costs (present value) [2]	$6,120,000 - $6,440,000
	Annualized Costs (present value) [2]	$580,000 - $610,000
	Annual Cost/Ton (present value) [3]	$249 - $262
Advantages	· little or no potential for groundwater contamination · seismic damage of no consequence · high incentive to recycle to minimize transport and disposal costs · minimal environmental risk · ease of management	
Disadvantages	· lack of direct control	

1 These costs are for disposal only, because collection costs are the same for all options.

2 Present value calculations are in 1995 dollars, and are based on 8% discount rate and 20-year planning horizon. Figures rounded to the nearest $10,000.

3 Based on 1994 annual disposal rate of 2,317 tons.

4 The range of costs is based on a high and low estimate of transportation costs from Cordova to Glennallen.

TABLE 12: COSTS OF SOLID WASTE MANAGEMENT OPTIONS
VALDEZ

☐ = *preferred MSW management option*

TOTAL COSTS (present value) [1] OVER 20 YEARS	OPTION 1A: Vert. Expansion of Balefill (no modifications)	OPTION 1B: Vert. Expansion of Balefill (cut-off wall)	OPTION 2: Lateral Expansion of Balefill (w/liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$5,900,000**	**$8,836,000**	**$10,190,000**	**$7,869,000 - 8,664,000**	**$10,182,000 - 11,242,000**	**$9,332,000**	**$8,253,000**	**$13,563,000**	**$12,567,000**
Collection	----------	----------	----------	$2,358,000 (same cost for all options)					
TOTAL	$8,258,000	$11,194,000	$12,548,000	*$10,227,000 11,022,000*	*$12,540,000 - 13,600,000*	$11,690,000	$10,611,000	$15,921,000	$14,925,000

ANNUAL COSTS/TON [2] (1995 dollars)	OPTION 1A: Vert. Expansion of Balefill (no modifications)	OPTION 1B: Vert. Expansion of Balefill (cut-off wall)	OPTION 2: Lateral Expansion of Balefill (w/liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$97**	**$144**	**$180**	**$128 - 141**	**$166 - 184**	**$152**	**$135**	**$221**	**$205**
Collection	----------	----------	----------	$39 (same cost across all options)					
TOTAL	$136	$183	$219	$167 - $180	$205 - $223	$191	$174	$260	$244

[1] Present value calculations are in 1995 $s and are based on an 8% discount rate and 20-year timeframe.
Cost per ton estimates are based on 1994 solid waste generation of 5776 tons.

TABLE 13: COMPARISON OF LEADING SOLID WASTE MANAGEMENT OPTIONS [1]
VALDEZ

OPTION 1A: Vertical Expansion of Balefill – no modifications

Estimated Costs of Disposal *(collection not included)*	Total Costs (present value) [2]	$5,960,000
	Annualized Costs (present value) [2]	$560,000
	Annual Cost/Ton (present value) [3]	$97
Advantages	· permit in place · socio status quo · proximity to users	
Disadvantages	· uncertainty of permit extension · potential groundwater contamination, stream intrusion, and seismic upset	

OPTION 3: Regional Landfill - Glennallen [4]

Estimated Costs of Disposal *(collection not included)*	Total Costs (present value) [2]	$7,870,000 - $8,660,000
	Annualized Costs (present value) [2]	$740,000 - $820,000
	Annual Cost/Ton (present value) [3]	$128 - $141
Advantages	· little or no potential for groundwater contamination · seismic damage of no consequence · strong incentive to recycle to minimize transport disposal costs · minimal environmental risk · ease of management	
Disadvantages	· lack of direct control	

[1] These costs are for disposal only because collection costs are the same for all options.
[2] Present value calculations are in 1995 dollars, and are based on 8% discount rate and 20-year planning horizon. Figures rounded to the nearest $10,000.
[3] Based on 1994 annual disposal rate of 5,776 tons.
[4] The range of costs is based on a high and low estimate of transportation costs from Valdez to Glennall

TABLE 14: COST OF SOLID WASTE MANAGEMENT OPTIONS [1]
TATITLEK AND CHENEGA BAY

☐ = *preferred MSW management option*

TOTAL COSTS (present value) [1]		OPTION 1: Cost to Bring Landfill into	OPTION 2: Operate Existing Landfill in	OPTION 3: Ship to Glennallen	OPTION 4: Regional Landfill:	OPTION 5: Incineration	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Capital Costs	***($)***	N/A	$223,000	$80,000	$105,000	$180,000	$80,000	$80,000
Annual O&M Costs	***($/yr)***	N/A	$9,500	$29,000	$31,000	$42,000	$35,000	$33,000
Total Present Value [2] of Costs (over 20 yrs)	***($)***	Ch Bay: $154,000 Tatitlek: $236,000	$321,000	$369,000	$608,000	$577,000	$617,000	$601,000
Annualized Cost (present value)	***($)***	N/A	$30,000	$35,000	$58,000	$54,000	$59,000	$57,000
Annual Cost/Ton (present value) [3]	***($)***	N/A	$303	$352	$578	$544	$586	$571

[1] Collection costs are not included in these figures, because residents self-haul wastes to the landfill.
[2] Present value calculations are in 1995 dollars and based on an 8% discount rate and a 20-year time frame.
[3] Annual cost per ton is based on an annual disposal rate of 100 tons in each village.

TABLE 15: COST OF RECOMMENDED OPTIONS TATITLEK AND CHENEGA BAY

Cost to Bring Existing Landfill into Compliance with Regulations [1]

	Tatitlek	Chenega Bay
Total Cost	**$236,000**	**$154,000**
Village In-Kind Contribution	$65,000	$42,000
Total Cost to be Raised from Outside Funding Sources	$171,000	$112,000

Cost to Operate Existing Landfill in Compliance with Regulations [2]

CAPITAL COSTS:	Tatitlek	Chenega Bay
Total Capital Cost [3]	**$85,000**	**$85,000**
Village In-Kind Contribution	$3,000	$3,000
Total Cost to be Raised from Outside Funding Sources	$82,000	$82,000
ANNUAL COSTS:	**Tatitlek**	**Chenega Bay**
Total Annual Cost	**$9,500**	**$9,500**
Village In-Kind Contribution [4]	$2,000	$2,000
Monthly Cost/Household Required to Pay for Annual Cost [5]	$18	$25

[1] This option would put cover material and a geomembrane over the existing site and fence the entire perimeter. In Chenega, the stream would be diverted around the landfill. The cost includes funding to hire a contractor to perform this work, and would be completed within one year.

[2] This option includes capital costs to purchase equipment and vehicles to maintain the landfill and annual costs to hire .25 FTE to maintain the landfill (e.g., to apply regular cover). Additional information on these costs is included in Appendix E.

[3] These costs are the totals needed for the first five years of operation.

[4] This is for materials needed each year to cover the landfill.

[5] This figure is based on dividing the annual labor costs ($7,500) by 25 households in Chenega and 35 households in Tatitlek, respectively.

IV. CONCLUSION

By creating the Sound Waste Management Plan, communities have chosen a proactive approach to environmental management. The Plan shapes the future of waste management practices in the communities through development of creative and cost-effective solutions to a wide range of environmental management problems.

The Sound Waste Management Plan demonstrates the dedication of communities to significantly improving their waste management practices. The Sound Waste Management Plan recommendations have been endorsed by local councils, and will involve communities' providing a substantial amount of capital and staff resources to implement the Plan.

The Sound Waste Management Plan is the culmination of a steady series of improvements which communities have been making in their waste management practices over the past two years. These include scrap metal recycling in Cordova and Valdez, improved solid waste disposal site maintenance in Tatitlek, and privatization of waste disposal and increased recycling in schools in Whittier. As a result of several solid waste management improvements in Valdez, the Department of Environmental Conservation recently extended the City's landfill disposal permit.

Many more improvements will be made as the Sound Waste Management Plan is implemented. Improved and comprehensive used oil management, solid waste recycling and disposal, and household hazardous waste management—all critical to preventing land and marine pollution - will be implemented under the Plan. The Plan has demonstrated the ability of the region to successfully work in concert with state and federal agencies; some of the Plan's recommendations will be implemented with technical and/or funding assistance from state and federal agencies. Development of the Plan itself would not have been possible without funding from the *Exxon Valdez* Oil Spill Trustee Council.

One of the most important benefits of the collaborative planning process has been the improved communication and working relationship among Prince William Sound communities. As one community member put it, "the Sound Waste Management Plan process has helped to heal the wounds created by the oil spill." Prince William Sound communities plan to continue to build mutual understanding and create positive waste management solutions by continuing to work together in the future.

ATTACHMENT A
Council Resolution
Endorsing the Plan

expected to be signed by April 30, 1996

A RESOLUTION OF THE COMMUNITIES OF PRINCE WILLIAM SOUND
SUPPORTING THE SOUND WASTE MANAGEMENT PLAN (SWMP)
AND COMMITTEE RECOMMENDATIONS

WHEREAS, the communities of Prince William Sound including Chenega Bay, Cordova, Tatitlek, Whittier, and Valdez have worked cooperatively with the Alaska Department of Environmental Conservation on the Sound Waste Management Plan (SWMP); and

WHEREAS, the Sound Waste Management Plan (SWMP) was developed through a regional planning process coordinated by the Prince William Sound Economic Development Council, funded by the *Exxon Valdez* Oil Spill Trustee Council; and

WHEREAS, these communities have problems identified in the Sound Waste Management Plan including used oil, bilge water, household hazardous waste, solid waste recycling, and solid waste disposal; and

WHEREAS, the Sound Waste Management Plan was developed to find solutions to these and other environmental management problems in the communities in order to prevent environmental contamination, safeguard public health, and promote economic development; and

WHEREAS, the Sound Waste Management Plan recommends the following five major improvements in waste management practices: 1. Create a comprehensive used oil management system in each community; 2. Establish a regional household hazardous waste collection and training program; 3. Institute community-sponsored drop-off recycling programs for cardboard and aluminum; 4. Construct EnVironmental Operation Stations in each community; and
5. Determine how and where municipal solid waste will be disposed of over the long term; and

WHEREAS, the implementation of the five recommendations will significantly and cost-effectively improve the way waste is managed within Prince William Sound communities; and

THEREFORE BE IT RESOLVED, that the communities of Prince William Sound endorse and commit to the extent possible the implementation of the Sound Waste Management Plan (SWMP).

Mayor Margy Johnson
City of Cordova

Pete Kompkoff, President
Chenega Bay IRA Tribal Council

Gary Kompkoff, President
Tatitlek IRA Tribal Council

Mayor John Harris
City of Valdez

Mayor Ben Butler
City of Whittier

ATTACHMENT B
Regional Partnership Agreement Between the Communities and the Alaska Department of Environmental Conservation

Regional Partnership Agreement on Household Hazardous Waste

between

Chenega Bay, Cordova, Tatitlek, Valdez, and Whittier

and

the Alaska Department of Environmental Conservation

I. PURPOSE STATEMENT

The Alaska Department of Environmental Conservation (DEC) and the Prince William Sound communities of Chenega Bay, Cordova, Tatitlek, Valdez, and Whittier are committed to working together to better manage solid waste and marine pollution in Prince William Sound. This agreement establishes the common goal among the signatories of creating a regional household hazardous waste program in Prince William Sound and commits the signatories to specific roles and responsibilities to accomplish that goal.

Household hazardous waste consists of paints, lead-acid batteries, solvents, and other household materials that contain hazardous constituents. These wastes should not be disposed of in community landfills because of their potential to harm human health and the environment, including the increased possibility of fires, the release of toxic fumes, and contamination of ground water and surface water. The Prince William Sound Household Hazardous Waste Program created by this agreement will ensure that these wastes are managed safely.

II. DEC AND COMMUNITY CONTACT PERSONS

The DEC contact for this agreement is the Director of the Division of Statewide Public Service. The contact for the Prince William Sound communities is the Executive Director of the Prince William Sound Economic Development Council.

III. CHANGES TO THE AGREEMENT

The signatories will review this regional agreement at the end of one year to determine whether it will be extended for an additional year. It may be amended in the future to include environmental management issues other than household hazardous waste. This agreement is a mechanism for working cooperatively to solve local environmental problems, and is not an enforcement document.

IV. EFFECTIVE DATE OF AGREEMENT

This agreement is effective upon signing.

V. OVERVIEW OF THE REGIONAL PROGRAM

This agreement establishes a regional household hazardous waste program in Prince William Sound. While household hazardous waste is the primary focus of this agreement, used oil management and solid waste recycling, particularly in Tatitlek and Chenega Bay, are also addressed within the framework of the regional household hazardous waste program. The Prince William Sound Household Hazardous Waste program is comprised of three major components: training, planning and administration, and collection. Each of these components is elaborated on in the following sections.

VI. TRAINING

Overview: One of the primary goals of the regional program is to minimize the costs to communities of household hazardous waste (HHW) management. Training local personnel in how to identify, sort, and package HHW will reduce the communities' need for contractual assistance in performing these services. Local personnel must receive special training to perform these activities, which is comprised of three components: 1) 40-hour classroom HAZWOPER training (as identified in 29 CFR 1910.120); 2) 24-hour field training; and 3) an 8-hour classroom refresher course each year after the initial training. Based on this training, local personnel are eligible to receive certification as "hazardous waste site workers".

A. Role of DEC

1. Provide 24-hour field training during the collection events to local personnel who are assisting at the events.

2. Provide one 8-hour refresher training course in the program's first year; this training will be a part of the 24-hour field training.

B. Role of Community

1. Obtain the 40-hour classroom HAZWOPER training for one or more community personnel. This will include funding the tuition, per diem, and travel costs of staff to attend the training. Communities will determine the number of staff for whom they are able to provide the training. Communities may also seek funding for these costs from outside sources.

2. Identify training participants and provide a roster of the participants to DEC for the 24-hour field and 8-hour refresher training.

VII. PLANNING AND ADMINISTRATION

Overview: DEC will be responsible for planning and coordinating the inter-community or regional aspects of the program, while each community will be responsible for planning and administering activities that take place within that community. Planning and administrative tasks include scheduling HHW collection events in the communities; developing, executing, and administering a regional contract for professional HHW disposal and on-site collection services; and identifying the roles of the communities, state agencies, and the contractor.

A. Role of DEC

1. Assist the Prince William Sound Economic Development Council (PWSEDC) in scheduling the dates of the HHW collection events in the communities. Collection events will take place in the same general timeframe to enable coordination of transportation and other activities, thereby minimizing overall program costs. DEC will also ensure that the schedule arranged for Prince William Sound communities does not interfere with the schedule of collection events in Southeast Alaska, since equipment will be shared between the regions.

2. Assist the communities and PWSEDC with developing and executing a regional contract for professional HHW collection and disposal services.

3. Provide guidance on planning for the collection event within the communities.

B. Role of Community

1. Arrange for the location of the HHW collection event within the community.

2. Provide and set up the non-technical equipment (e.g., tables, signage, etc.) necessary for the collection event.

3. Advertise the event through a variety of local venues (e.g., newspaper, radio, etc.)

4. The villages will coordinate with Chugachmuit to ensure that the HHW activities under this agreement complement the HHW activities underway by Chugachmuit.

5. Provide year-round public education on the use of non-hazardous household products and safe management of household hazardous waste.

VIII. COLLECTION EVENT

Overview: One time each year, an HHW Collection Day will be held in each community, during which HHW will be collected, sorted, packaged, and manifested for shipment.[1] These activities will be overseen by a professional HHW contractor, with assistance from DEC and trained local personnel. The Southeast Conference/DEC "Wastemobile", which is a van and trailer containing laboratory and safety equipment to be used at the event, will be transported on the Alaska Marine Highway System to Cordova, Valdez, and Whittier and, if feasible, to Tatitlek and Chenega Bay. After the event, the HHW will be recycled or shipped on a private/commercial carrier to a regulated hazardous waste disposal site. Communities will recycle the collected materials (e.g., used oil, batteries) whenever possible.

A. Role of DEC

1. Arrange for the transport, on-loading, and off-loading of the Wastemobile on the Alaska Marine Highway System.

2. Provide at least one DEC staff person per collection event to assist with collection, sorting, and packaging of the waste, and to provide field training to community personnel. In Tatitlek and Chenega Bay, DEC will oversee the packaging of the HHW for transport to a larger community for final disposal. Appendix A lists the on-site activities for which DEC will assume primary responsibility. It is anticipated that DEC staff will spend one to three days in each community to allow for mobilization, holding the collection event, and breakdown time.

3. While in the villages, assist with providing general technical assistance on environmental issues (e.g., used oil management, solid waste management) as needed.

4. Help ensure that the most economical and environmentally beneficial way to recycle/dispose of the HHW is achieved.

5. During the collection event, DEC will provide educational information as feasible to event participants on the use of non-hazardous household products and safe management of household hazardous waste.

HHW will be collected during the event through residential drop-off of their HHW at the collection site(s) and/or through collecting HHW from a storage depot, where the community may have been accepting HHW from residents over the course of the year. Tatitlek and Chenega Bay will both have HHW storage depots starting in 1996.

B. Role of Community

1. In Cordova, Valdez, and Whittier pay the expenses associated with hiring a contractor to oversee the collection, packaging, and shipment of the HHW. In Tatitlek and Chenega Bay, DEC will oversee HHW packaging.

2. Provide trained personnel to assist at the collection event. Attachment A identifies the type of activities for which community personnel will be responsible at the event.

3. Recycle or reuse appropriate materials collected at the events to minimize program costs (e.g., used oil, batteries, scrap metal, etc.). Recycling or reuse of the materials may occur within each community or, in the case of the villages, materials may be shipped to a larger community for recycling.

4. Cordova, Valdez, and Whittier will accept cardboard and aluminum cans from the villages at no charge. Additionally, Valdez will accept lead-acid batteries from other Prince William Sound communities at no charge. Other materials may also be accepted at no charge if Valdez, Cordova, or Whittier can make use of them; these materials will be determined on a case by case basis. The communities will seek additional ways to work together to minimize program costs.

5. Pay the expenses associated with shipping the HHW and disposing of it at a regulated disposal site.

6. Clean up the collection area (e.g., of litter, etc.) after the event is completed.

C. Role of Alaska Marine Highway System

1. Fund the transport of the wastemobile at a reduced rate to and from Whittier, Cordova, and Valdez, and up to two DEC personnel to accompany the vehicle.

2. Work with DEC and the villages to determine if transport of the wastemobile to and from Tatitlek and Chenega Bay one time per year is feasible.

Regional Partnership Agreement on Household Hazardous Waste

between

Chenega Bay, Cordova, Tatitlek, Valdez, and Whittier

and

the Alaska Department of Environmental Conservation

SIGNATORIES:

Donald P. Kompkoff, President
Chenega Bay IRA Village Council

Scott Janke, City Manager
City of Cordova

Gary Kompkoff, President
Tatitlek IRA Village Council

Phil Hubbard, City Manager
City of Valdez

David Morgan, Acting City Manager
City of Whittier

Marianne See
Director of Statewide Public Service
Alaska Department of Environmental Conservation

Michele Brown, Commissioner
Alaska Department of Environmental Conservation

Gary Heyden, Director
Alaska Marine Highway

Paul Roetman, Executive Director
Prince William Sound Economic
Development Council

ATTACHMENT A

PROPOSED OPERATIONAL ROLES AND RESPONSIBILITIES IN REGIONAL HOUSEHOLD HAZARDOUS WASTE MANAGEMENT

HHW System Elements	Activities	Responsibilities		
		Community	ADEC	Contractor
Waste Collection/ Packaging	Scheduling of Events	Assist	Lead	
	Site Selection	Lead	Assist	
	Public Information	Lead		
	Mobilization			
	· Mobile lab	Assist	Lead	
	· Shipping Drums/conex	Assist	Assist	Lead
	Site Set-Up			
	· Emergency planning	Assist	Lead	
	· Traffic control	Lead		
	· Solid waste disposal	Lead		
	Collection Event			
	· Profiling wastes	Assist	Assist	Lead
	· Waste ID and chemical analysis		Assist	Lead
	· Handling of wastes	Assist	Assist	Lead
	· Consolidation of wastes		Assist	Lead
	· Record keeping	Assist	Lead	
	· Annual generator report			Lead
	Demobilization			
	· Lab demobilization		Lead	
	· Site clean-up	Lead		
Waste Shipment	Preparing Manifest/Packing Lists			Lead
	Signing Manifest		Lead	
	Packing Conex			Lead
	Forklift Services	Lead		
	Placarding			Lead
	DOT/USCG Approval	Assist		Lead
Waste Disposal	HHW Disposal Arrangements			Lead
	Recycling of Selected Materials (used oil, batteries)	Lead		

SOUND WASTE MANAGEMENT PLAN

TECHNICAL APPENDIX

CHENEGA BAY

CORDOVA

TATITLEK

VALDEZ

WHITTIER

Working together to better manage solid waste and prevent marine pollution

Prepared for the Communities of Chenega Bay, Cordova, Tatitlek, Valdez and Whittier by the Prince William Sound Economic Development Council. February 1996

APPENDIX A
Individual Local Council Resolutions

DRAFT

CITY OF CORDOVA
PLANNING AND ZONING COMMISSION
RESOLUTION 96-07

A RESOLUTION OF THE PLANNING AND ZONING COMMISSION OF THE CITY OF CORDOVA, ALASKA RECOMMENDING THAT THE 17 MILE COPPER RIVER HIGHWAY LOCATION BE SELECTED AS THE SITE OF THE NEW LANDFILL.

WHEREAS, The current landfill permit expires in approximately two years and can not be renewed at the current location ; and

WHEREAS, During the last twenty years three engineering studies have concluded that the 17 mile Copper River Highway location is the best location for the next landfill; and

WHEREAS, The recently completed Ross and Associates "Prince William Sound Solid Waste Management Plan" found that the 17 mile CRH location is the best alternative location based on economics for the new Cordova landfill; and

WHEREAS, The City selected 60 acres of land at the 17 mile CRH location as part of its land entitlement under the provisions of 14(c)(3); and

NOW THEREFORE, BE IT RESOLVED that the Planning and Zoning Commission recommends that the City Council approves the selection of the 17 mile Copper River Highway location for the development of a new landfill.

BE IT FURTHER RESOLVED that the Planning and Zoning Commission urges the City Council to request $400,000 in funding from the settlement of the Copper River Highway lawsuit as partial funding for the development of the 17 mile Copper River Highway landfill.

PASSED and APPROVED, THIS _____ DAY of March, 1996

_____
Chairperson

Attest: _____
Recording Secretary

City of Valdez, Alaska
Resolution No. 95-___

WHEREAS, the City of Valdez has worked cooperatively with the City of Cordova, City of Whitter, Village of Chenega and Village of Tatitlek on the Sound Waste Management Program (SWMP); and

WHEREAS, the communities involved in the SWMP were successful in getting the Exxon Valdez Oil Spill (EVOS) trustees to fund the SWMP proposal in 1995; and

WHEREAS, all of the communities have problems that have been identified during the SWMP. Universal problems include in municipal solid waste, used oil, oily waste, household hazardous waste; and

WHEREAS, All the communities participating in the SWMP could use additional equipment and space to centralize the collection of waste oil, oily waste, household hazardous waste, and recyclable material; and

WHEREAS, The city of Valdez would like to consolidate all waste handling at the Baler Facility with other collection stations around town to allow ease of participation by the citizens; and

WHEREAS, the SWMP members have developed a proposal to construct a EnVironmental Operations Station in each of the communities; and

WHEREAS, The SWMP members have worked with EVOS to submit a proposal to the EVOS trustees for funding of the EnVironmental Operations Station; and

WHEREAS, EVOS has asked for a resolution of support for the proposal and a commitment to operate the EnVironmental Operations Station after it is completed; and

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF VALDEZ, ALASKA, THAT the Valdez City Council of the City of Valdez encourage EVOS to fund the Environmental Operation Station to help improve the waste management practices through out the sound.

AND FURTHERMORE BE IT RESOLVED THAT the City of Valdez will take ownership and operate the facility in the future.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF VALDEZ, ALASKA, this 20th day of February, 1996.

CITY OF VALDEZ, ALASKA

CITY OF WHITTIER, ALASKA
RESOLUTION 453-96

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF WHITTIER, ALASKA, APPROVING THE PARTICIPATION IN THE PRINCE WILLIAM SOUND ECONOMIC DEVELOPMENT COUNCIL, SOLID WASTE MANAGEMENT PLAN WITH A COMMITMENT TO PROVIDE FUNDING FOR THE DESIGN OF THE STATION AND TO PROVIDE FUNDING FOR THE HOUSEHOLD HAZARDOUS WASTE (H.H.W.) COLLECTION EVENT PLANNED FOR THE FALL OF 1996.

Whereas, the community desires to participate in the PWSEDC, SWM Plan; and

Whereas, it is in the public interest to improve solid waste management in the community and surrounding harbor area; and

Whereas,the Whittier Small Boat Harbor costs are funded by the Whittier Small Boat Harbor Fund for it's share and the City of Whittier costs are to be funded by the City of Whittier General Fund for it's share; and

NOW THEREFORE, the City Council of the City of Whittier hereby Resolves that:

Section 1. The City Manager is hereby authorized to enter into a cooperative agreement with the Whittier Small Boat Harbor and other entities in establishing funding for a solid waste management plan.

Section 2. This resolution shall take effect immediately upon its adoption.

PASSED AND APPROVED by a duly constituted quorum of the Whittier City Council on this 19th day of February, 1996.

ATTEST:

Ben Butler
Ben Butler, Mayor

Michelle Swarthout
MiChelle Swarthout, City Clerk

AYES:	**7**
NOES:	**0**
ABSENT:	**0**
ABSTAIN:	**0**

453-96.RES

APPENDIX B
Waste Management Inventory

INVENTORY OF POLLUTION SOURCES AND PROBLEMS IN PRINCE WILLIAM SOUND

Prepared for

PWSEDC SOLID WASTE COMMITTEE

FEBRUARY 29, 1996

Prepared by

ROSS & ASSOCIATES
ENVIRONMENTAL CONSULTING, LTD.

1218 Third Avenue, Suite 1207
Seattle, Washington 98101

(206) 447-1805
Fax (206) 447-0956

Inventory of Pollution Sources and Problems in Prince William Sound

BACKGROUND

The Sound Waste Management Project is a cooperative, multi-community project designed to reduce pollution entering Prince William Sound. A wide variety of waste streams are generated in each of the communities on an on-going basis that may affect the Sound. These include used oil, municipal solid waste, fish wastes, sewage effluent, and stormwater runoff. The goal of the project is to develop and implement appropriate solutions to the most pressing waste management problems in each of the five communities and in the region as a whole.

This waste stream inventory represents the completion of the first step in the Sound Waste Management Project. The purpose of the inventory is to provide each of the communities participating in the Sound Waste Management Project - Valdez, Cordova, Whittier, Tatitlek, and Chenega - with baseline information on their pollution sources and problems. This information will form the basis for developing appropriate solutions in subsequent stages of the project.

This inventory provides information on approximately 30 different waste streams. For each waste stream, the inventory describes the amount of waste generated, current management practices, any known adverse environmental impacts, and any expected changes in generation or management of the waste stream. Information for the inventory was obtained through site visits to each of the communities and by reviewing existing reports and records.

The inventory is divided into a "key findings" section that provides an overview of the waste stream sources and problems in the region as a whole and into sections on each individual community. A series of figures is included to highlight relevant information.

Section 1: Key Findings

Pollution Sources and Waste Streams

A wide variety of sources - households, businesses, government agencies, and industry - generate waste streams that could adversely affect Prince William Sound. Most types of wastes generated in coastal communities have the potential to reach coastal waters. Waste may be directly discharged into the Sound (by industries such as Alyeska or fish processors which are permitted by the state to treat and then discharge their waste in accordance with environmental regulatory standards), or waste may migrate into the Sound (e.g., contaminants may leach out of a landfill built in a tidal zone or higher water table, or loose garbage may blow into the Sound).

Each of these sources differs in terms of the types and amounts of waste generated and how the wastes are currently managed to minimize impacts to public health and the environment. The major waste streams and sources in Prince William Sound are identified in Figures 1A and B.

Figure 1A: Major Waste Streams and Sources

Waste Streams	Sources
Solid Waste Facilities . windblown garbage . leachate (potential)	All sources, including households, businesses, government agencies.
Sewage Treatment/Septic Tank Systems . wastewater effluent . sludge	All sources

Waste Streams	Sources
Continued	
Harbor Wastes . used oil . oily wastes (sorbents, etc.) . oily bilge water . fish carcasses . sewage . painting wastes . scrap metal	Vessels, sports-fish cleaning, boat repair
Commercial Fish Processors . process water . sewage . fish carcasses . used oil . oily wastes	St. Elias Ocean Products (Cordova) Silver Lining Seafoods (Cordova) North Pacific Processors (Cordova) Great Pacific Seafoods (Whittier) Peter Pan Seafoods (Valdez) Nautilus Seafoods (Valdez) Sea Hawk Seafoods (Valdez)
Other Industrial and Business Waste, including: . wastewater . tank scale (Alyeska) . used oil . oily wastes	Alyeska Pipeline Service Co. Smaller businesses (e.g. auto repair)
Household Hazardous Wastes, including: . batteries . paint . used oil	Households, boaters, small businesses, government agencies

Waste Streams	Sources
Continued	
Scrap Metal and Wood . iron and steel . abandoned vehicles . land clearing, construction debris	Households, businesses, government agencies
Hazardous and Infectious wastes, including: . contaminated soils . medical wastes	Businesses, government agencies, medical clinics and hospitals
Stormwater Runoff	Urbanized areas (e.g., roads, roofs)

Several waste streams are also generated at remote sites within the Sound, as identified below.

Figure 1B: Waste Streams and Sources at Remote Sites

Waste Streams	Sources
Fish Hatcheries . process water . waste water . solid waste . used oil, oily wastes	Valdez Fisheries Wally Noerenberg Hatchery (Esther Island) Cannery Creek Hatchery (Unakwik Inlet) Armin Koernig Hatchery (Evans Island) Main Bay Hatchery
Fishing, logging camps, federal government sites . waste water . solid waste . used oil . contaminated soils	Johnstone (FAA site); Strawberry Point (FAA site); Olson Bay (NMFS site); Jerry Point (U.S. Army); Montague Island, MacLoud Harbor (logging camp); Two Moon Bay (logging site); Cape Hinchinbrook

Current Waste Management Systems

Valdez, Cordova, and Whittier have all made substantial improvements to their waste management practices over the past two to three years. Tatitlek is in the process of exploring ways to fund improvements to its waste management practices.

The City of Valdez began operating a solid waste baler in June 1994. Baling solid wastes prolongs the life of the landfill (by conserving space), reduces windblown litter, and minimizes the contaminant concentration of potential leachate (because bales are less permeable to rainfall). The City also added a Solid Waste Manager to its Public Works Department staff, thereby enabling the City to improve its day-to-day management of solid waste. Due in large part to these changes, ADEC has informed Valdez that it will receive in the near future an operating permit renewal for its balefill from the Alaska Department of Environmental Conservation. Valdez has also started year-round collection of household hazardous waste and lead-acid batteries at its baling facility. A floating sport-fish cleaning station will soon be installed outside of the small boat harbor to minimize adverse impacts of fish cleaning (e.g., concentration of wastes in the harbor which may reduce water quality to below federal or state standards, odor and aesthetics).

In Cordova, solid waste has been baled since 1987. In recent years, the City has initiated cardboard and aluminum can recycling, and has begun an innovative gill net recycling program. In 1995, Cordova participated in a one-time collection and recycling of scrap metal (funded through an Alaska DOT/PF, federal ISTEA grant; Valdez also participated in this program), and the City is now planning to recycle scrap metal on an on-going basis. Cordova's used oil program has been improved through purchase of an additional used oil burner (to heat the baler facility) and a mobile incinerator (55-gallon unit) to burn oily rags and other materials.

In Whittier, solid waste collection and disposal has been privatized. This has enabled the city to more easily determine and charge users of the system the total or "true" costs associated with solid waste management (prior to this the City had been operating at a $40,000 annual deficit). Whittier is also improving its used oil collection program through the recent installation of a used oil burner to heat one of the city buildings and the planned construction of a bermed and covered oil collection facility. The City is currently budgeting for the removal of asbestos and remediation of petroleum-contaminated soil from past military activities.

In Tatitlek, a waste management plan was completed in the last few years that identifies and prioritizes the village's waste management problems. In addition, the village is working with Chugachmuit to construct a building in which to collect and sort household hazardous waste.

Waste Management Issues

Prince William Sound communities have a good understanding of the issues surrounding waste management. The improvements made by them in recent years have made each community more aware of and in a better position to address the remaining areas that need improvement in their waste management systems.

Of the approximately thirty waste streams assessed for this inventory, five waste streams pose considerable environmental or other concerns for of most the participating communities. These are: used oil, municipal solid waste, recyclables (e.g., cardboard, aluminum), lead-acid batteries and other household hazardous waste, and shore-based fish processing waste. Other waste streams also pose management problems, but tend to be problems for an individual community rather than for the region as a whole.

Used Oil. A combined total of approximately 40,000 gallons of used oil is generated in the communities each year. In general, communities report that they find all aspects of used oil handling and transportation difficult. In Tatitlek, there is currently no legal way to dispose of used oil in the village. Consequently used oil is being stored or illegally dumped. In the remaining communities, although recent improvements have been made, the existing used oil burner capacity is insufficient to manage the current and/or expected future generation. Valdez faces an additional problem that regulations may limit the city's ability of the city to easily and inexpensively transport used oil to upland burners. A lack of sufficient burner capacity and/or regulatory barriers may result in an increase in illegal dumping (if a city can no longer collect used oil) or increased spills due to longer storage and handling periods. (Figure 1C)

Municipal Solid Waste Disposal. A combined total of approximately 8,000 tons of municipal solid waste (MSW) is disposed of each year in the communities (Figure 1D). Landfills are nearing capacity in three of the four communities (Tatitlek, Valdez, Cordova).[1] High precipitation, high groundwater, high tide (in Cordova), and the proximity to coastal waters create the potential for contaminants to leach into ground or surface waters more readily than other possible sites in the region.

Lead-acid Batteries and other Household Hazardous Waste. An estimated 1,000 - 1,400 used batteries are generated each year in the communities. Batteries and other household hazardous wastes (HHW) contain hazardous constituents that can contaminate a municipal disposal site and pose a liability to the community: a significant number of the sites on the federal "Superfund" list are municipal solid waste disposal sites. Currently, Valdez is the only city that has a convenient and inexpensive (to residents) household hazardous waste and battery collection program. None of the other communities have

[1] Whittier's municipal solid waste is collected and disposed by a private contractor at the Anchorage landfill.

HHW programs. Cordova does have a battery recycling program, but it is not at this time well coordinated with the local NAPA store that also accepts batteries. Tatitlek disposes of its batteries together with the rest of its solid waste.

Recyclables (cardboard, aluminum). Although they do not pose public health or environmental problems, recyclables take up space in the landfill and are marketable commodities. In addition, recycling is one of the preferred management methods in the state's waste management hierarchy. Although for many recyclables the transportation costs outweigh the revenues, aluminum and cardboard can be collected and shipped out on a break even (cardboard) or profitable (aluminum) basis from Prince William Sound. To date the communities have relied almost solely on volunteer collection efforts, which tend to lag over time. Nationally, over 50% of the aluminum and cardboard generated is recycled, while in Prince William Sound communities 20% or less of these materials are recycled. (Figure 1E)

Shore-based Fish Processing Wastes. There appear to be problems with accumulation of fish offal from fish processors in Cordova and, to a lesser extent, processors in Valdez. The accumulation of many years of processing wastes in the shallow inlet off Cordova may have contributed to the development of an anaerobic zone on the inlet's floor - unusable habitat to fish and other marine resources of the area. In Whittier, large pieces of fish waste disposed of improperly in the septic system have caused problems for the system. Although planning has been conducted by the cities, state, EPA, and fish processors to solve the offal problem, none of the proposals developed to solve the problem have been funded.

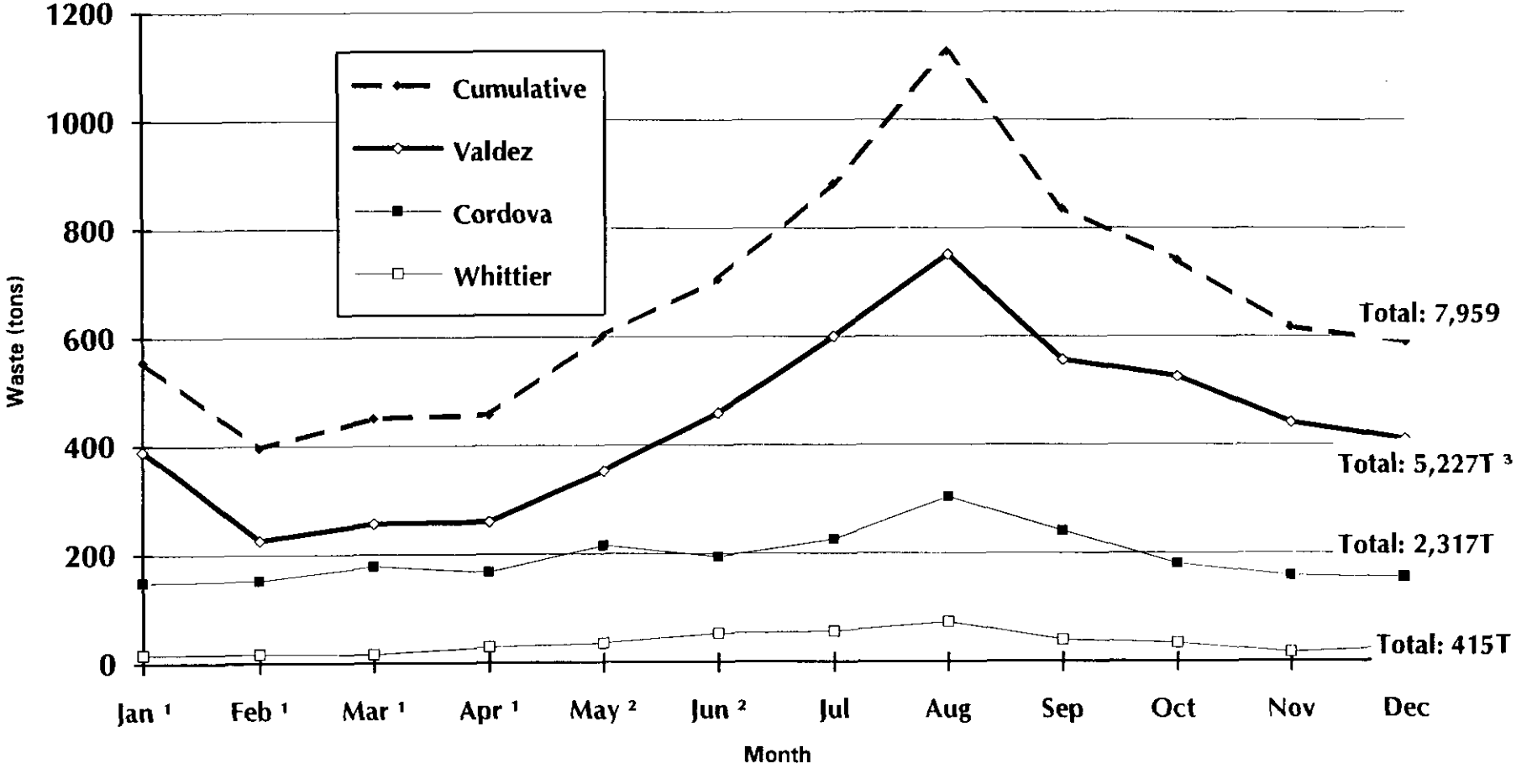
These waste streams represent the most pressing waste management issues common to the greatest number of communities.[2] Additional information on these and the other waste streams - including oil-contaminated materials, sewage sludge, stormwater runoff - are contained in later sections of this inventory. This information will be used to help develop appropriate solutions to the community's pollution problems. The solutions may range from changes in practices that can easily be implemented by a community, to coordinated recycling or other programs, to construction of waste management facilities. Appropriate solutions to the waste management problems of greatest concern to the communities will be developed in the next stages of the project.

[2] This is based on a ranking of waste streams conducted by the Public Works Directors or the equivalent from each community and site visits to each of the community.

Figure 1C: 1994 Used Oil Profile (Prince William Sound)

	Community			
	Cordova	**Tatitlek**	**Valdez**	**Whittier**
Volume Generated (gallons/yr)	25,000	200	10,000	1,500
Current Management Status	Burn locally for energy recovery (at Cordova Electric Cooperative)	Store in drums until arrangements can be made for disposal/ recycling (some is used in chainsaws)	Burn for energy recovery at city shop, garages, DOT, other private burners	Burn for energy recovery at 2 city burners or privately owned burner
Issues	» Burner is antiquated » Volume burned for energy recovery is limited by tank storage capacity		» In future, may not have capacity to burn all the used oil generated » Regulations may limit opportunities to transport used oil from harbor to other locations for storage, burning	» The city is redesigning its used oil collection program » The city currently has a 50,000+ gallon surplus of used oil in storage

Figure 1D: 1994/1995 Seasonal Variation in MSW Disposal (Cordova, Valdez and Whittier)



[1] Based on 1995 generation, not 1994 (Cordova/Whittier)

[2] Estimate based on partial month's data (Cordova)

[3] Estimated. Actual 1994 generation (5776 tons) used in documents generated later in the project.

SEASON.XLS Chart 1 03/25/96

Figure 1E: Prince William Sound Regional Recycling Profile (1994)

Waste Stream	National	Community			
		Cordova	Tatitlek	Valdez	Whittier
Total Estimated MSW Generation (tons/yr)*		**2,417**	**183**	**5,700**	**440**
Cardboard					
Total Volume Generated (tons/yr)		350	13	855	66
Volume Recycled (tons/yr)		35	0%	110	5
% of WS Recycled	***56%***	***10%***	***0%***	***13%***	***8%***
Newspaper					
Total Volume Generated (tons/yr)		100	1	228	13
Volume Recycled (tons/yr)		0	0%	22	<1
% of WS Recycled	***46%***	***0%***	***0%***	***10%***	***unknown***
Office Paper					
Total Volume Generated (tons/yr)		72	59	285	13
Volume Recycled (tons/yr)		<1	unknown	43	0%
% of WS Recycled	***37%***	***<1%***	***unknown***	***15%***	***0%***
Aluminum					
Total Volume Generated (tons/yr)		25	unknown	57	4
Volume Recycled (tons/yr)		5	unknown	2	<1
% of WS Recycled	***53%***	***20%***	***unknown***	***4%***	***12%***
Lead Acid Batteries					
Total Number Generated (per yr)		400-600	10	600-800	25
Number Recycled (per yr)		350-500	0%	600-800	20
% of WS Recycled	***95%***	***85%***	***0%***	***98%***	***80%***

* Annual MSW generation in Cordova, Valdez, and Whittier based on percentages in "MSW Composition, Percent by Weight." Annual MSW generation does not include lead acid batteries.

Section 2: Cordova Waste Stream Generation and Management

The following information describes the amounts of wastes generated in Cordova and how they are currently being managed. The quantity and management of waste streams generated is important for developing appropriate alternatives for reduction, recycling, and/or disposal of the waste. The information is organized according to the following four categories of waste streams: municipal solid waste; recyclable waste streams; waste streams requiring special processing; and water-related waste streams.

MUNICIPAL SOLID WASTE

Current Generation Rate. The annual generation by weight of municipal solid waste in Cordova is approximately 2300 tons, with about 6 tons of baled waste produced per day on an annual average. The existing waste generation rate is based on data collected by the City from June 1994 to May 1995. The city recorded the number of bales received and weighed two of the bales to estimate the average bale weight. The waste generation varies seasonally: more waste is generated during the summer months with the influx of population associated with the summer fishing season. (Figures 2A and B)

Future Generation Rate. The waste generation rate is correlated with population, economics, and community goals and practices. An increase in population usually results in an increase in solid waste. Waste reduction or recycling can reduce the amount of waste sent to a disposal facility.

The population in Cordova is projected to grow approximately 1% per year over the next 20 years. Under this assumption, Cordova's waste generation in 2010 would be approximately 2,700 tons per year. With a recycling program that was able to reach a 20% reduction/recycling rate in the next five years, Cordova's waste generation would decrease to approximately 1,800 tons in 2010. This is an achievable goal. (Figure 2C)

Remaining Landfill Capacity. Based on Cordova's current solid waste permit, a site visit and interviews with Public Works staff, the balefill has approximately 5 years of remaining capacity at its current design grading plan.

Waste Composition. The composition of MSW generated by Alaskan communities varies somewhat from the national average, due to the higher percentage of goods requiring packaging for shipment to Alaska and to differences in climate.

These differences mean that Alaskans generate a higher percentage of paper and a lower percentage of brush and yard waste, for example, than the rest of the country. (Figure 2D)

MSW Management System. The City of Cordova operates the MSW collection system and provides residential and commercial pickup on a weekly basis. MSW may also be dropped off at the baler facility.

Most items are baled, but when practical, recyclables are set aside, including lead-acid batteries. The majority of recyclables processed are presorted by the grocery store or from the city recycling containers outside of the Public Works Department.

The balefill is located on the tidal flats in the City of Cordova. The bales are covered with a tarp. Soil cover is applied on an as-needed basis. Potential environmental impacts from current MSW management practices include windblown garbage from open dumpsters and the balefill, and tidal inflow into the lower portion of the balefill. The city's current permit expires October 1998. (Figure 2E)

The Solid Waste program operates as an Enterprise Fund. The City's 1994 operating budget and 1995 disposal rates are shown in Figure 2F and G.

RECYCLABLE MATERIALS

Aluminum and Cardboard. The City of Cordova collects aluminum and cardboard at dumpsters located at the Public Works Department. The majority of cardboard collected for recycling comes from one of the two grocery stores in town.

The aluminum and cardboard are baled using the solid waste baler. This causes some inconvenience as the baler must be thoroughly cleaned and MSW cannot be baled until the operator is finished baling the recyclables. After baling, the recyclables are taken to dockside, where Samson Tug and Barge loads them (at no charge) and ships them for $850 per shipping container. The recyclables are sold to Skagit River Steel in Washington State. The City earns a profit (after shipping) on the aluminum and "breaks even" on the cardboard. In 1994, approximately 5 tons of aluminum and 35 tons of cardboard were recycled.

The AC store recycles its own cardboard. Approximately 100-200 bales were recycled in 1994. The store indicated its willingness to give its cardboard to the city for recycling if it would help to the city's recycling efforts.

Abandoned Vehicles. The City has been towing abandoned vehicles to two locations over the last five years. In 1995, the City received funding through an ISTEA grant to hire a contractor to process and ship the vehicles to a recycler. Approximately 500 cars were shipped. The City is in the process of planning an on-going, routine scrap metal program to recycle scrap every other year, partially funded with the remaining ISTEA funds.

Gillnets. A volunteer group began a gill net recycling program in 1993. Gill nets were collected at the harbor, baled by the City, and then the City shipped them at a reduced rate to a recycler in Seattle where they were melted and used to make new products. In 1994, 11 tons of net were recycled. Recycling of the nets has fallen off, due to decreasing volunteer efforts and the cost to the City to recycle them. This is a labor intensive program.

Lead-acid Batteries. The NAPA store in Cordova accepts batteries for recycling on a one for one exchange basis when a new battery is purchased. The baler also accepts batteries for a service fee. In 1995, 200 batteries were collected at the harbor. The harbor gave them to NAPA for recycling.

Several issues have emerged concerning battery recycling in the City. First, NAPA's battery policy is not well known (e.g., whether they will only accept a 1-for-1 exchange or whether they will accept non-NAPA or multiple batteries). Second, some of the property next to the NAPA store used by NAPA for used battery storage is owned by the City and it is unclear if the City and NAPA have agreed on the use of this property for battery storage. To the extent that NAPA is or becomes the largest recycler of batteries (of NAPA and non-NAPA batteries), a cooperative approach between the City and NAPA would likely result in the most successful recycling effort. (Figure 2H)

In 1994, Cordova recycled approximately 10% of its cardboard, 20% of its aluminum, and 85% of its batteries. This compares with a national recycling rate of 56% for cardboard, 53% for aluminum, and 95% for batteries. (Figure 2I)

SPECIAL WASTE GENERATION AND MANAGEMENT

Special wastes are those wastes that should not be disposed of in the same manner as the rest of the municipal solid waste stream due to their potential contamination of ground or surface water, their large size, or other factors. (Batteries and scrap metal fall into this category, but are recycled by the city and so have been discussed in the previous section.)

Used Oil. Two 500-gallon used oil collection tanks are located at the harbor. The baler also accepts used oil in small quantities (less than five gallons). The used oil is pumped into a 12,000 gallon oil storage tank at the harbor. From there

it is transported by 1,000 gallon tank truck to Cordova Electric Cooperative (CEC) where it is burned as a fuel supplement for the boiler. There are also two city-owned burners (located at the city shop and the baler) that burn a relatively small portion of the used oil generated.

The majority of used oil is collected in the summer. At the start of the 1995 summer season, the used oil storage and collection tanks were at capacity. The CEC boiler is antiquated, and requires frequent maintenance to keep it operating.

Oily Wastes. Oil-contaminated materials, such as rags and sorbents are baled or burned. In 1994, the harbor purchased a mobile burner (a "Smartash") to burn all of its oily materials (less than 55 gallons per year).

Household Hazardous Wastes. Most household hazardous wastes (HHW) are currently disposed of with the rest of the MSW. During its annual spring cleanup (of litter, etc.) the City receives some HHW which it stores or ships out for hazardous waste disposal. The City also occasionally has a paint exchange for paint collected during the clean up.

Sewage Sludge. Sewage sludge is disposed of at a permitted sludge disposal bed near the airport on FAA property. The City is currently looking for a new site not on FAA property. The City plans to install a dewatering plant in the summer of 1995.

Asbestos. Asbestos is disposed of in a separate area of the balefill.

Construction and Demolition Debris. Construction and demolition debris, such as building debris, logs, and concrete rubble, is disposed of in a separate area of the balefill. (Figure 2J)

WATER-RELATED WASTE GENERATION AND MANAGEMENT

Stormwater Runoff. Stormwater runoff over urbanized areas (streets, roofs, etc.) contains various petroleum products, metallic dust, food wastes, and other contaminants. Storm systems can also be contaminated by leaking sewage mains or leaking fuel oil mains. Overall, the amount of run-off generated pollutants from urban Cordova is likely to be minimal given the relatively small urbanized area. The stormwater runoff generated at the airport (e.g., deicing chemicals) is managed by ADOT through an NPDES general permit.

Fish Wastes

Shore-based Processors. There are three operating seafood processors in Cordova: St. Elias Ocean Products; Silver Lining Seafoods; and North Pacific Processors. It is estimated that these processors generate approximately 2,500-7,500 tons of fish waste per year (based on an estimate by Prince William Sound Science Center). In accordance with NPDES permit conditions, the processors grind the fish waste to 1/2" or less and deposit in the Sound via an outfall pipe.

Sport Fish Cleaning Stations. The City provides five floats in the harbor. The harbor does not consider sport fish cleaning wastes to be a problem as the charter fleet is relatively small.

Vessel Wastes

Bilge Water. There are no facilities (oil-water separators) for bilge water. Some bilge water is run through the Eyak Corporation's oil-water separator, and is then put into the used oil collection tanks at the harbor.

Wastewater. The harbor does not currently have sewer pumpouts.

Wastewater Effluent. The state's Wastewater Disposal Regulations specify treatment and disposal standards for wastewater. Cordova's facility has a design flow of 0.7 million gallons per day (MGD), with an average daily flow in 1994 of approximately 0.6 MGD. (Figure 2K)

Figure 2A: Cordova Yearly MSW Generation Rates (1994-95)

Units of Measure	Avg. Daily	Monthly	Yearly
Weight (tons)*	6	193	2,317
Number of Bales for Disposal**	10	227	2,726
Range (bales)	2-25	175-360	
Waste Diverted from Balefill (tons)***			100

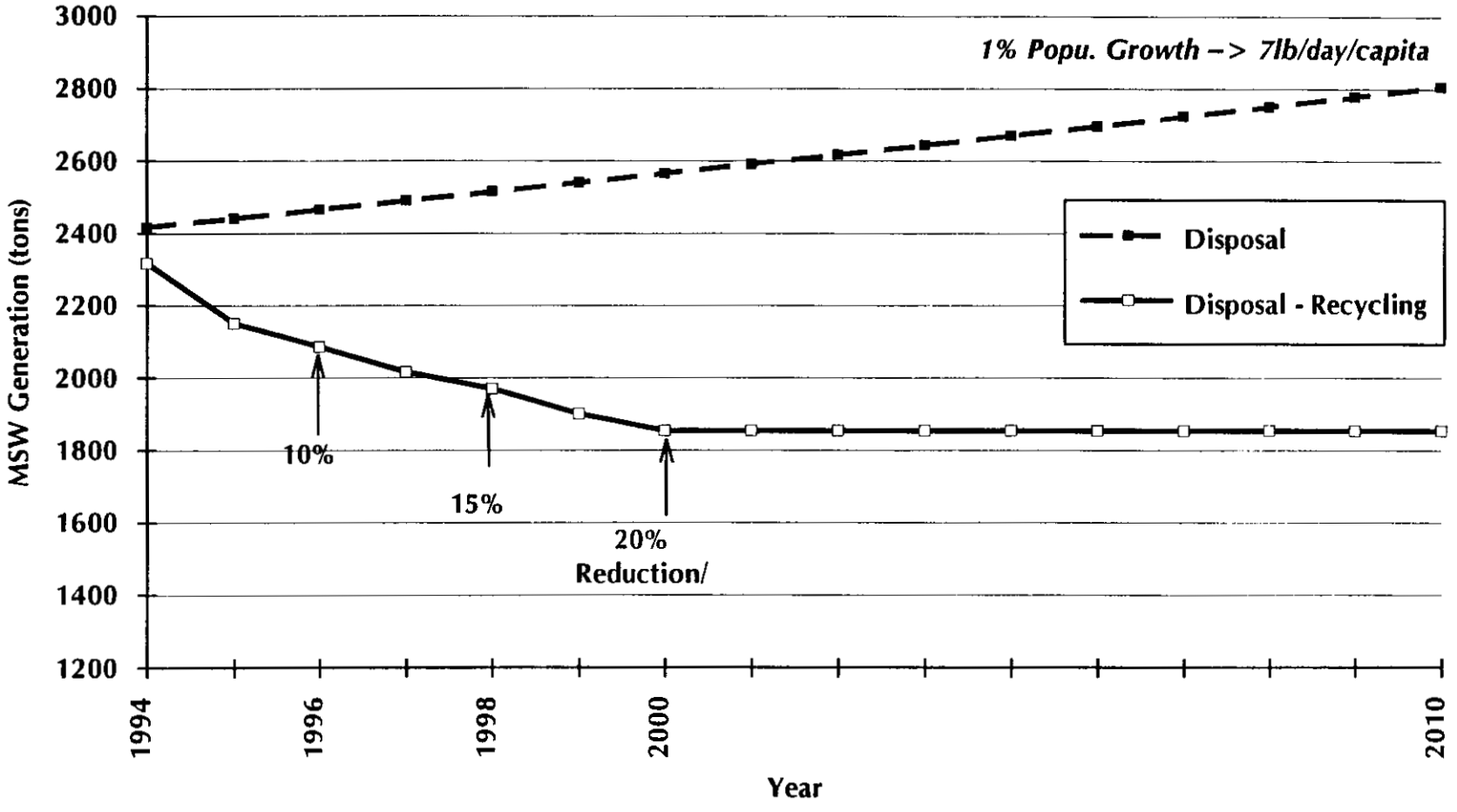
footnotes:
* Assume 1,700 lb/bale
** The municipal baler operates approximately 270 days/year
*** Estimated quantity of aluminum and cardboard recycled

Figure 2B: Seasonal Variation in Cordova's MSW Disposal (1994/95)

	J*	F*	M*	A**	M**	J	J	A	S	O	N	D	Total
Quantity (tons)***	149	152	178	167	215	194	226	303	241	180	158	154	2,317
Quantity (cy)****	280	286	334	315	405	365	426	571	453	339	298	290	4,361
% of total weight	6	7	8	7	9	8	10	13	10	8	7	7	100%

footnotes:
* based on 1995 data
** based on partial month's data
*** assume 1,700 lb/bale
**** assume 1.6 yd^3/bale

Figure 2C: Projected MSW Generation With and Without Recycling (Cordova)



NOTE: Based on 2400+ tons annual generation in 1994 (100 tons diverted)

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Figure 2D: MSW Composition, Percent by Weight

Waste	National*	Prince William Sound	Comments
Paper	38	43	Alaska doubles/triples packaging
Glass	6	5	shipping/breakage & weight
Metals (ferrous and non)	8	8	
Plastics	9	12	replaces glass
Rubber & Leather	3	3	
Textiles	3	3	
Wood	7	8	packaging
Food	7	8	
Brush & Yard	16	6	few yards (esp. Whittier)
Miscellaneous	3	4	
Total	100	100	

footnote: * Drawn from EPA's "Characterization of Municipal Solid Waste in The United States: 1994 Update" The figures do not include Construction and Demolition debris, municipal sludges, combustion ash, automobile bodies, or industrial process wastes.

Figure 2E: MSW Management System (Cordova)

— COLLECTION —	
Volume Collected and Disposed	2,317 tons
Point of Collection	(1) Residential and commercial pickup (2) dropoff at baler
Frequency of Collection	Pickup: weekly
Storage Containers	Dumpsters; special bins for recyclables (adjacent to City Hall, public boat harbor)
Vehicles	Two refuse compactor trucks; 18-foot dump-flatbed
— PROCESSING —	
Sorting for Recyclables	Some cardboard picked off at baler. Sorted cardboard collected from grocery store, city collection bin in town.
Baling	All MSW
Equipment	1985 Logemann baler (5 days/wk in winter; 6 days/wk in summer)
— DISPOSAL —	
Site Description	Balefill; section reserved for C&D debris (5 acre site) and for asbestos
Disposal Method	Balefill
Site Ownership	City of Cordova
Wastes No Longer Accepted	Oily waste, liquid petroleum, liquid septic tank pumpings, sewage, pathogenic wastes, commercial fish processing waste, solvents, strong acids, explosives, hazardous wastes, junk vehicles, PCB fluids, untreated medical wastes (40 CFR 261)
Site Practices (fencing, covering)*	
Fencing	Yes (still waiting to fence new area)
Attendant	Full time at baler
Liner	Not required
Monitoring	Yes, monthly (leachate samples; 2+ monitoring wells)
Leachate Collection, Treatment	Not required
Gas Control	Not required
Open Burning	No
Cover	Yes, of soil or appropriate substitute
Run-on Run-Off Control	
Closure Plans	
Site Issues	
Remaining Capacity	5 years
Regulatory Status	Permit expires October 1998
Potential Environmental Impacts	Windblown garbage; tidal inflow into lower portion of balefill

Figure 2F: 1994 Solid Waste System Operating Budget (Cordova)

Item	Amount	Comment
COSTS		
Administrative	$231,698	
Supervisory		Public Works Director (.10 FTE)
Labor		Baler Crew (3 FTE)
Supplies	26,492	
Services	81,991	
Vehicle Expense	94,835	
Debt Service	12,679	
Misc.	46,236	
TOTAL COSTS	**$493,931**	
TOTAL OPERATING BUDGET		**$493,931**

Solid Waste Service fees are included in city utility fees. If utility fees do not cover the full cost of the city's Solid Waste Services, additional money can be drawn from the city's general fund.

Figure 2G: 1995 Refuse Disposal Rates

Customer Category	Pickup/ Delivery	Cost	Comment
Residential *	Pickup	$33.70/mo	1-3 containers (35 gal cans) per weekly pickup
		2.00	each additional container
		4.80	per cu yd, additional bulk materials
Commercial**	Pickup	$33.70/mo	1-3 containers (35 gal. cans) per weekly pickup
		2.00	each additional container
Containerized Svcs **	Rental	$20.20/mo	3 cu yd dumpster
		27.00/mo	4 cu yd dumpster
		40.50/mo	6 cu yd dumpster
	Pickup	121.40/mo	3 cu yd dumpster ($30.30/week)
		161.80/mo	4 cu yd dumpster ($40.50/week)
		242.70/mo	6 cu yd dumpster ($60.70/week)

** Clean recyclables delivered to the baler are accepted free of charge*

*** Pickup rates of recyclables for commercial and containerized services are generally one half (1/2) the normal refuse disposal fees. Commercial customers who bring recyclables to the baler are charged 25% of the normal refuse disposal fees.*

Figure 2H: Recycling Activities (Cordova)

Material	Recycler	Collection	Shipping/Marketing	Annual Quantity	Comments
Aluminum	» City » USCG (own)	» Collection: Public Works Bldg. & grocery store » USCG collects own	» City wastes: bale and ship via Samson Tug & Barge to Skagit River Steel » USCG takes to Anchorage	» City: 5 tons	»Samson loads and ships for $850 per van.
Cardboard	» City » AC Store	» Collection: PW Bldg. & grocery store » AC Store ships own to Anchorage	Bale all wastes and ship via Samson Tug & Barge to Skagit River Steel	» City: 32 tons » AC Store: 100-200 bales	»Samson loads and ships for $850 per van. City earns net revenue from cardboard recycling.
Lead-Acid Batteries	NAPA	» NAPA collects (no fee) » Baler collects ($5-10 fee)	NAPA ships South	200+	NAPA policy needs to be clarified
Used Oil	City, harbor	Collect at harbor in tanks	Burned locally by the electric company for energy recovery	25,000 gal	»Burner is antiquated; volume burned for energy recovery is limited by tank storage capacity »Baler has new burner
Abandoned Vehicles	One-time effort by PWSEDC, City	City has been towing city vehicles to two locations	Contractor processes and ships them to a recycler at a cost to the city	100 vehicles	Funded by special one-time $100K DOT ISTEA grant to collect 500+ stockpiled vehicles. Plan to purchase crusher and implement longer-term program.
Gillnet/ Web	City	Collected at baler	Some nets reused locally. Others shipped at a reduced rate to Skagit River Steel in Seattle.	11 tons	Recycling has fallen off (not cost-effective)

NOTE: Other common recyclables (office paper and newspaper) are occasionally recycled by Cordova.

Figure 21: Composition and Recycling Rates of Selected Recyclables (Cordova)

Material	% Total MSW		Waste Stream Generated in Cordova (tons)	% Waste Stream Recycled		Waste Stream Recycled in Cordova (tons)*
	National	Cordova		National	Cordova	
Newspaper	6%	4%	100	46%	0%	0
Office Paper	3	3	72	37	<1	<1
Cardboard	13	15	350	56	10	35
Aluminum	1	1	25	53	20	5
Lead Acid Batteries	1	<1	<25	95	<85	<21

footnotes: National figures drawn from EPA's "Characterization of Municipal Solid Waste in the U.S.: 1994 Update."

Figure 2J: Special Waste Generation and Management Profile (Cordova)

Waste Stream	Generation	Management	Comments
Construction & Demolition Debris	600-700 cu. yds	Special area at balefill	
Used Oil	25,000 gal/yr	Energy recovery: burn at Cordova Electric Corp.; burn at City Shop	Burner is old; storage capacity is limited
Oil-contaminated Materials	< 55 gal/gal	(1) Baled and balefilled; or (2) incinerated	Incinerator is portable (Smartash)
Oil-contaminated Soils			
Scrap Metal	100 vehicles	One-time recycling effort underway	Recycling arranged by PWSEDC, funded by ISTEA
Household Hazardous Waste	Unknown	City recycles (informal "paint exchange") or uses up paints	Informal collection during annual cleanup
Sewage Sludge	500-2500 dry tons/yr	Dispose at sludge pit near airport (open lagoon)	Looking for a new site; installing a dewatering plant; test sludges 2x per year
Medical Waste	100 tons/yr	(1) Incinerate at hospital (2) Send ash to balefill for disposal	
Incinerator Ash			
Cruise Ship Waste (Marpol)	N/A		
Zinc	Unknown	Not currently recycled	Recycling opportunity
Glycol		DOT ships its antifreeze to Valdez to be recycled	
Asbestos	Unknown	Disposed in separate area at balefill	

NOTE: "Special Wastes" are defined as wastes not normally managed with other MSW.

Figure 2K: Water-Related Wastes Generation and Management Profile (Cordova)

Waste Stream	Generation	Management	Comments
Wastewater Effluent	.6 MGD		Design Flow: .7 MGD
Stormwater Runoff			
Deicing chemicals	Urea: 100 tons/yr Salt: 100 tons/yr	Handled by ADOT through NPDES general permit	
Urban Area Runoff	Unknown	Street drains into harbor	No catchment basin
Fish Wastes			
Shore-based Processors	2,500-7,500 tons/yr	Grind, deposit in PWS (via outfall pipe)	Fish wastes dumped in Sound lead to anaerobic conditions: decline in marine life
Floating Processors			
Sport fish Cleaning Stns	5 floats in harbor		City does not consider a problem (small charter fleet)
Vessel Wastes			
Bilge Water	Unknown	Some run through oil-water separator (Eyak Corp.); oil burned for energy recovery	
Wastewater	Unknown	No sewer pumpouts	Most boats do not use holding tanks

Figure 2L: Non-Community-Specific Wastes Generation and Management Profile (Cordova)

Waste Stream	Generation	Management	Comments
Old Equipment/Litter Sites**	Unknown	FAA and military sites being cleaned	
Wastes from Floating Lodges	Unknown	Not addressed	Volunteers occasionally clean up littered beaches

**** Johnstone, Strawberry Point, Olson Bay; Jerry Point, Cape St. Elias, Cabin Lake Rd. Logging Camp, Cape Himhenbrook**

Section 3: Valdez Waste Stream Generation and Management

The following information describes the amounts of wastes generated in Valdez and how they are currently being managed. The quantity and management of waste streams generated is important for developing appropriate alternatives for reduction, recycling, and/or disposal of the waste. The information is organized according to the following four categories of waste streams: municipal solid waste; recyclable waste streams; waste streams requiring special processing; and water-related waste streams.

MUNICIPAL SOLID WASTE

Current Generation Rate. The annual quantity of municipal solid waste (MSW) generated for disposal in Valdez is approximately 5,230 tons, with an average daily generation of 17 tons. Valdez bales its MSW and generates 8 - 25 bales of MSW per day. The waste generation rate is based on data collected by the City of Valdez from January through December 1994. The waste generation varies seasonally: more waste is generated during the summer months with the influx of population associated with summer fishing and tourist season. (Figures 3A-B) The City estimates that approximately 15% of its MSW is generated by Alyeska Pipeline Services. (A table showing Alyeska's waste generation is attached to this inventory as Figure 3K).

Future Generation Rate. The waste generation rate is correlated with population, economics, and community goals and practices. An increase in population usually results in an increase in solid waste. Waste reduction or recycling can reduce the amount of waste sent to a disposal facility.

The population in Valdez is assumed to grow about 1% per year over the next 20 years. Under this assumption, Valdez's annual waste generation would be approximately 6,500 tons per year in 2010. With a recycling program that was able to reach a 20% reduction/recycling in the next five years, Valdez's waste generation would be approximately 5,000 tons in 2010. (Figure 3C)

Remaining Landfill Capacity. The balefill has 3 - 5 years remaining capacity under its current design grading plan. Vertical expansion is possible.

Waste Composition. The composition of MSW generated by Alaskan communities varies somewhat from the national average, due to the higher percentage of goods requiring packaging for shipment to Alaska and to differences in climate. These differences mean that Alaskans generate a higher percentage of paper and a lower percentage of brush and yard waste, among other differences, than the rest of the country. (Figure 3D)

MSW Management System. The City of Valdez began operation of a baler facility in June 1994. The City operates the collection system and provides residential and commercial pickup twice per week, which is the most frequent service in Prince William Sound. MSW may also be dropped off at the baler facility.

The baler staff set aside recyclables and hazardous wastes, when practical, from the MSW as it is brought to the baler. The City also has a convenient drop-off for residents at the baler facility for lead-acid batteries, household hazardous waste, small amounts of used oil (less than five gallons), and some metals. The City also provides a grease barrel pick-up at a charge of $125 per barrel, or free drop-off in the original container.

The balefill is located approximately 0.6 miles northeast of the Richardson Highway and access is now limited to Solid Waste staff. The bales are transported to the balefill on a daily basis (except in cases of bad weather where they are stored under cover at the baler). The bales are covered with a tarp. In addition, intermediate cover (gravel, silt, and stumps) is applied on an as-needed basis. Potentially adverse environmental conditions at the balefill location include a high water table, high precipitation, and earthquake and tsunami risk. Contaminants have been detected down gradient of the landfill in the ground water.

The City recently hired a Solid Waste Manager to improve the overall management of solid waste. DEC also recently informed the city that its solid waste management permit will be renewed (Spring 1995). (Figure 3E)

The Solid Waste Operating Budget for 1994 was approximate $670,000. The solid waste budget is funded by the General Fund tax base. (Figure 3F)

RECYCLABLE MATERIALS

Aluminum and Paper Recycling. The City operates a joint recycling program with Alyeska and the Prince William Sound Conservation Alliance for aluminum, office paper, newsprint, and cardboard. Figure 3H shows the total quantities recycled in 1994.

Alyeska funds the collection and transportation of the recyclables by a private contractor to the Anchorage Recycling Center, and donates the proceeds to charity. The City has assisted in the program by establishing a central collection bin in the city for the recyclables. The City has resisted getting more involved in recycling as it could require additional staff without having a significant reduction in the volume of the material going into the landfill. Although active in getting the program started, the participation of the volunteer Conservation Alliance has waned in the recent past.

Alyeska also recycles paper and aluminum at its facilities, accounting for the large volume of office paper recycled in Valdez relative to other communities in the region.

The grocery store recycles its own cardboard (approximately 100 tons). The Harborview Development Center recently began collecting aluminum on a volunteer basis and ships it to Anchorage via the U.S. Coast Guard.

Lead-Acid Batteries. The City allows free drop-off of lead-acid batteries at the baler. Exide Corporation picks up the batteries on a monthly basis for recycling at no charge. The City pays $35 to have the fish totes transported back to Valdez.

Abandoned Vehicles and Scrap Metal. In 1995, the City received funding through an ISTEA grant to hire a contractor to process and ship abandoned vehicles to a recycler. Approximately 1,200 cars were shipped. The City accepts white goods at the baler for a $50 service fee to cover the costs of CFC removal (a certified local company removes the CFCs). (Figures 3G and H)

SPECIAL WASTE GENERATION AND MANAGEMENT

Special wastes are those wastes that should not be disposed of in the same manner as the rest of the municipal solid waste streams due to their potential contamination of ground or surface water, size, or other factors. Batteries and scrap metal fall into this category, but are recycled by the city and are discussed in the previous section. (Special waste generation and practices are summarized in Figure 3I.)

Used Oil. Approximately 10,000 gallons of used oil is collected each year in Valdez for recycling. Used oil is collected at the harbor in a 5,000 gallon stationary tank. Two small mobile tanks are also available. The oil is burned at any of several burners in the community (city shop, DOT, two garages, three private burners). The users pick up or harbor personnel deliver the oil to the burners.

Although the number of burners in the City has increased in the last few years, there are additional public buildings the City would like to heat with used oil burners.

The City's harbormaster reports that all aspects of handling used oil are problematic. Some of the difficulty stems from not knowing how much used oil will be generated in any given year and, if it is a high-volume year, not being able to burn all the oil it collects. The most recent difficulty is the possible prohibition against transporting the used oil from the harbor to the burners in larger than 55-gallon quantities unless the City becomes a transporter of used oil. Transporter status triggers a variety of record-keeping, insurance, and other requirements. The City is currently determining how to resolve this problem.

Oily Wastes. Oil-contaminated materials, such as rags and sorbents are shipped out of the community for disposal as a hazardous material.

Household Hazardous Wastes (HHW). The City has a free drop-off at the baler facility for HHW. A contractor packages and transports the wastes on an as needed basis (approximately quarterly). The City pays approximately $12,000 per year for HHW packaging, shipping, and disposal. Of the five communities, Valdez is the only one in the region with an on-going HHW program.

Construction and Demolition Debris (C&D). The City has a separate disposal site for wood, large metal objects, construction debris, asphalt and other similar materials. Alyeska's C&D waste comprises 80% - 90% of the total 7,200 cubic yard annual volume.

The City has planned and/or instituted several changes at the construction pit in the last year. These include initiating a tipping fee at the site, and in the near future the City plans to deposit wood waste at the baler facility for private citizens and businesses to use. The City revenues from the tipping fee totaled $6,500 for the first quarter. This amount may decrease in the future if Alyeska begins to recycle its scrap metal.

Incinerator Ash, Tank Scale, and Sandblast Grit. There are three special waste streams generated in relatively large quantities by Alyeska and managed by the City: incinerator ash (92 85-gallon drums/year), tank scale (25 tons/year), and sandblast grit (30 - 40 tons/year). These waste streams are TCLP-tested and then disposed of in the construction pit.

Sewage Sludge. The City has a permitted sludge pit. Alyeska disposes of their sludge separately. To comply with regulations, the City is installing a dewatering unit and will put the sludge in the balefill.

Asbestos. The balefill does not currently accept asbestos. Building contractors or others must find alternate disposal sites.

Medical Waste. Medical waste is currently shipped to Fairbanks Memorial Hospital for incineration.

Cruise Ship Waste (MARPOL). Seventy-one cruise ships visited Valdez in 1994, and 70 - 100 are expected in 1995. Only one of these ships off-loaded waste during one of their seven landings in 1994. The cruise ship hires a private contractor who picks up the waste from the dock and takes it to the baler. The City is considering charging a port tariff for the cruise ship waste. If the City finds that this is legal and implements it, the volume of cruise ship waste may decrease even further.

WATER-RELATED WASTE GENERATION AND MANAGEMENT

Stormwater Runoff. Stormwater runoff over urbanized areas (streets, roofs, etc.) contains various petroleum products, metallic dust, food wastes, and other contaminants. Storm water systems can also be contaminated by leaking sewage mains or leaking fuel oil mains. Valdez currently has no contaminant removal system in place in its sewer stormwater; street runoff drains into the harbor and bay, where there are no catch basins or oil-water separators. The stormwater runoff generated at the airport (e.g., deicing chemicals) is managed by ADOT through an NPDES general permit.

Fish Wastes

Shore-based Processors. There are three operating seafood processors in Valdez: Nautilus Seafoods, Peter Pan Seafoods, and Sea Hawk Seafoods. In accordance with regulations, these processors grind their fish waste to less than 1/2" diameter and discharge it through outfall pipes to deep water (between -30 and -200 feet).

Sport Fish Cleaning Stations. Fish carcasses are deposited in the harbor from five fish cleaning stations. The City has recently budgeted for the construction of a floating dumpster outside of the harbor to decrease the floating waste and odor from fish cleaning activities inside the harbor. If successful, the City may build additional fish cleaning stations.

Vessel Wastes

Bilge Water There are no oil-water separators for bilge water in Valdez. The City will accept bilge water if it is mostly oil.

Wastewater The small boat harbor does not currently have a sewer pumpout. The commercial harbor has a single pumpout. The addition of sewer pumpouts is a component of the Harbor's master plan and funding has been allocated for it.

Wastewater Effluent. The state's Wastewater Disposal Regulations specify treatment and disposal standards for wastewater. The City's permit is currently under review by EPA for renewal. Valdez's facility has a design flow of 1.5 million gallons per day (MGD), with an average daily flow in 1994 of approximately 0.8 MGD. Alyeska has its own sewage treatment plant. (Figure 3J)

Figure 3A: Valdez 1994 MSW Generation Rates

Units of Measure	Avg. Daily*	Monthly	Yearly
Weight (tons)	17	425	5,227
Number of Bales for Disposal**	17	445	5,345
Range (bales)	8-25	230-770	
Weight diverted from balefill (tons)***			400

footnotes: * The municipal baler operates 6 days/week (approx. 300 days/year)
** Assume 2 cy/bale. The balefill is expanding at the rate of 7 acre-feet/year, not including cover material
*** Volume estimate includes recyclables and a portion of Construction & Demolition debris

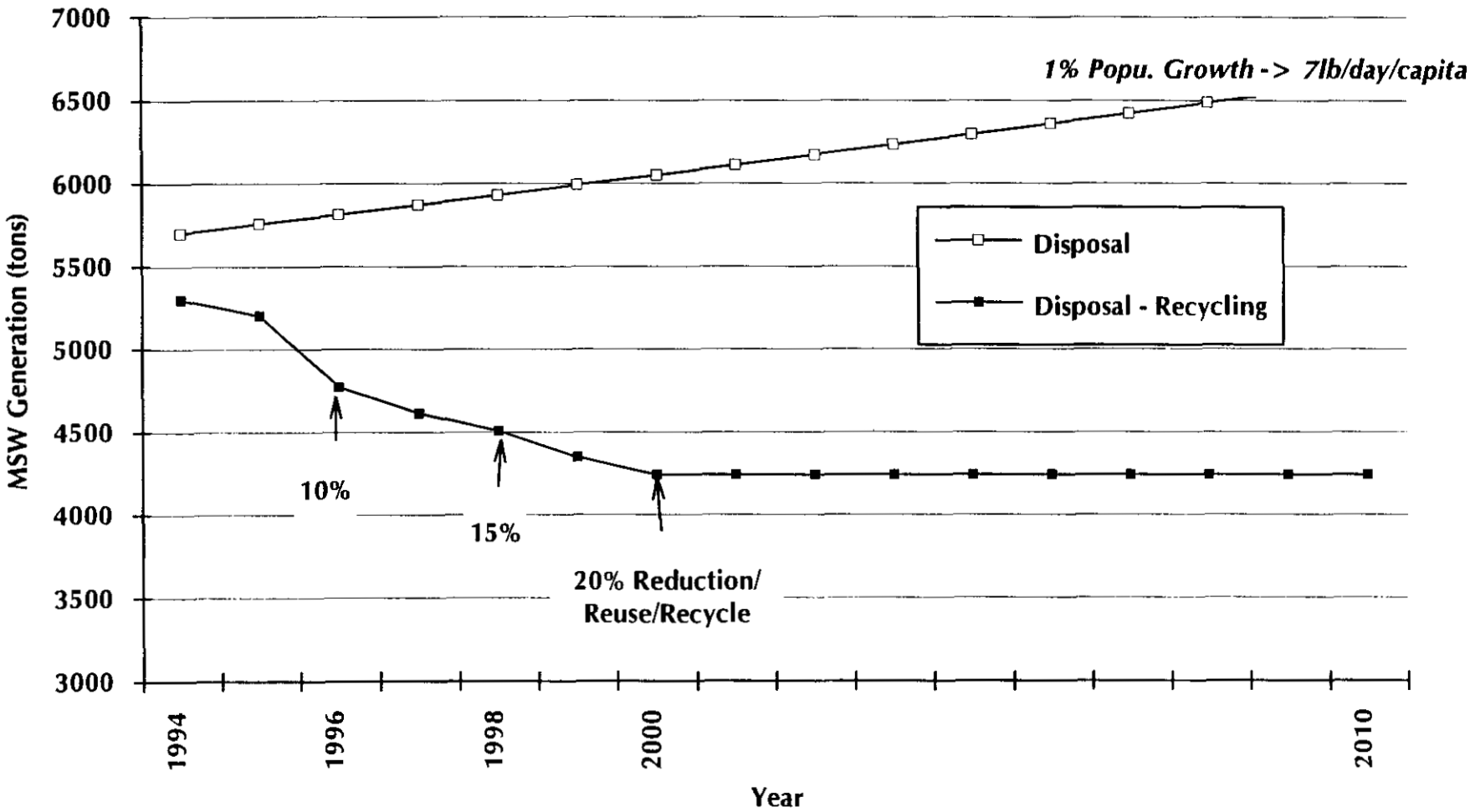
Figure 3B: 1994 Seasonal Variation in Valdez's MSW Disposal

	J	F	M	A	M	J	J	A	S	O	N	D	Total
Quantity (tons)	390	226	257	260	352	459	600	751	556	526	441	409	5,227
Quantity (cy)*	780	462	526	532	720	938	1,228	1,536	1,136	1,076	902	836	10,690
% of total	8	4	5	5	7	9	12	14	11	10	8	8	100

footnotes: * Assume 2 cy/bale

This information has been provided by the City of Valdez Solid Waste Department. The baler started accepting all material in July 1994. Prior to that time, some material was deposited directly into the landfill.

Figure 3C: Projected MSW Generation With and Without Recycling (Valdez)



NOTE: Based on 5700 tons annual generation (400 tons diverted)

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Figure 3D: MSW Composition, Percent by Weight

Waste	National*	Prince William Sound	Comments
Paper	38	43	Alaska doubles/triples packaging
Glass	6	5	shipping/breakage & weight
Metals (ferrous and non)	8	8	
Plastics	9	12	replaces glass
Rubber & Leather	3	3	
Textiles	3	3	
Wood	7	8	packaging
Food	7	8	
Brush & Yard	16	6	few yards (esp. Whittier)
Miscellaneous	3	4	
Total	100	100	

footnote: * Drawn from EPA's "Characterization of Municipal Solid Waste in The United States: 1994 Update" The figures do not include Construction and Demolition debris, municipal sludges, combustion ash, automobile bodies, or industrial process wastes.

Figure 3E: MSW Management System (Valdez)

--- COLLECTION ---	
Volume Collected and Disposed	5,227 tons
Point of Collection	(1) Residential and commercial pickup (2) Dropoff at baler
Frequency of Collection	Pickup: 2x/wk (pickup at dock 1x/mo.)
Storage Containers	Dumpsters
Vehicles	(1) 18 yard, (1) 20 yard rear-loading packer trucks; (1) 16 yard rear-loading packer for backup
— PROCESSING —	
Sorting for Recyclables	MSW not sorted; dropoff at baler for batteries, HHW, oil, metals
Baling	Yes
Equipment	Mosley HLBA-III-100-2-AP-12/9 baler
--- DISPOSAL —	
Site Description	Class II landfill (< 20t/day); 30 acres (based on 40 CFR 258)
Disposal Method	Balefill
Site Ownership	City of Valdez
Wastes No Longer Accepted	Septic tank pumpings, honey bucket wastes, asbestos, vehicles, medical wastes, oil and gas drilling wastes
Site Practices (fencing, covering)*	
Fencing	Yes, locked gate
Attendant	FT attendant at baler, access to balefill controlled
Liner	Not required
Monitoring	Yes, at 3 sites - sample 4x/yr
Leachate Collection, Treatment	
Gas Control	
Open Burning	
Cover	Gravel, silt, and stumps
Run-on Run-Off Control	
Closure Plans	Yes
Site Issues	
Remaining Capacity	3-5 years under current grading plan - vertical expansion possible
Regulatory Status	Permit renewed (Spring 1995)
Potential Environmental Impacts	High water table, high precipitation, earthquake risk, tsunami

Figure 3F: 1994 Solid Waste Operating Budget (Valdez)

Item	Amount	Comment
COSTS		
Administrative	$423,427	
Supervisory		1 Public Works Director (10% of salary is devoted to MSW); 1 Solid Waste Manager
Labor		5 F/T employees
Capital Equipment	79,217	
Parts and Supplies	81,309	
Contractual Services	23,407	
Utilities	37,899	
Misc.	24,395	
TOTAL COSTS	**$669,654**	

TOTAL OPERATING BUDGET	**$669,654**

NOTE: This operating budget is funded by the General Fund tax base. In 1995, a tipping fee for C&D debris was introduced, and earned $6,500 in direct revenues in the first quarter. This amount may decrease in the future as Alyeska is beginning to recycle its scrap metal.

Figure 3G: Recycling Activities (Valdez)

Material	Recycler	Collection	Shipping/Marketing	Annual Quantity	Comments
Aluminum **Office Paper** **Newsprint** **Cardboard**	Joint program with Alyeska, city and PWS Conservation Alliance	Collection at grocery store; Aluminum also collected at City Hall	Alyeska funds contractor to pick up/truck the city's recyclables to Anchorage Recycling Center; proceeds donated to charity	Aluminum 2T Office Pap 39T Newsprint 22T Cardboard 10T	Other recycling activities: » Alyeska recycled 44 tons of materials in 1994, including glass and sensitized paper; plans to bale cardboard » Eagle Quality Center recycles own cardboard (100T/year) » Harborview Development Center collects aluminum and ships to Anchorage via U.S. Coast Guard
Lead-Acid Batteries	City of Valdez	Drop off at baler	Exide Corp. picks up for recycling (no charge)	60 tons	Monthly pickup: Exide picks up and ships to smelter in CA
Used Oil	City, DOT, service stations, private businesses	Drop off at harbor or baler, or burned on-site	Picked up at harbor or delivered to burn	10,000 gallons	In future, may not have capacity to burn all of used oil. Regulations may limit opportunities to transport used oil from harbor to other locations for storage, burning.
Abandoned Vehicles	One-time effort by PWSEDC, City	Contractor will be hired to collect and crush vehicles	Contractor will make shipping and marketing arrangements	Expect collection of 1300 vehicles in 1995 (stockpiled qty.)	Special one-time $120K DOT grant (Cordova also funded for $100K through grant)

NOTE: 7% of the MSW generated in Valdez in 1994 was recycled

Figure 3H: Composition and Recycling Rates of Selected Recyclables (Valdez)

Material	% Total MSW		Waste Stream Generated in Valdez (tons)	% Waste Stream Recycled		Waste Stream Recycled in Valdez (tons)*
	National	Valdez		National	Valdez	
Newspaper	6%	4%	228	46%	10%	22
Office Paper	3	5	285	37	15	43
Cardboard	13	15	855	56	13	110**
Aluminum	1	<1	57	53	4	2
Lead Acid Batteries	1	1	61	95	98	60

footnotes: National figures drawn from EPA's "Characterization of Municipal Solid Waste in the U.S.: 1994 Update."
* Quantity is for city and Alyeska combined
** Quantity includes 100 tons recycled by Eagle Quality Center

Figure 31: Special Waste Generation and Management (Valdez)

Waste Stream	Generation	Management	Comments
Construction & Demolition Debris	7,200 cy/yr	Drop off at C&D landfill; wood from Alyeska to be delivered to baler for free pickup	In 1995, city started charging for disposal; permit to expire 10-95; Alyeska to begin recycling their metals
Used Oil	10,000 gal/yr	Drop off at harbor or baler. 5,000 gallon harbor stationary tank, with two smaller mobile tanks. Users pick up or harbor delivers to burners	Several facilities burn waste oil for fuel (city shop, DOT, two garages, three private burners)
Oil-contaminated Materials	9 tons/yr	Shipped out for hazardous materials management	
Oil-contaminated Soils	Unknown		DOT plans to install above ground double walled tanks
Scrap Metal	» City–unknown » DOT–5 tons/yr	Drop off at construction pit	One-time recycling effort underway
Household Hazardous Waste	2 tons	Contractor picks up as needed (approx. quarterly)	City pays approximately $12K/year
Sewage Sludge	» 650 dry lbs/day » 120 dry tons/yr	(1) Permitted sludge pit burial (2) Alyeska disposes of separately	To comply with regulations, installing dewatering unit and will be put in balefill/used as vegetative cover
Medical Waste		Shipped to Fairbanks Memorial Hospital to incinerate	New EPA regulations may restrict certain incineration activities
Incinerator Ash	92 85-gallon drums	Drop off in drums at construction pit	TCLP-tested, Alyeska main generator
Tank Scale & Sandblast Grit	60 tons/yr	Drop off in drums or supersacks at construction pit	TCLP-tested, Alyeska main generator
Cruise Ship Waste (Marpol)	60 tons/yr	Drop off at baler by private contractor	City to begin charging port tariff
Zinc		Construction pit	
Glycol			DOT recycles its own
Asbestos		Not accepted for disposal	

NOTE: "Special Wastes" are defined as wastes not normally managed with other MSW.

Figure 3J: Water-Related Waste Generation and Management: Valdez

Waste Stream	Generation	Management	Comments
Wastewater Effluent	0.8 MGD (avg) Design flow: 1.5 MGD	Three stage lagoon system	Permit under review for renewal
Stormwater Runoff	-------	Street drains into harbor, no catch basins or oil-water separator	Proposal for stormwater catch basins in Harbormaster plan
Fish Wastes	Unknown		Corps of Engineers looking at ways to improve flow in harbor
Shore-based Processors	Peter Pan Seafoods, Nautilus Seafoods	Peter Pan: outfall to <200 ft Nautilus: outfall to 30 ft	
Floating Processors			
Sport Fish Cleaning Stations	Heavy generation three months/year	Five stations, carcasses deposited in harbor	Constructing one floating dumpster as a pilot effort
Vessel Wastes			
Bilge Water	-------	Harbor doesn't accept unless mostly oil	No oily water processors
Wastewater	-------	» Small boat harbor: no pumpout system » Commercial harbor: single point pumpouts to lift station	Set aside money for sewage pumpout

Section 4: Tatitlek Waste Stream Generation and Management[3]

The following information describes the amounts of wastes generated in Tatitlek and how they are currently being managed. The quantity and management of waste streams generated is important for developing appropriate alternatives for reduction, recycling, and/or disposal of the waste. The information is organized according to the following four categories of waste streams: municipal solid waste; recyclable waste streams; waste streams requiring special processing; and water-related waste streams.

MUNICIPAL SOLID WASTE

Current Generation Rate. The annual quantity of municipal solid waste (MSW) generated in Tatitlek is 183 tons. This figure includes construction and demolition debris and scrap metal, because most of these materials are disposed of together with the rest of the village's MSW. Including these materials gives Tatitlek an annual per capita waste generation rate (1.69 tons per capita per year) that is higher than the national average (one ton per capita per year). (Figure 4A).

Remaining Landfill Capacity. The landfill is currently at capacity (telephone conversation with Gary Kompkoff, IRA Village President). The Village IRA Council considers funding for the development of a new landfill a high priority.

Waste Composition. The composition of MSW generated by Alaskan communities varies somewhat from the national average, due to the higher percentage of goods requiring packaging for shipment to Alaska and to differences in climate. These differences mean that Alaskans generate a higher percentage of paper and a lower percentage of brush and yard waste, among other differences, than the rest of the country. (Figure 4B)

MSW Management System. The disposal site is 1.5 miles from the village, near the end of the airport runway. The Village maintenance staff person is in charge of collection and waste disposal. The Village provides weekly pickup of MSW from residences (weather permitting) using the village-owned dump truck. As well, individuals can haul their own MSW to the disposal site. There is currently no fee charged for the collection service, in part because of the city's inability to pick up

[3] Information on Tatitlek is based on a telephone interview and Tatitlek's 1993/94 solid waste management plan. The information will be updated after a site visit to Tatitlek has been completed.

solid waste on a regular basis (due to weather conditions). The disposal site is owned by the Tatitlek Corporation. Cover is not applied on a regular basis, but recently the village received surplus dirt from on-site contractors to cover the site. The site is fenced and has a gate, but these need extensive repairs. Paper waste is sometimes blown away by high winds. The disposal site is unpermitted.

RECYCLABLE MATERIALS

Aluminum Cans. Aluminum cans are collected at three locations in the Village, including the Community school and two businesses, and are also collected by individuals. The cans are shipped by air to the Anchorage Recycling Center if arrangements can be made for free transportation. The Village is exploring the possibility of recycling paper. (Figure 4C)

SPECIAL WASTE GENERATION AND MANAGEMENT

Special wastes are those wastes that should not be disposed of in the same manner as the rest of the municipal solid waste streams due to the potential contamination of ground or surface water, size, or other factors. (Special waste generation and practices are summarized in Figure 4D.)

Abandoned Vehicles and Scrap Metal. Scrap metal is disposed of at the disposal site. Old appliances are dismantled prior to disposal.

Lead-acid Batteries and Household Hazardous Waste (HHW). Approximately 10 waste batteries are generated per year in Tatitlek, and are currently disposed of rather than recycled. The same is true of HHW. The Village would like to set up a system to pick up hazardous waste, including batteries, for recycling or disposal outside of the Village.

Used Oil. Approximately 200 gallons of used oil are generated annually. Used oil is collected in drums and stored at a specific location until arrangements can be made for pick up and recycling in another community. Some used oil is used in chainsaws.

Construction and Demolition Debris (C&D). Scrap lumber is generally burned or utilized by residents. Other construction waste is disposed at the disposal site.

Septic Tanks Wastes or Sludge. Septic tank wastes are collected in the community septic system. The septic tank is checked annually by an Indian Health Service inspector. The community septic tank has no pump/transport tank or usable disposal site.

Medical Waste. Medical clinic waste is annually shipped to ANMC for disposal.

WATER-RELATED WASTE GENERATION AND MANAGEMENT

Stormwater Runoff. Stormwater runoff over urbanized areas (streets, roofs, etc.) contains various petroleum products, metallic dust, food wastes, and other contaminants. Stormwater systems can also be contaminated by leaking sewage mains or leaking fuel oil mains. Due to its relatively small urbanized area, pollution generated by stormwater runoff is not likely to be a major problem for Tatitlek.

Fish Wastes. There is a mariculture operation in Tatitlek, but the wastes generated are not considered an immediate concern by the village. (Figure 4E)

Figure 4A: MSW Composition, Percent by Weight

Waste	National*	Prince William Sound	Comments
Paper	38	43	Alaska doubles/triples packaging
Glass	6	5	shipping/breakage & weight
Metals (ferrous and non)	8	8	
Plastics	9	12	replaces glass
Rubber & Leather	3	3	
Textiles	3	3	
Wood	7	8	packaging
Food	7	8	
Brush & Yard	16	6	few yards (esp. Whittier)
Miscellaneous	3	4	
Total	100	100	

footnote: * Drawn from EPA's "Characterization of Municipal Solid Waste in The United States: 1994 Update" The figures do not include Construction and Demolition debris, municipal sludges, combustion ash, automobile bodies, or industrial process wastes.

Figure 4B: MSW Management System (Tatitlek)

— COLLECTION —	
Volume Collected and Disposed	183 tons
Point of Collection	(1) Residential; (2) Businesses
Frequency of Collection	Weekly pickups, weather permitting (individuals can haul own trash to dump site)
Storage Containers	Disposable: plastic garbage bags, boxes
Vehicles	City dump truck
— PROCESSING —	
Sorting for Recyclables	Aluminum collected at schools and businesses
Baling	No
Equipment	No
— DISPOSAL —	
Site Description	1.5 miles away from village; at end of airport runway
Disposal Method	Landfill
Site Ownership	Tatitlek Corporation
Banned/Excluded Wastes	Medical waste shipped to ANMC
Site Practices (fencing, covering)*	
Fencing	Yes: needs repairs; gate doesn't lock
Attendant	No
Liner	No
Monitoring	No
Leachate Collection, Treatment	No
Gas Control	No
Open Burning	No
Cover	No
Run-on Run-Off Control	Bulldoze site monthly
Closure Plans	No
Site Issues	
Remaining Capacity	Currently nearing capacity
Regulatory Status	Unpermitted
Potential Environmental Impacts	Blowing paper litter, leachate, no regular cover, high water table

Fiigure 4C: Recycling Activities (Tatitlek)

Material	Recycler	Collection	Shipping/Marketing	Annual Quantity	Comments
Aluminum		Collect at Community School, Community Center	Will ship via air with charter operator to Anchorage Recycling Center (ARC)		
Used Oil		Reuse			Use in chainsaws

* *Note: Tatitlek is currently exploring opportunities to recycle cardboard, abandoned vehicles, and lead acid batteries.*

Figure 4D: Special Waste Generation and Management (Tatitlek)

Waste Stream	Generation/Year	Management	Comments
Construction & Demolition Debris	Unknown	Scrap lumber generally burned or used by residents; other construction waste disposed at construction site	
Used Oil	200 gal	Stored in drums until arrangements can be made for disposal/recycling in another city	
Oil-contaminated Materials	Unknown	Disposal site	
Oil-contaminated Soils	N/A		
Scrap Metal	» 1 car » 5 appliances	Disposal site	
Household Hazardous Wast	Unknown	Disposal site	
Sewage Sludge	Unknown	Collected in community septic system	Tanks checked annually by PHS
Medical Waste	Unknown	Ship to ANMC for disposal	
Incinerator Ash	N/A		
Tank Scale & Sandblast Grit	N/A		
Cruise Ship Waste (Marpol)	N/A		
Zinc			
Antifreeze			
Asbestos			

NOTE: "Special Wastes" are defined as wastes not normally managed with other MSW.

Figure 4E: Water-Related Waste Generation and Management (Tatitlek)

Waste Stream	Generation	Management	Comments
Wastewater Effluent		Outfall pipe to ocean	
Stormwater Runoff		No management practices	
Fish Wastes			
Shore-based Processors	Mariculture		
Floating Processors	N/A		
Sport Fish Cleaning Stations	N/A		
Vessel Wastes			
Bilge Water		No OWS or other facilities	
Wastewater		No sewage pumpouts	

Section 5: Chenega Bay Waste Stream Generation and Management

Figure 5A: MSW Management System (Chenega Bay)

--- COLLECTION ---	
Volume Collected and Disposed	172 tons per year
Point of Collection	Homes, harbor, businesses, schools
Frequency of Collection	Drop-off at any time, village employee collects trash from community buildings
Storage Containers	Bags, boxes, cans, buckets
Vehicles	Private vehicles, IRA Council vehicles
--- PROCESSING ---	
Sorting for Recyclables	No
Baling	No
Equipment	No
--- DISPOSAL ---	
Site Description	
Disposal Method	Landfill
Site Ownership	Chenega Bay IRA
Wastes No Longer Accepted	
Site Practices (fencing, covering)	
Fencing	No fence
Attendant	No
Liner	No
Monitoring	No
Leachate Collection, Treatment	No
Gas Control	No
Open Burning	
Cover	No. Planning to cover with remediated soil from old saltery clean up
Run-on Run-Off Control	No
Closure Plans	N/A
Site Issues	
Remaining Capacity	"At capacity"
Regulatory Status	Unpermitted
Potential Environmental Impacts	Drain to Anderson Creek (salmon spawning habitat which can no longer be used); blowing litter; wildlife access to disposal site

Figure 5B: Special and Recyclable Waste Management Profile: Chenega Bay

Waste Stream	Generation/yr	Management	Comments
Construction & Demolition Debris	unknown	Reuse/incinerate/dispose	Demolition debris at old herring cannery saltery, old PHS trailer
Used Oil	200 gal/yr	Currently, store in drum on dock, or burn in barrels	»Not burned for energy recovery »HHW/used oil storage facility to be built
Oil-contaminated Materials	unknown	Disposed of in landfill	Oiled boom on dock, not containerized
Oil-contaminated Soils	unknown	Stockpiled at landfill	Currently obtaining funding to clean up around tanks at old saltery site and to remediate stockpiled soil
Scrap Metal	six abandoned vehicles + 200 drums (accumulated over several years)	No centralized collection or management of scrap metal	
Household Hazardous Waste	unknown	No disposal method	Storage facility to be built
Sewage Sludge *	2-4 tons	Store in sewage holding tanks	Tank has not been pumped for 5+ years; is overflowing on beach
Medical Waste		Incinerate; ship out needles to Seward	
Asbestos	unknown		Old herring cannery saltery
Batteries	10-15/year	Disposed of in landfill	Not recycled
Paper (cardboard, newsprint, office)	84 tons	Burned by individuals, disposed in landfill	Not recycled
Aluminum Cans	10 tons	Disposed of in landfill	Not recycled--school collected in 1993 and 1994, but airlines uncooperative in transporting them

NOTE: "Special Wastes" are defined as wastes not normally managed with other MSW.

** Assume average sewage sludge generation = .2 tons/day/capita (average population = 60-80)*

Figure 5C: Water-Related Wastes Management Profile (Chenega Bay)

Waste Stream	Generation/yr	Management	Comments
Wastewater Effluent	unknown	Outfall pipe to Sound	Septic tank system
Stormwater Effluent	N/A	N/A	
Fish Wastes			
Shore-based Processors	N/A	N/A	
Floating Processors	N/A	N/A	
Sport fish Cleaning	unknown	Disposed of in Sound	
Vessel Wastes			
Bilge Water	unknown	No OWS or other facilities	
Wastewater	unknown	No sewage pumpouts	

Figure 5D: Non-Community-Specific Wastes Generation and Management Profile (Chenega Bay)

Waste Stream	Generation/yr	Management	Comments
Remote residences	four private homes--Sawmill Bay	Sewage practices unknown	

Section 6: Whittier Waste Stream Generation and Management

The following information describes the amounts of wastes generated in Whittier and how they are currently managed. The quantity and management of waste streams generated is important for developing appropriate alternatives for reduction, recycling, and/or disposal of the waste. The information is organized according to the following four categories of waste streams: municipal solid waste; recyclable waste streams; waste streams requiring special processing; and water-related waste streams.

MUNICIPAL SOLID WASTE

Current Generation Rate. The annual quantity of municipal solid waste (MSW) generated for disposal in Whittier is approximately 415 tons, with an average daily generation of one ton per day. This information is based on records kept by the City's waste collection and disposal contractor (Peninsula Sanitation). (Figure 5A).

Future Generation Rate. The waste generation rate is correlated with population, economics, and community goals and practices. An increase in population usually results in an increase in solid waste. Waste reduction or recycling can reduce the amount of waste sent to a disposal facility.

The population in Whittier is expected to remain relatively stable over the next 20 years. Under this assumption, Whittier's annual waste generation would be approximately 440 tons per year (including the waste that is currently diverted for recycling). With a recycling program that was able to reach a 20% reduction/recycling goal in the next five years, Whittier's annual waste generation would decrease to approximately 340 tons. (Figure 5B)

Waste Composition. The composition of MSW generated by Alaskan communities varies somewhat from the national average, due to the higher percentage of goods requiring packaging for shipment to Alaska and to differences in climate. These differences mean that Alaskans generate a higher percentage of paper and a lower percentage of brush and yard waste, among other differences, than the rest of the country. (Figure 5C)

MSW Management System. In 1993, the City of Whittier privatized the collection and disposal of its MSW. Its contractor, Peninsula Sanitation, collects the city's solid waste every other week using a compactor truck and transports it via rail and

road to the Anchorage transfer station at Girdwood. The MSW is ultimately disposed of at the Anchorage landfill. The MSW disposal rates are $13.50 for residents and $14.40 per cubic yard for the commercial and harbor dumpsters. The customers are billed for the total costs of waste collection and disposal services. (Figures 5D and E)

RECYCLING ACTIVITIES

Aluminum Can Recycling. Two stores currently collect aluminum cans. The stores are responsible for the recycling effort, including locating markets and funding transportation of the materials.

Lead-Acid Batteries. Approximately fifteen to twenty batteries are recycled each year. These batteries are normally abandoned beside dumpsters at the harbor. The Public Works Director collects and transports the batteries to a recycler in Anchorage. The City has been paying $.15/lb to recycle the batteries, but recently switched to another recycler which accepts the batteries at no charge. (Figures 5F and G)

SPECIAL WASTE GENERATION AND MANAGEMENT

Special wastes are those wastes that should not be disposed of in the same manner as the rest of the municipal solid waste streams due to their potential contamination of surface or ground water, their large size, or other factors. Batteries and scrap metal fall into this category, but are recycled by the city and are discussed in the previous section. (Special waste generation and practices are summarized in Figure 5H.)

Used Oil. Approximately 1,500 gallons of used oil are generated each year in Whittier. In addition, the city has a backlog of approximately 50,000 gallons of used oil. The City has a 250-gallon collection tank at the harbor. Used oil is transferred to 55-gallon drums and transported to be burned at either of two burners in Whittier (one privately-owned, one city-owned). The City recently purchased an additional used oil burner. The City is in the process of designing a new harbor collection system, which includes construction of an 8′ by 12′ building to house a 500 gallon collection tank with 110% containment, and associated equipment.

Oily Materials. These materials are currently disposed of with the rest of the MSW. The City generates a relatively large amount of oil boom from harbor activities and is planning to buy a mobile barrel-type burner (a "Smartash") to burn oil materials.

Petroleum-Contaminated Soil. The City recently unearthed a large quantity (specific quantity unknown) of contaminated soil during its water system reconstruction. The soil is currently stockpiled until an approach to and budget for its remediation can be determined. The City expects to unearth additional contaminated soils during its upcoming harbor redevelopment.

Abandoned Vehicles and Scrap Metal. Approximately 35 abandoned vehicles are currently strewn throughout the City. At this time, Whittier does not have any plans to ship the vehicles out for recycling. The City is attempting to obtain a gondola car from the railroad in which to collect other types of scrap metal.

Household Hazardous Wastes (HHW). The City does not operate a HHW program.

Construction and Demolition Debris (C&D). A minimal amount of construction and demolition debris is generated in Whittier.

Septic Tank Sludge. The City has four 20,000 gallon septic tanks. Fifty thousand gallons of septage was recently shipped to Anchorage for disposal. According to the Public Works Director, this may have been the first time that sludge had been removed from the septic system.

Asbestos. Whittier has a large military building (a building which used to house service personnel) that has been condemned. The building is believed to contain a large quantity of asbestos. Although the City does not own the building, the current owner has gone bankrupt. The City is in the process of budgeting for removal of the asbestos.

WATER-RELATED WASTE GENERATION AND MANAGEMENT

Stormwater Runoff. Stormwater runoff over urbanized areas (streets, roofs, etc.) contains various petroleum products, metallic dust, food wastes, and other contaminants. Stormwater systems can also be contaminated by leaking sewage mains or leaking fuel oil mains. Whittier currently has no stormwater system in place.

Fish Wastes. Great Pacific Seafoods operates a processing plant in Whittier. The fish guts are disposed in deep water; the rest is ground and disposed of through the city's wastewater system. The City has had problems with the processor not

grinding the fish waste into small enough (1/2" or less) pieces but, after a complaint lodged by the City, the problem appears to have been resolved.

Vessel Wastes

Bilge Water There are no facilities (oil-water separators) for bilge water in Whittier.

Wastewater The boat harbor does not currently have a sewer pumpout.

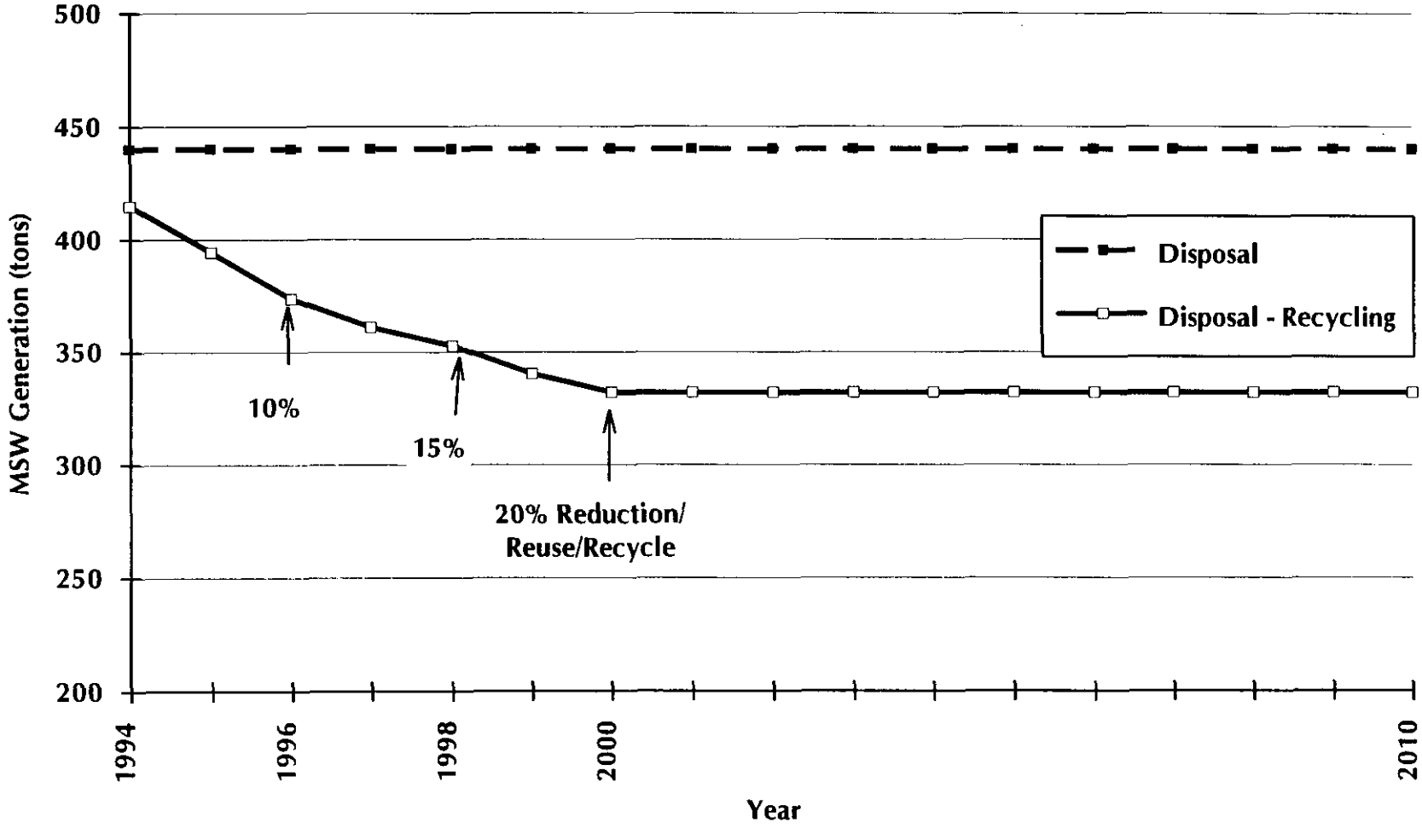
Wastewater Effluent. Wastewater effluent from the City's four 20,000 gallon septic tanks is disposed of through an ocean outfall at -40 feet through a diffuser. (Figure 5I)

Figure 6A: 1994/1995 Seasonal Variation in MSW Generation

	J	F	M	A	M*	J*	J*	A*	S*	O*	N*	D*	Total
Quantity (tons)	17	18	16	29	35	53	56	73	40	34	18	26	415
% of total weight	4	4	4	7	8	13	13	18	10	8	4	6	100%

footnotes: These numbers were furnished by Peninsula Sanitation, Whittier's contract hauler
* 1994 volumes

Figure 6B: Projected MSW Generation With and Without Recycling (Whittier)



NITE: Based on 440 annual generation in 1994 (25 tons diverted)

Ross & Associates Environmental Consulting, Ltd.

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Figure 6C: MSW Composition, Percent by Weight

Waste	National*	Prince William Sound	Comments
Paper	38	43	Alaska doubles/triples packaging
Glass	6	5	shipping/breakage & weight
Metals (ferrous and non)	8	8	
Plastics	9	12	replaces glass
Rubber & Leather	3	3	
Textiles	3	3	
Wood	7	8	packaging
Food	7	8	
Brush & Yard	16	6	few yards (esp. Whittier)
Miscellaneous	3	4	
Total	100	100	

footnote: * Drawn from EPA's "Characterization of Municipal Solid Waste in The United States: 1994 Update" The figures do not include Construction and Demolition debris, municipal sludges, combustion ash, automobile bodies, or industrial process wastes.

Figure 6D: 1993 Solid Waste Operating Budget (Whittier)*

Item	Amount	Comments
COSTS		
Administrative	$40,100	
Supervisory		Public Works Director (.5FTE)
Labor		2 FTE
Debt Service		
Consulting Svcs.		
Services	6,846	Includes licences & permits, freight and rental services, and travel expenses
Lease	30,012	
Waste Disposal	31,000	Includes rail transport and gondola fees
Supplies/Materials	8,600	Includes utilities and repairs
TOTAL COSTS	**$116,558**	

** These figures are based on the City's projected 1993 budget and not actual expenditures.*

TOTAL OPERATING BUDGET	**$116,558**

Figure 6E: 1995 Refuse Disposal Rates

Customer Category	Pickup/ Delivery	Cost	Comment
Harbor Dumpsters	Pickup	$14.40	per cubic yard
Residential	Pickup	$13.50	per month

Figure 6F: Recycling Activities (Whittier)

Material	Recycler	Collection	Shipping/Marketing	Annual Quantity	Comments
Aluminum	2 stores collect	Barrels outside stores	Ship to Anchorage Recycling Center	1/2 tons	
Cardboard	Anchor Inn store collects [1]		Ship to Anchorage Recycling Center	5 tons	
Lead-Acid Batteries	Battery Specialist (Anchorage, AK)	At harbor	PW Director loads pallet onto personal truck and delivers to recycler (one trip/year)	15-20 (1 ton)	City pays $.15/lb to recycle; is exploring other recycling options
Used Oil	City of Whittier	250 gal collection tank at harbor	Transfer to 55 gal drum and burn at city/private burner	1,500 gal	
Junk Vehicles	Not currently recycled	Not currently collected	N/A	30-35 (generated over several years)	City would like to collect and ship to Anchorage

[1] *the Anchor Inn also collects glass (brown, green, and clear) and newspaper*

Figure 6G: Composition and Recycling Rates of Selected Recyclables (Whittier)

Material	% Total MSW		Waste Stream Generated in Whittier (tons)	% Waste Stream Recycled		Waste Stream Recycled in Whittier (tons)*
	National	Whittier		National	Whittier	
Newspaper	6%	3%	13	46%	<10%	<1
Office Paper	3	3	13	37	—	—
Cardboard	13	15	66	56	8	5
Aluminum	1	1	4	53	12	<1
Lead Acid Batteries	1	1	<2	95	80	1

footnotes: National figures drawn from EPA's "Characterization of Municipal Solid Waste in the U.S.: 1994 Update."

Figure 6H: Special Waste Generation and Management (Whittier)

Waste Stream	Generation/Year	Management	Comments
Construction & Demolition Debris	Minimal		
Used Oil	1,500 gal	Burn for energy recovery	»The city has 2 municipal waste oil burners (one is not yet hooked up), 1 privately owned burner » The city is redesigning its used oil collection program » The city currently has a 50,000+ gal surplus of used oil in storage
Oil-contaminated Materials	3 cu.yds.	Disposed with rest of MSW	The city is researching alternate methods of management (e.g., purchase of a SmartAsh incinerator to burn oil booms and other materials
Oil-contaminated Soils	Unknown	Store in contained piles	
Scrap Metal	Unknown	Store around city	The city is looking at different disposal options
Household Hazardous Waste	Unknown	No special management	
Sewage Sludge	Unknown	Store in septic tanks	50,000 gal recently shipped to Anchorage for disposal following tank pumpout
Medical Waste	Minimal		There is no clinic or hospital
Cruise Ship Waste (Marpol)	N/A		
Zinc	Unknown	---	Can be found under grid in harbor in small quantities
Antifreeze	Unknown		
Asbestos	Unknown		Condemned military buildings may contain large amounts; City is budgeting for its removal

NOTE: "Special Wastes" are defined as wastes not normally managed with other MSW.

Figure 6I: Water-Related Waste Generation and Management (Whittier)

Waste Stream	Generation/Year	Management	Comments
Wastewater Effluent	5.2 million gal	Four 20,000 gal. septic tanks; ocean outfall 40 ft to a diffuser	Also pump hatcheries' septic tanks
Stormwater Runoff			
Fish Wastes			
Shore-based Processors	Great Pacific Seafoods: 1,000 tons	Fish guts disposed in deep water; rest is ground and flushed to city's ww sewer system	System at capacity; during heavy rains, have infiltration and inflow
Floating Processors	N/A		
Sport Fish Cleaning Stns	500 lbs		
Hatcheries *		Fish waste is filtered and vacuumed into ww system; is treated and discharged on an NPDES permit	Hatcheries barge their solid waste (non-fish related) to Whittier; private contractor handles disposal at Anchorage landfill
Vessel Wastes			
Bilge Water	unknown	Vessels discharge before entering harbor	Oily bilge water sometimes pollutes harbor
Wastewater	unknown	No sewage pumpouts available	

*** Seven fish hatcheries are located in PWS. Four are owned by PWSAC (Cordova): Wally Noerenberg (Esther Island); Cannery Creek (Unakwik Inlet); Armin F. Koernig (Evan Island); and Main Bay (Main Bay).**

APPENDIX C
Recycling and Solid Waste Management Cost Estimates

Appendix C.1—Valdez
Introduction: Cost Estimates of Solid Waste Management Options

Appendix C to the Sound Waste Management Plan provides detailed cost estimates of municipal solid waste management alternatives for Valdez, Cordova, Tatitlek, and Chenega Bay.[1] Community representatives who developed the Sound Waste Management Plan will use this cost information as a foundation for discussions with their city/village councils and the general public to determine how best to manage municipal solid waste over the long term.

Appendix C is divided into three sections (C.1, C.2, C.3), each of which contain cost estimates for individual communities: Valdez, Cordova, and the villages (cost estimates for Tatitlek and Chenega Bay have been combined due to the similarity of population size and current solid waste management methods). For each community, a wide range of municipal solid waste disposal alternatives were analyzed. For Cordova and Valdez, the current costs of solid waste collection and the costs and revenues associated with operating a drop-off recycling program were also estimated.

The cost estimates were developed based on extensive discussion with and review by city and village personnel participating in the project. Site visits to each community were conducted to help ensure that a complete and accurate understanding of the community's current solid waste management program and management issues was achieved.

The information contained in each of the three community sections is organized as follows:

- **cost summary sheets**, which compare the total capital and annual costs of the different waste disposal options and identify the preferred options for each community;
- **cost estimates of individual disposal options**, which provides detail on the individual cost components of each option;
- **cost estimates of the current costs of solid waste collection** in Cordova and Valdez; and
- **cost estimates of operating a recycling program** in Cordova and Valdez.

The cost summary sheets present the costs for each option in three different ways:

- **total costs** over the life of the disposal option (a twenty year planning horizon was used);
- **annualized costs**, which is what the option would cost if it were paid for in equal annual payments over the project's life; and
- **cost per ton**, which divides the annualized costs by the tons of solid waste generated annually.

The information contained in this Appendix was used to develop Recommendation #5 ("Choosing Solid Waste Disposal Sites and Methods") of the Sound Waste Management Plan.

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[1] Cost estimates were not developed for Whittier, because the city recently made the long-term decision to privatize its solid waste collection and to dispose of its solid waste at the Anchorage landfill.

TABLE OF CONTENTS: VALDEZ

Cost Estimates of Solid Waste Management Options

February 29, 1996

TABLE 1: COMPARISON OF SOLID WASTE MANAGEMENT OPTIONS [1]
Valdez

		OPTION 1A:	OPTION 1B:	OPTION 2:	OPTION 3:	OPTION 4:	OPTION 5A:	OPTION 5B:	OPTION 6:	OPTION 7:
Costs [2]		**Vertical Expansion of Balefill (no modifications)**	**Vertical Expansion of Balefill (cut-off wall)**	**Lateral Expansion of Balefill (with liner)**	**Regional Landfill: Glennallen**	**Regional Landfill: Mile 70**	**Regional Landfill: Valdez (lat. expansion)**	**Regional Landfill: Valdez (vert. expansion, cut-off wall)**	**Ship to Southeast**	**Ship to Lower 48**
Capital Costs	($)	$1,627,000	$5,655,000	$7,500,000	$324,000	$2,049,000	$6,532,000	$4,942,000	$324,000	$324,000
Annual O&M Costs (except trans.) [2]	($/yr)	$410,000	$410,000	$410,000	$714,000 - $789,000	$628,000	$390,000	$390,000	$899,000	$581,000
Transportation	($/yr)	N/A	N/A	N/A	[3]	$140,000 - $240,000	N/A	N/A	$350,000	$575,000
Closure	($)	$500,000	$500,000	$500,000	N/A	$172,500	$508,000	$508,000	N/A	N/A
Insurance	($/yr)	N/A	N/A	N/A	N/A	$17,250	$17,500	$17,500	N/A	N/A
Total Present Value of Costs [4]	($)	$5,960,000	$8,836,000	$10,190,000	$7,869,000 - $8,664,000	$10,182,000 $11,242,000	$9,332,000	$8,253,000	$13,563,000	$12,567,000
Annualized Cost (present value)	($)	$562,000	$833,000	$1,040,000	$742,000 - $817,000	$960,000 - $1,060,000	$880,000	$778,000	$1,279,000	$1,185,000
Annual Cost/Ton (present value) [5]	($)	$97	$144	$180	$128 - $141	$166 - $184	$152	$135	$221	$205

1 All costs (except annual costs) are based on a twenty-year period.
2 Collection, recycling, and post-closure costs are not included in these figures. All costs have been rounded to the nearest thousand.
3 Transportation is included in Annual O&M for this alternative.
4 Present value calculations are in 1995 dollars and based on an 8% discount rate.
5 Cost estimates are based on 1994 solid waste disposal of 5776 tons.

TABLE 2: COST SUMMARY OF SOLID WASTE MANAGEMENT OPTIONS, INCLUDING COLLECTION VALDEZ

☐ = *preferred MSW management option*

TOTAL COSTS (present value) [1] OVER 20 YEARS	OPTION 1A: Vert. Expansion of Balefill (no modifications)	OPTION 1B: Vert. Expansion of Balefill (cut-off wall)	OPTION 2: Lateral Expansion of Balefill (w/liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$5,900,000**	**$8,836,000**	**$10,190,000**	**$7,869,000 - 8,664,000**	**$10,182,000 - 11,242,000**	**$9,332,000**	**$8,253,000**	**$13,563,000**	**$12,567,000**
Collection	----------	----------	----------	$2,358,000 (same cost for all options)					
TOTAL	$8,258,000	$11,194,000	$12,548,000	*$10,227,000 - 11,022,000*	*$12,540,000 - 13,600,000*	$11,690,000	$10,611,000	$15,921,000	$14,925,000

ANNUAL COSTS/TON [2] (1995 dollars)	OPTION 1A: Vert. Expansion of Balefill (no modifications)	OPTION 1B: Vert. Expansion of Balefill (cut-off wall)	OPTION 2: Lateral Expansion of Balefill (w/liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$97**	**$144**	**$180**	**$128 - 141**	**$166 - 184**	**$152**	**$135**	**$221**	**$205**
Collection	----------	----------	----------	$39 (same cost across all options)					
TOTAL	$136	$183	$219	$167 - $180	$205 - $223	$191	$174	$260	$244

[1] Present value calculations are in 1995 $s and are based on an 8% discount rate and 20-year timeframe.
Cost per ton estimates are based on 1994 solid waste generation of 5776 tons.

TABLE 3: COMPARISON OF LEADING SOLID WASTE MANAGEMENT OPTIONS [1]
VALDEZ

OPTION 1A: Vertical Expansion of Balefill – no modifications

Estimated Costs of Disposal *(collection not included)*	Total Costs (present value) [2]	$5,960,000
	Annualized Costs (present value) [2]	$560,000
	Annual Cost/Ton (present value) [3]	$97
Advantages	· permit in place · socio status quo · proximity to users	
Disadvantages	· uncertainty of permit extension · potential groundwater contamination, stream intrusion, and seismic upset	

OPTION 3: Regional Landfill - Glennallen [4]

Estimated Costs of Disposal *(collection not included)*	Total Costs (present value) [2]	$7,870,000 - $8,660,000
	Annualized Costs (present value) [2]	$740,000 - $820,000
	Annual Cost/Ton (present value) [3]	$128 - $141
Advantages	· little or no potential for groundwater contamination · seismic damage of no consequence · strong incentive to recycle to minimize transport disposal costs · minimal environmental risk · ease of management	
Disadvantages	· lack of direct control	

[1] These costs are for disposal only because collection costs are the same for all options.

[2] Present value calculations are in 1995 dollars, and are based on 8% discount rate and 20-year planning horizon. Figures rounded to the nearest $10,000.

[3] Based on 1994 annual disposal rate of 5,776 tons.

[4] The range of costs is based on a high and low estimate of transportation costs from Valdez to Glennallen.

OPTION 1A: Vertical Expansion of Balefill (no modifications)

COST SUMMARY FOR OPTION 1A: VERTICAL EXPANSION OF BALEFILL (no modifications)

Capital Expenditures

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Permitting Costs [1]	LS			49,500
» Equipment and Vehicles	LS	455,000	3 [2]	1,365,000
» Design/Administration Costs (15%)	N/A	N/A	N/A	212,000
TOTAL COSTS (approximate) in 1995 $s				**$1,627,000**

[1] Assume initial and 3 renewals (figures based on draft ADEC regulations)

[2] Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance)

Item	Unit	Cost/Unit	Quantity	Annual Cost
» Cover Material	CY	$5	3,000	$15,000
» Site Upkeep (e.g., fence repairs)	LS			5,000
» Building Maintenance	LS			4,500
» Equipment O&M	LS			5,000
» Utilities	LS			20,000
» Salaries, Wages, and Benefits [1]	FTE	N/A	5.5	350,000
» Monitoring (Leachate/Groundwater)		10,000	20	10,000
ANNUAL O&M COSTS (1995 $s)				**$410,000**

[1] Each permanent employee receives a 26% Benefits package that includes a retirement plan, Medicare and Worker's Compensation. Each seasonal laborer receives a 17.75% benefits package. In addition, each permanent employee receives health insurance at a cost to the City of $4,250 per person.

NOTE: These summary figures do not include costs of municipal solid waste collection.

Account Requirements

Item	Unit	Cost/Unit	Quantity [1]	Total Cost (20-yr Operating Period) [2]
» Closure Fund	AC	$50,000	10	$500,000
» Post-Closure Fund *	AC	10,000	10	$1,000,000
» Insurance	LS	N/A	1	N/A [3]
TOTAL ACCOUNT REQUIREMENTS (1995 $s)				**$1,500,000**

[1] Based on the development of a 20-acre site (10 acres to be filled); existing 45-acre site is funded under a separate account

[2] The city would set aside a portion of this total amount each year, so that the total amount would be in the fund by the end of the 20-year operating period

[3] Valdez self-insures

* The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

BREAKDOWN OF SALARIES, WAGES, AND BENEFITS: VALDEZ

Salaries and Wages [1]	FTE	Annual Cost (1995 $s)
Public Works Director	0.06	$5,670
Solid Waste Manager	0.6	41,292
Landfill Operator	1	62,210
Baler Operator	1	65,478
Baler Assistant	2	124,420
Equipment Operator	—	
Seasonal Laborers	1	11,304
General Overhead (12.5%)		38,797
TOTAL ANNUAL LABOR COSTS		**$350,000**

[1] In addition to salaries and wages, the figures shown include benefits. Each permanent employee receives a 26% Benefits package that includes a retirement plan, Medicare and Worker's Compensation. Each seasonal laborer receives a 17.75% benefits package. In addition, each permanent employee receives health insurance at a cost to the City of $4,250 per person.

OPTION 1B: Vertical Expansion of Balefill
(with leachate cut-off wall)

COST SUMMARY FOR OPTION 1B: VERTICAL EXPANSION OF BALEFILL (with leachate cut-off wall)

Capital Expenditures

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Site Development	LS		1	$3,500,000
» Permitting Costs [1]	LS			49,500
» Equipment and Vehicles	LS	455,000	3 [2]	1,365,000
» Design/Administration Costs (15%)	N/A	N/A	N/A	740,000
TOTAL COSTS (approximate) in 1995 $s				**$5,655,000**

[1] Assume initial and 3 renewals (figures based on draft ADEC regulations)

[2] Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance)

Item	Unit	Cost/Unit	Quantity	Annual Cost
» Cover Material	CY	$5	3,000	$15,000
» Site Upkeep (e.g., fence repairs)	LS			5,000
» Building Maintenance	LS			4,500
» Equipment O&M	LS			5,000
» Utilities	LS			20,000
» Salaries, Wages, and Benefits [1]	FTE	N/A	5.5	350,000
» Monitoring (Leachate/Groundwater)		10,000	20	10,000
ANNUAL O&M COSTS (1995 $s)				**$410,000**

[1] Each permanent employee receives a 26% Benefits package that includes a retirement plan, Medicare and Worker's Compensation. Each seasonal laborer receives a 17.75% benefits package. In addition, each permanent employee receives health insurance at a cost to the City of $4,250 per person.

NOTE: These summary figures do not include costs of municipal solid waste collection.

Account Requirements

Item	Unit	Cost/Unit	Quantity [1]	Total Cost (20-yr Operating Period) [2]
» Closure Fund	AC	$50,000	10	$500,000
» Post-Closure Fund *	AC	10,000	10	$1,000,000
» Insurance	LS	N/A	1	N/A [3]
TOTAL ACCOUNT REQUIREMENTS (1995 $s)				**$1,500,000**

[1] Based on the development of a 20-acre site (10 acres to be filled); existing 45-acre site is funded under a separate account

[2] The city would set aside a portion of this total amount each year, so that the total amount would be in the fund by the end of the 20-year operating period

[3] Valdez self-insures

* The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 1B: BREAKDOWN OF SITE DEVELOPMENT COSTS: VALDEZ

Item	Unit	Cost/ Unit	Quantity	Total Cost (20-yr Operating Period) [1]
» Predevelopment Engineering Svcs. (incl. EIS, Feasibility Report, System Design)	LS	$250,000	1	$250,000
» Land Acquisition or Value	AC	3,000	20	60,000
» Site Development [2]	AC	15,000	10	150,000
» Leachate Cut-Off Wall	LS			1,313,000
» Leachate System [2]	AC	50,000	10	500,000
» Site Landscaping, etc.	AC	5,000	20	100,000
» Access Road	LS	50,000	1	50,000
» Utilities	LS	100,000	1	100,000
» Ancillary Building	SF	150	1,000	150,000
» Leachate Holding	LS	200,000	1	200,000
» Monitor Wells	EA	10,000	4	40,000
» Contingency (20%)	LS			582,000
SITE DEVELOPMENT TOTAL COSTS (1995 $s)				**$3,495,000**

[1] The capital costs are assumed to occur in the first year except for the following. Site development, and permitting costs will be incurred in years 1, 6, 11, and 16 (equal amounts in each of the four years). The leachate system and leachate holding costs will be incurred in years 1 and 11. Equipment and vehicle costs will be incurred in years 1, 8, and 15.

[2] Assume only 10 acres of site is developed for disposal; remaining 10 acres are buffer

OPTION 1B: BREAKDOWN OF LEACHATE CUT-OFF WALL COSTS

Item	Unit	Cost/Unit	Quantity	Total (20-yr Operating Period)
Excavation 20' deep x 2' wide x 6,000 LF (45 acres)	CY	$10	10,000	$100,000
Clay	CY	$25	10,000	250,000
Leachate Wellpoint System (one every 25')	EA	$2,000	250	500,000
Pumps, Piping, etc.	LS		2	100,000
Delivery Truck	LS	$50,000	2	100,000
Contingency (15%)				158,000
Engineering (10%)				105,000
TOTAL:				**$1,313,000**

OPTION 2: Lateral Expansion of Balefill (with liner)

COST SUMMARY FOR OPTION 2: LATERAL EXPANSION OF CURRENT BALEFILL (with liner)

Capital Expenditures

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Site Development	LS		1	$5,000,000
» Permitting Costs [1]	LS			49,500
» Equipment and Vehicles	LS	455,000	3 [2]	1,365,000
» Design/Administration Costs (15%)	N/A	N/A	N/A	960,000
TOTAL COSTS (approximate) in 1995 $s				**$7,500,000**

[1] Assume initial and 3 renewals (figures based on draft ADEC regulations)

[2] Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance)

Item	Unit	Cost/Unit	Quantity	Annual Cost
» Cover Material	CY	$5	3,000	$15,000
» Site Upkeep (e.g., fence repairs)	LS			5,000
» Building Maintenance	LS			4,500
» Equipment O&M	LS			5,000
» Utilities	LS			20,000
» Salaries, Wages, and Benefits [1]	FTE	N/A	5.5	350,000
» Monitoring (Leachate/Groundwater)		10,000	20	10,000
ANNUAL O&M COSTS (1995 $s)				**$410,000**

[1] Each permanent employee receives a 26% Benefits package that includes a retirement plan, Medicare and Worker's Compensation. Each seasonal laborer receives a 17.75% benefits package. In addition, each permanent employee receives health insurance at a cost to the City of $4,250 per person.

NOTE: These summary figures do not include costs of municipal solid waste collection.

Account Requirements

Item	Unit	Cost/Unit	Quantity [1]	Total Cost (20-yr Operating Period) [2]
» Closure Fund	AC	$50,000	10	$500,000
» Post-Closure Fund *	AC	10,000	10	$1,000,000
» Insurance	LS	N/A	1	N/A [3]
TOTAL ACCOUNT REQUIREMENTS (1995 $s)				**$1,500,000**

[1] Based on the development of a 20-acre site (10 acres to be filled); existing 45-acre site is funded under a separate account

[2] The city would set aside a portion of this total amount each year, so that the total amount would be in the fund by the end of the 20-year operating period

[3] Valdez self-insures

* The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 2: BREAKDOWN OF SITE DEVELOPMENT COSTS

Item	Unit	Cost/ Unit	Quantity	Total Cost (20-yr Operating Period) [1]
» Predevelopment Engineering Svcs. (incl. EIS, Feasibility Report, System Design)	LS	$250,000	1	$250,000
» Land Acquisition or Value	AC	3,000	20	60,000
» Site Development [2]	AC	15,000	10	150,000
» Liner [2]	AC	250,000	10	2,500,000
» Leachate System [2]	AC	50,000	10	500,000
» Site Landscaping, etc.	AC	5,000	20	100,000
» Access Road	LS	50,000	1	50,000
» Utilities	LS	100,000	1	100,000
» Ancillary Building	SF	150	1,000	150,000
» Leachate Holding	LS	200,000	1	200,000
» Monitor Wells	EA	10,000	4	40,000
» Contingency (20%)	LS			820,000
SITE DEVELOPMENT TOTAL COSTS (1995 $s)				**$5,000,000**
SITE DEVELOPMENT COST PER ACRE * (1995 $s)				**$500,000**

[1] The capital costs are assumed to occur in the first year except for the following. Site development, Liner, and permitting costs will be incurred in years 1, 6, 11, and 16 (equal amounts in each of the four years). The leachate system and leachate holding costs will be incurred in years 1 and 11. Equipment and vehicle costs will be incurred in years 1, 8, and 15.

[2] Assume only 10 acres of site is developed for disposal; remaining 10 acres are buffer

OPTION 3: Regional Landfill in Glennallen

COST SUMMARY FOR OPTION 3: REGIONAL LANDFILL IN GLENNALLEN [1]

Capital Costs

Transfer Station Construction	$324,000

Annual Costs

Transfer Station O&M	$321,000
Transportation and Disposal Costs	$393,000 - $468,000
TOTAL:	**$714,000 - $789,000**

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land Acquisition [1]				
Access, Site, Building Construction	LS		Modifications	$100,000
Transfer Containers–Supplied by Carrier	N/A	N/A	N/A	N/A
Recycling Bins and Containers	LS			$10,000
Loader [2]	EA	$80,000	2	$160,000
Engineering and Contingencies (20%)				$54,000
TOTAL:				**$324,000**

[1] Plan to use existing site

[2] Assumes the loader will have to be replaced once over the twenty-year period.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount	*Subtotal*
Personnel					
Operators [1]	FTE	$50,000	4	$200,000	
Public Works Director	FTE	$125,000	0.2	$25,000	
Administration (12.5%)	LS	N/A	N/A	$11,000	*$236,000*
Equipment					
Vehicle Maintenance	LS			$10,000	
Fuel, misc.	LS			$20,000	
Utilities	LS	N/A	N/A	$20,000	*$50,000*
Site Maintenance	LS	N/A	N/A	$3,000	*$3,000*
Insurance	LS	N/A	N/A	$3,000	*$3,000*
SUBTOTAL:				**$292,000**	
10% Contingency:				*$29,200*	
TOTAL:				**$321,200**	

[1] Includes maintenance of inert landfill (equivalent to 1 FTE)

ANNUAL DISPOSAL COSTS BASED ON LANDFILL TIPPING FEES

Location	Cost/Ton	Annual Disposal Cost[1]			
		Valdez	Cordova	Tatitlek	Chenega Bay
Glennallen[2]	$68 - $81	$393,000 - $468,000	$158,000 - $188,000	$6,800 - $8,100	$6,800 - $8,100
Southeast Alaska	$100	$577,600	$231,700	$10,000	$10,000
Lower 48[3]	$45	$259,920	$104,265	$4,500	$4,500

[1] These figures are based on each community's annual tonnage of solid waste disposed: Valdez–5,776 tons/yr; Cordova–2317 tons/yr; Tatitlek–100 tons/yr; and Chenega Bay 100 tons/yr.

[2] The Glennallen cost includes both transportation from Valdez and disposal costs, and is based on an estimate by Copper Basin Sanitation Service (October 1995)

[3] Seattle pays $45/ton for rail and tipping fee to Arlington, Oregon (telephone conversation with Deanne Mount, City of Seattle)

OPTION 4: Regional Landfill at 70-Mile

SUMMARY OF COSTS FOR OPTION 4: REGIONAL LANDFILL AT 70 MILE (OWNED BY REGION)

Capital Costs

Item	Total Costs–Regional Landfill	Valdez Costs [2]
Transfer Station Construction	N/A	$324,000
Regional Landfill Construction	$2,500,000	$1,725,000
TOTAL:		**$2,049,000**

Annual Costs

Item	Total Costs–Regional Landfill	Valdez Costs [2]
Transfer Station O&M	N/A	$321,000
Transportation	N/A	$140,000 - $240,000
Regional Landfill O&M	$445,000	$307,000
TOTAL:		$768,000 - $868,000

Account Requirements

Insurance	$25,000/year	$17,250
Closure	$250,000 total	$172,500

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

[2] The Valdez portion of the regional landfill construction and O&M costs is based on multiplying the total costs for these items by Valdez's contribution to the amount of solid waste to be disposed of at the regional landfill (5776 tons, or 69% of 8300 tons).

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land Acquisition [1]				
Access, Site, Building Construction	LS		Modifications	$100,000
Transfer Containers–Supplied by Carrier	N/A	N/A	N/A	N/A
Recycling Bins and Containers	LS			$10,000
Loader [2]	EA	$80,000	2	$160,000
Engineering and Contingencies (20%)				$54,000
TOTAL:				**$324,000**

[1] Plan to use existing site

[2] Assumes the loader will have to be replaced once over the twenty-year period.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount	*Subtotal*
Personnel					
Operators [1]	FTE	$50,000	4	$200,000	
Public Works Director	FTE	$125,000	0.2	$25,000	
Administration (12.5%)	LS	N/A	N/A	$11,000	*$236,000*
Equipment					
Vehicle Maintenance	LS			$10,000	
Fuel, misc.	LS			$20,000	
Utilities	LS	N/A	N/A	$20,000	*$50,000*
Site Maintenance	LS	N/A	N/A	$3,000	*$3,000*
Insurance	LS	N/A	N/A	$3,000	*$3,000*
SUBTOTAL:				**$292,000**	
10% Contingency:				*$29,200*	
TOTAL:				**$321,200**	

[1] Includes maintenance of inert landfill (equivalent to 1 FTE?)

LONG-HAUL TRANSPORTATION TO VALDEZ AND MILE 70

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Shipment to Valdez	$100,000 [2]	6,000 [3]	N/A	6,000 [3]
Wharfage in Valdez 4	$25,000	N/A	N/A	N/A
TOTAL TO VALDEZ:	**$125,000**	**$6,000**	**N/A**	**$6,000**
Truck from Valdez to "70 Mile" 5	$60,000 - $100,000	$5,000	$140,000 - $240,000	$5,000
TOTAL 70 MILE :	**$185,000 - $225,000**	**$11,000**	**$140,000 - $240,000**	**$11,000**

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)
2 Based on estimate received from Samson Tug & Barge of $760 per container.
3 Assume local hauler transports as "surplus" @ $500/container and one container is shipped each month.
4 This is based on Sampson Tug and Barge quote of $0.32 per 100 lbs for terminal handling and $4/ton for wharfage (for a total of $10.40 per ton).
5 Assume costs are 20% less than cost to Glennallen. High end of range is based on cost estmate from Samson Tug & Barge of $935 per container to Glennallen. Price includes containers and chassis. Low end of range is based on $550/container.

CONSTRUCTION OF A REGIONAL LANDFILL [1]

Capital Cost Estimate

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land	AC	$3,500	30	$105,000
Building	SF	$60	1 (50'x100')	$300,000
Equipment: D-6; Compactor; Lift; Trucks, etc. [2]	LS	$500,000	2	$1,000,000
Access Road	LS			$100,000
Utilities Installation	LS			$100,000
Fencing	LF	$25	2,000	$50,000
Site Preparation	AC	$10,000	20	$200,000
Landscaping	LS			$50,000
Permitting	LS			$100,000
Contingency (10%)				*$200,500*
Engineering (15%)				*$300,750*
TOTAL CAPITAL COSTS:				**$2,500,000**

[1] NOTE: These figures represent the estimated total costs required to construct a regional landfill. To determine Valdez's portion of the cost (as reflected on page 1), an annual cost per ton of the landfill was first determined by calculating the present value of the regional landfill costs (capital and operating costs) and dividing that by the total tons to be disposed of in the region (8,300 tons). This cost per ton figure was then multiplied by the total tons to be disposed by Valdez in a regional landfill (5,776 tons) annually.

[2] Assume 10-yr lifecycle

CONSTRUCTION OF A REGIONAL LANDFILL

Annual Operation and Maintenance Cost Estimate

Item	Unit	Cost/Unit	Quantity	Annual Cost
Labor	FTE	$60,000	3	$180,000
Building O&M, Utilities	LS			$100,000
Equipment Maintenance	LS			$75,000
Misc. Materials	LS			$50,000
Administration (10%)				*$40,500*
TOTAL ANNUAL COSTS:				**$445,000**

Account Requirements

Item	Unit	Cost/Unit	Quantity	Total Cost
Closure	LS			*$250,000 total* [1]
Post-Closure Fund	LS			*$1,000,000 total* [2]
Insurance	LS			*$25,000/year*

[1] Annual payments would be made such that at the end of the 20-year operating period this amount of monies would be in the fund.

[2] The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 5A: Regional Landfill at Valdez
(lateral expansion of balefill)

COST SUMMARY FOR OPTION 5A: REGIONAL LANDFILL IN VALDEZ (lateral expansion of balefill)

Capital Expenditures

Item	Total Regional Cost (20-yr Operating Period)	Valdez Costs [1]
» Site Development [2]	$6,700,000	$4,690,000
» Permitting Costs [3]	49,500	34,650
» Equipment and Vehicles [4]	1,365,000	955,500
» Design/Administration Costs (15%)	1,217,000	851,900
TOTAL COSTS (approximate) in 1995 $s	**$9,332,000**	**$6,532,000**

1 Assume Valdez costs correspond to its percentage of the region's waste quantity, or 70%.

2 Assumes 35% greater site development costs than a Valdez-only balefill. This is based on Valdez receiving a 45% increase in tonnage of waste, and assuming that there would be less than a one to one correspondence between increase in waste and additional construction costs.

3 Assume initial and 3 renewals (figures based on draft ADEC regulations)

4 Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance) for Option 5A

Item	Annual Regional Cost	Valdez Costs
» Cover Material [1]	$22,000	$15,000
» Site Upkeep (e.g., fence repairs)	5,000	3,500
» Building Maintenance	4,500	3,000
» Equipment O&M	5,000	3,500
» Utilities	20,000	14,000
» Salaries, Wages, and Benefits [2]	180,000	343,000
» Monitoring (Leachate/Groundwater)	10,000	7,000
ANNUAL O&M COSTS (1995 $s)	**$247,000**	**$390,000**

[1] Assumes an increase in cover material costs of a Valdez-only balefill equivalent to the increase in waste to be received from the region.

[2] Assumes 3 FTE would operate the balefill and that these costs would be shared by the region, prorated based on the amount of waste from each city. It is assumed that Valdez, in addition, would have 3.5 FTE for other waste management activities (e.g., baler operator) solely dedicated to and paid for by Valdez (each at an average annual salary and benefits of $62,000/year).

Account Requirements

Item	Total Regional Cost (20-yr Operating Period)	Valdez Costs
» Closure Fund [1]	$725,000	$508,000
» Post-Closure Fund [2]	$1,000,000	$1,000,000
» Insurance	$500,000 ($25,000/yr)	$350,000 ($17,500/yr)
TOTAL ACCOUNT REQUIREMENTS (1995 $s	**$2,225,000**	**$1,858,000**

[1] The city would set aside a portion of this total amount each year, so that the total amount would be in the fund by the end of the 20-year operating period.

[2] The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 5B: Regional Balefill at Valdez
(vertical expansion with leachate cut-off wall)

COST SUMMARY FOR OPTION 5B: REGIONAL BALEFILL IN VALDEZ
(vertical expansion with leachate cut-off wall)

Capital Expenditures

Item	Total Regional Cost (20-yr Operating Period)	Valdez Costs [1]
» Site Development [2]	$4,725,000	$3,307,500
» Permitting Costs [3]	49,500	34,650
» Equipment and Vehicles [4]	1,365,000	955,500
» Design/Administration Costs (15%)	921,000	644,700
TOTAL COSTS (approximate) in 1995 $s	**$7,060,500**	**$4,942,000**

1 Assume Valdez costs correspond to its percentage of the region's waste quantity, or 70%.

2 Assumes 35% greater site development costs than a Valdez-only balefill. This is based on Valdez receiving a 45% increase in tonnage of waste, and assuming that there would be less than a one to one correspondence between increase in waste and additional construction costs.

3 Assume initial and 3 renewals (figures based on draft ADEC regulations)

4 Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance) for Option 5B

Item	Annual Regional Cost	Valdez Costs
» Cover Material [1]	$22,000	$15,000
» Site Upkeep (e.g., fence repairs)	5,000	3,500
» Building Maintenance	4,500	3,150
» Equipment O&M	5,000	3,500
» Utilities	20,000	14,000
» Salaries, Wages, and Benefits [2]	180,000 [3]	343,000
» Monitoring (Leachate/Groundwater)	10,000	7,000
ANNUAL O&M COSTS (1995 $s)	**$479,000**	**$390,000**

[1] Assumes an increase in cover material costs of a Valdez-only balefill equivalent to the increase in waste to be received from the region.

[2] Assumes 3 FTE would operate the balefill and that these costs would be shared by the region, prorated based on the amount of waste from each city. It is assumed that the Valdez, in addition, would have 3.5 FTE for other waste management activities (e.g. baler operator) solely dedicated to and paid for by Valdez (each at an average annual salary and benefits of $62,000/year).

Account Requirements

Item	Total Regional Cost (20-yr Operating Period)	Valdez Costs
» Closure Fund [1]	$725,000	$508,000
» Post-Closure Fund [2]	$1,000,000	$1,000,000
» Insurance	$500,000 ($25,000/yr)	$350,000 ($17,500/yr)
TOTAL ACCOUNT REQUIREMENTS (1995 $s	**$2,225,000**	**$1,858,000**

[1] The city would set aside a portion of this total amount each year, so that the total amount would be in the fund by the end of the 20-year operating period.

[2] The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 6: Ship to Southeast Alaska

OPTION 7: Ship to Lower 48

SUMMARY OF COSTS FOR OPTION 6: SHIP TO SOUTHEAST ALASKA [1]

Capital Costs

Transfer Station Construction	$324,000

Annual Costs

Transfer Station O&M	$321,000
Transportation	$350,000
Tipping Fee	$578,000
TOTAL:	**$1,249,000**

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

SUMMARY OF COSTS FOR OPTION 7: SHIP TO LOWER 48 [1]

Capital Costs

Transfer Station Construction	$324,000

Annual Costs

Transfer Station O&M	$321,000
Transportation	$575,000
Tipping Fee	$260,000
TOTAL:	**$1,156,000**

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land Acquisition [1]				
Access, Site, Building Construction	LS		Modifications	$100,000
Transfer Containers--Supplied by Carrier	N/A	N/A	N/A	N/A
Recycling Bins and Containers	LS			$10,000
Loader [2]	EA	$80,000	2	$160,000
Engineering and Contingencies (20%)				$54,000
TOTAL:				**$324,000**

[1] Plan to use existing site

[2] Assumes the loader will have to be replaced once over the twenty-year period.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount	*Subtotal*
Personnel					
Operators [1]	FTE	$50,000	4	$200,000	
Public Works Director	FTE	$125,000	0.2	$25,000	
Administration (12.5%)	LS	N/A	N/A	$11,000	*$236,000*
Equipment					
Vehicle Maintenance	LS			$10,000	
Fuel, misc.	LS			$20,000	
Utilities	LS	N/A	N/A	$20,000	*$50,000*
Site Maintenance	LS	N/A	N/A	$3,000	*$3,000*
Insurance	LS	N/A	N/A	$3,000	*$3,000*
SUBTOTAL:				**$292,000**	
10% Contingency:				*$29,200*	
TOTAL:				**$321,200**	

[1] Includes maintenance of inert landfill (equivalent to 1 FTE?)

LONG-HAUL TRANSPORTATION TO A LANDFILL IN LOWER 48 AND SOUTHEAST ALASKA

Cost Estimate

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Ship to Southeast [2]	$150,000	$10,000 [3]	$350,000	$10,000 [3]
Ship to Lower 48 [4]	$240,000	$14,000 [3]	$575,000	$14,000 [3]

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)

2 Based on costs from Samson Tug & Barge of $1,150/container from Cordova and $1,100/container from Valdez. (Costs do not include wharfage or terminal handling.)

3 Assume local hauler transports as "surplus" to Valdez or Cordova and one container is shipped each month.

4 Based on cost estimates from Samson Tug and Barge of $1,850/container from Cordova to Seattle and $1,800 from Valdez to Seattle.

ANNUAL DISPOSAL COSTS BASED ON LANDFILL TIPPING FEES

Location	Cost/Ton	Annual Disposal Cost[1]			
		Valdez	Cordova	Tatitlek	Chenega Bay
Glennallen[2]	$68 - $81	$393,000 - $468,000	$158,000 - $188,000	$6,800 - $8,100	$6,800 - $8,101
Southeast Alaska	$100	$577,600	$231,700	$10,000	$10,000
Lower 48[3]	$45	$259,920	$104,265	$4,500	$4,500

[1] These figures are based on each community's annual tonnage of solid waste disposed: Valdez–5,776 tons/yr; Cordova–2317 tons/yr; Tatitlek–100 tons/yr; and Chenega Bay 100 tons/yr.

[2] The Glennallen cost includes both transportation and disposal costs, and is based on an estimate by Copper Basin Sanitation Service (October 1995)

[3] Seattle pays $45/ton for rail and tipping fee to Arlington, Oregon (telephone conversation with Deanne Mount, City of Seattle)

Costs of Collection

COST ESTIMATES FOR COLLECTION OF SOLID WASTE [1]

Collection Services - Capital Costs

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Equipment and Vehicles [2]	LS	$195,000	3	$585,000

Collection Services - Annual Operation and Maintenance

Salaries and Wages	FTE	Annual Cost (1995 $s)
Public Works Director	0.04	$5,310
Solid Waste Manager	0.4	$27,528
Refuse Collector	2	111,820
Mechanic	0.5	31,143
Seasonal Laborers	1	11,304
TOTAL ANNUAL LABOR COSTS		**$187,000**

[1] The costs of collection are show for information purposes only and have not been incorporated into the total estimated cost of expanding Valdez's balefill.

[2] Assume 7yr +/- year lifecycle. Equipment and vehicles used for collection are assumed to be 30% of the overall cost of solid waste management equipment and vehicles, based on a telephone contact with the City's Public Works Director (September 4, 1995).

Recycling–Drop-Off Program Costs and Information on Selected Recycling Markets

ESTIMATED RECYCLING COSTS AND REVENUE

	Valdez
Costs [1]	
Capital Costs	$5,700 [2]
Annual	
· O&M [3]	$33,000
TOTAL COSTS/YR:	**$39,000**
Total Revenues per Year [5]	**$55,000**
Net Revenue per year	**$16,000**

[1] Costs are presented in present value terms. 1995 dollars and an 8% discount rate were used to determine the present value.

[2] Annualized from total of $60,000 for 60 collection dumpsters ($1000/dumpster). This was done to accurately compare annual costs and revenues. Twenty yearly payments of $5,700 with a discount rate of 8% is equivalent to a present value of $60,000.

[3] O&M includes $15,000 for labor (.5 FTE at $15/hr) plus funding for public education ($5000). Also includes transportation costs, estimated to be $13,000 (assumes shipping cost of $1000/container to Seattle, 18 tons per full container).

[4] Revenues are based on $125/ton for cardboard (200 tons recycled) and $1200/ton for aluminum (25 tons recycled).

RECYCLING PROGRAM: VALDEZ
Estimated Revenues from Recycling [1]

Material	Material as % Total MSW Stream*	% Waste stream potentially recycled**	Tons Potentially Recycled (tons/yr)***	Market Value/Ton****	Total Market Value ($)
Cardboard	15%	23%	200	$125	$25,000
Aluminum	<1%	45%	25	$1,200	$30,000
TOTAL:	**16%**	**4%**	**225**	**N/A**	**$55,000**

[1] These estimated revenues could potentially be obtained if Valdez implements a comprehensive drop-off or materials recovery facility. The estimated costs associated with implementing these programs are identified in other worksheets.

* From EPA's "Characterization of Municipal Solid Waste in the U.S.," 1994 update
** Based on national recycling rates (as identified in EPA's "Characterization of Municipal Solid Waste") with modifications based on Best Professional Judgment.
*** Based on 1994/95 MSW generation of 5,800 tons.
**** Based on a telephone survey of selected markets in Washington State and Alaska, July 1995.

INFORMATION ON SELECTED RECYCLING MARKETS

Markets	Port Location	Pick Up at Dock	Revenue Range	Comments
Weyerhaeuser 1962 77th Avenue Kent, WA 98032 (206) 682-1035 Doug Metz	• Seattle	**Yes** • Price includes pick-up from dock and freight	• Cardboard: $150/ton • Newsprint: $190/ton • Office Paper: $235/ton	• Cardboard and newsprint must be in bales of over 1,000 lbs. • Office paper must be in bales of over 1,200 lbs.
N.W. Recycling, Inc. PO Box R Bellingham, WA 98227 (206) 384-6313 Brian Parberry	• Bellingham	**Yes** • Price includes pick-up from dock	• Cardboard: $130/ton • Newsprint: $125/ton • Office Paper: $250/ton	• All materials must be baled
Canadian Fibre 3971 Boundary Rd. Richmond, BC V6V1T8 (604) 524-4627 Shawn Muir	• Vancouver • Facility is 12 miles from port	**No**	• Cardboard: $145/ton (bales under 1,000 lbs $200/ton (bales of 1,000 - 1,400 lbs.)	• Recycle newsprint and office paper through Belkin Paper Source (see below)
Belkin Paper Source 1050 United Blvd Coquitlam, BC V3K6V4 (604) 527-9968 Tim Purkiss	• Vancouver • Facility located at port; also accessible by rail and truck	**N/A**	• Cardboard: $140/ton • Newsprint: $165/ton • Office Paper: $200/ton	
Anchorage Recycling 6161 Rosewood Street Anchorage, AK 99518 (907) 562-2267		**No**	• Cardboard: $40/ton Newsprint: $20/ton Office Paper: $40/ton	
Waste Recovery 8501 N Borthwick Portland, OR 97217 (503) 283-2261 Mark Hope	• Seattle	**Yes** • Extra charge to pick up at dock and/or unload trailer	• Tires: (-) $.65/automobile tire (-) $3.50/truck tire • Tires with rim: (-) $2.50/automobile tire (-) 10.00/ truck tire	• Tires also accepted by trailer load: (-) $550 for a 27 foot trailer (-) $880 for a 40 foot trailer • Extra charge for larger tires

SCRAP METAL RECYCLING MARKETS

Markets	Port Location	Pick Up at Dock	Revenue Range	Comments
Seattle Iron & Metal 2955 11th Ave SW Seattle, WA 98134 (206) 682-0040 Alan Sidell	• Seattle • Facility is 2-3 miles from docks.	**Yes** • Cost varies depending on quantity & value of shipment: $0 - $10/ton	• Aluminum Cans: $1,240/ton • White Goods: $40/ton • Junk Vehicles: $60/ton • Scrap Metal: $80/ton (steel)	• Shipments of one type of item preferred to mixed batches • Facility will take baled and crushed metals, if contaminants removed
ABC Recycling 8081 Meadow Ave Burnaby, B.C. Canada V3N 2V9 Melvyn Yochlwitz	• Vancouver	**Yes** • Cost varies depending on quantity & value of shipment: $5 - $10/ton range	• Aluminum Cans: $1,200-$1,260/ton • White Goods: $45-$50/ton • Scrap Metal: $90/ton (steel)	• All prices listed are Canadian • For White Goods, the facility needs certification that freon was removed from each unit.
Skagit River Steel and Recycling P.O. Box 376 Burlington, WA 98223 (800) 869-7097 Lois Young	• Seattle • Bellingham is a possible pickup site	**Yes** • Facility uses trucks to transport recyclables from docks to site; $200/trip for Seattle, $150/trip to Bellingham	• Aluminum Cans: $960-$1,260/ton • White Goods: Free - $10/ton • Junk Vehicles: $10/ton Scrap Metal: $25 - $40/ton	• Can prices depend on volume, how clean they are, and packaging (baled is preferred) • Facility will charge $35/unit of White Good with no certification • Cars cannot have rubber, glass or upholstery, and must have a "junk title" • Preferred preparation for scrap steel: under 4 ft. block, at least 1/8" thick
Alaska Metals Recycling 9705 King St. Anchorage, AK (907) 349-4833 Robert Snell	• Anchorage (North Star)	**Yes** • Cost varies depending on packaging, volume, value: $10-$25/ton	• Aluminum Cans: $600-$900/ton • White Goods: Free • Junk Vehicles: $10-$30/ton • Scrap Metal (steel): $40/ton	• High end price for cans baled and boxed • Company will take White Goods if owner signs release saying freon was removed • Metal prices fluctuate between winter (low) and summer (high)
Joseph Simon & Sons 2202 E. River St. Tacoma, WA 98421 (206) 272-9364 Mark Simon	• Tacoma	**No**	• Aluminum Cans: $900-$1,200/ton	• Flattened/baled cans are preferred
General Metals 1902 Marine View Dr. Tacoma, WA (800) 562-9876 Ken Kushin	• Tacoma	• Facility has dock at the Port of Tacoma; no charge for pick-up	• White Goods: $48/ton • Junk Vehicles: $70/ton • Scrap Metal: $60 -$80/ton	• Baled equipment would get higher price. Compressors need to be removed • Cars must have batteries, tires, oil removed, gas tank emptied • High end of scrap metal price for bales 18" wide and 5 ft or smaller

CURRENT STATUS OF SCRAP METAL COLLECTION ACTIVITIES (1995)

I. STATUS OF SCRAP METAL PROGRAM

	Cordova	Valdez
Current Status	• Barge due 8/20, will haul estimated 500+ vehicles and scrap steel, totaling 2,000 tons	• Collection underway, crusher in town; 1300+ vehicles collected or targeted for collection
Items Collected	• Vehicles and steel; scrap steel collected at the cost of the contractor	• Vehicles • Scrap brass, bronze and copper
Contractors	• Toklat Inc.: J.R. Thompson (907) 243-2892 • General Metals: Ken Kushin (206) 572-4000 • Island Tug & Barge Co.: Frank Ellefson (206) 938-0403	• ABC Towing - Rod Lewis (907) 835-2030, Glenn Allen office
Equipment Provided by Contractor	• End Dumps, loader, 235 hoe/thumb mech. truck, waste oil tank	• Car crusher, wrecker to remove cars from private or city property
Contractor Fees	• $152/vehicle	• $96,200 total
Recycler	• General Metals (Tacoma, WA)	• Simon & Sons, General Metals (Tacoma, WA)
Community Responsibility	• City placed vehicles in three locations; contractor picks up all vehicles	• ABC Towing drains fluids, removes batteries and picks up vehicles
Estimated Costs to Community	• $100/vehicle; includes towing, disposal of most fluids, battery	• Community baler facility provides shrink wrap for collected batteries, coordinates w/Exide to ship off-site.

II. OVERALL ASSESSMENT OF CURRENT SCRAP METAL RECYCLING EFFORT

Positive Impacts of Scrap Metal Pickup	• Contractor removed vehicles from large lots, providing good working areas • Ultimate reduction of landfill use	• Contractor takes responsibility for preparation of car (battery and fluids), removal from property
Difficulties Encountered	• Contractor would leave an area prior to completing the cleanup.	
Unexpected Costs/Requirements	• None encountered	• None encountered
Lessons Learned	• City would set time and penalty clause	
Program Needs	• 75 vehicles abandoned/year, left on city ROW.	• 100 vehicles abandoned/year
Future Activities	• City plans to purchase compactor and CAT 235 w/Thumb	

Appendix C.2—Cordova
Introduction: Cost Estimates of Solid Waste Management Options

Appendix C to the Sound Waste Management Plan provides detailed cost estimates of municipal solid waste management alternatives for Valdez, Cordova, Tatitlek, and Chenega Bay.[1] Community representatives who developed the Sound Waste Management Plan will use this cost information as a foundation for discussions with their city/village councils and the general public to determine how best to manage municipal solid waste over the long term.

Appendix C is divided into three sections (C.1, C.2, C.3), each of which contain cost estimates for individual communities: Valdez, Cordova, and the villages (cost estimates for Tatitlek and Chenega Bay have been combined due to the similarity of population size and current solid waste management methods). For each community, a wide range of municipal solid waste disposal alternatives were analyzed. For Cordova and Valdez, the current costs of solid waste collection and the costs and revenues associated with operating a drop-off recycling program were also estimated.

The cost estimates were developed based on extensive discussion with and review by city and village personnel participating in the project. Site visits to each community were conducted to help ensure that a complete and accurate understanding of the community's current solid waste management program and management issues was achieved.

The information contained in each of the three community sections is organized as follows:

- **cost summary sheets**, which compare the total capital and annual costs of the different waste disposal options and identify the preferred options for each community;
- **cost estimates of individual disposal options**, which provides detail on the individual cost components of each option;
- **cost estimates of the current costs of solid waste collection** in Cordova and Valdez; and
- **cost estimates of operating a recycling program** in Cordova and Valdez.

The cost summary sheets present the costs for each option in three different ways:

- **total costs** over the life of the disposal option (a twenty year planning horizon was used);
- **annualized costs**, which is what the option would cost if it were paid for in equal annual payments over the project's life; and
- **cost per ton**, which divides the annualized costs by the tons of solid waste generated annually.

The information contained in this Appendix was used to develop Recommendation #5 ("Choosing Solid Waste Disposal Sites and Methods") of the Sound Waste Management Plan.

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[1] Cost estimates were not developed for Whittier, because the city recently made the long-term decision to privatize its solid waste collection and to dispose of its solid waste at the Anchorage landfill.

TABLE OF CONTENTS: CORDOVA

Cost Estimates of Solid Waste Management Options

February 29, 1996

TABLE 1: COMPARISON OF SOLID WASTE MANAGEMENT OPTIONS [1]
Cordova

Costs [2]		OPTION 1: Vertical Expansion of Balefill (no modifications)	OPTION 2A: Construct Local Landfill at 17 Mile (with liner)	OPTION 2B: Construct Local Landfill at 17 Mile (without liner)	OPTION 3: Regional Landfill: Glennallen [4]	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion, cut-off wall)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Capital Costs	($)	$585,000	$4,233,000	$2,096,000	$324,000	$1,024,000	$2,937,000	$2,300,000	$324,000	$324,000
Annual O&M Costs [2]	($/yr)	$183,000	$195,000	$195,000	$549,000 - $579,000	$576,000 - $616,000	$441,000	$441,000	$648,000	$610,000
Closure	($)	$300,000	$300,000	$300,000	N/A	$70,000	$200,000	$200,000	N/A	N/A
Insurance	($/yr)	$10,000	$10,000	$10,000	N/A	$7,000	$7,000	$7,000	N/A	N/A
Total Present Value of Costs [3]	($)	$2,747,000	$5,325,000	$4,173,000	$6,120,000 - $6,438,000	$7,084,000 - $7,509,000	$7,258,000	$6,827,000	$7,209,000	$6,769,000
Annualized Cost (present value)	($)	$259,000	$502,000	$394,000	$577,000 - $607,000	$668,000 - $708,000	$684,000	$644,000	$680,000	$638,000
Annual Cost/Ton (present value) [5]	($)	$112	$217	$170	$249 - $262	$288 - $306	$295	$277	$293	$276

1 All costs (except annual costs) are based on a twenty-year operating period.
2 Collection, recycling, and post-closure costs are not included in these figures. All costs have been rounded to the nearest thousand.
3 Present value calculations are in 1995 dollars and based on an 8% discount rate.
4 If a 15% recycling rate was achieved, Annual O&M Costs would be reduced by approximately $45,000.
5 Based on an annual disposal rate of 2,317 tons (1994 rate).

TABLE 2: COST SUMMARY OF SOLID WASTE MANAGEMENT OPTIONS, INCLUDING COLLECTION CORDOVA

= *preferred MSW management option*

TOTAL COSTS (present value) [1]	OPTION 1: Vertical Expansion of Balefill	OPTION 2A: Construct Balefill at 17 Mile (w/liner)	OPTION 2B: Construct balefill at 17 Mile (no liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$2,747,000**	**$5,325,000**	**$4,173,000**	**$6,120,000 - 6,438,000**	**$7,084,000 - 7,509,000**	**$7,258,000**	**$6,827,000**	**$7,209,000**	**$6,769,000**
Collection	$1,547,000 (same cost for all options)								
TOTAL	$4,294,000	$6,872,000	$5,720,000	$7,667,000 - 7,985,000	$8,631,000 - $9,056,000	$8,805,000	$8,374,000	$8,756,000	$8,316,000

ANNUAL COSTS/TON [2] **(1995 dollars)**	OPTION 1: Vertical Expansion of Balefill	OPTION 2A: Construct Balefill at 17 Mile (w/liner)	OPTION 2B: Construct balefill at 17 Mile (no liner)	OPTION 3: Regional Landfill: Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5A: Regional Landfill: Valdez (lat. expansion)	OPTION 5B: Regional Landfill: Valdez (vert. expansion)	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Management/ Disposal	**$112**	**$217**	**$170**	**$249 - 262**	**$288 - 306**	**$295**	**$277**	**$293**	**$276**
Collection	$63 (same cost across all options)								
TOTAL	$175	$280	$233	$312 - 325	$351 - 369	$358	$340	$356	$339

[1] Present value calculations are in 1995 $s and are based on an 8% discount rate and 20-year timeframe.

[2] Cost per ton estimates are based on 1994 solid waste generation of 2317 tons.

TABLE 11: COMPARISON OF LEADING SOLID WASTE MANAGEMENT OPTIONS [1] CORDOVA

OPTION 1: Vertical Expansion of Balefill – no modifications

Estimated Costs of Disposal	Total Costs (present value) [2]	$2,750,000
	Annualized Costs (present value) [2]	$260,000
	Annual Cost/Ton (present value) [3]	$112
Advantages	· permit in place · socio status quo · proximity to users	
Disadvantages	· uncertainty of permit extension · potential groundwater contamination, stream intrusion, and seismic upset	

OPTION 2B: Construct Local Landfill at 17 Mile – without liner

Estimated Costs of Disposal	Total Costs (present value) [2]	$4,170,000
	Annualized Costs (present value) [2]	$390,000
	Annual Cost/Ton (present value) [3]	$170
Advantages	· encourages recycling · protected from stream intrusion	
Disadvantages	· potential groundwater contamination and seismic upset · distance from town	

OPTION 3: Regional Landfill - Glennallen [4]

Estimated Costs of Disposal	Total Costs (present value) [2]	$6,120,000 - $6,440,000
	Annualized Costs (present value) [2]	$580,000 - $610,000
	Annual Cost/Ton (present value) [3]	$249 - $262
Advantages	· little or no potential for groundwater contamination · seismic damage of no consequence · high incentive to recycle to minimize transport and disposal costs · minimal environmental risk · ease of management	
Disadvantages	· lack of direct control	

1 These costs are for disposal only, because collection costs are the same for all options.

2 Present value calculations are in 1995 dollars, and are based on 8% discount rate and 20-year planning horizon. Figures rounded to the nearest $10,000.

3 Based on 1994 annual disposal rate of 2,317 tons.

4 The range of costs is based on a high and low estimate of transportation costs from Cordova to Glennallen.

OPTION 1: Vertical Expansion of Balefill

COST SUMMARY FOR OPTION 1: VERTICAL EXPANSION OF LANDFILL

Capital Expenditures

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Permitting [1]	LS			49,500
» Equipment and Vehicles	LS	455,000	3 [2]	459,000
» Design/Administration Costs (15%)	N/A	N/A	N/A	76,000
TOTAL COSTS (approximate) in 1995 $s				**$585,000**

[1] Assume initial and 3 renewals (figures based on draft ADEC regulations)
[2] Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance)

Item	Unit	Cost/Unit	Quantity	Annual Cost
» Cover Material	CY	$10.00	2,000	$20,000
» Site Upkeep (e.g., fence repairs)	LS			5,000
» Building Maintenance	LS			3,000
» Equipment O&M	LS			5,000
» Utilities	LS			22,000
» Salaries, Wages, and Benefits	FTE	N/A	2.5	118,000
» Monitoring (Leachate/Groundwater)		$10,000.00	20	10,000
ANNUAL O&M COSTS (1995 $s)				**$183,000**

[1] Totals have been rounded to the nearest thousand.

NOTE: These summary figures do not include costs of municipal solid waste collection.

Account Requirements

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Closure Fund				$300,000
» Post-Closure Fund [1]	AC	10,000	10	$1,000,000
» Insurance	LS	10,000	20	$200,000
TOTAL ACCOUNT REQUIREMENTS (1995 $s)				**$1,500,000**

[1] The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

BREAKDOWN OF SALARIES, WAGES, AND BENEFITS: CORDOVA

Salaries and Wages	FTE	Annual Cost (1995 $s)
Public Works Director	0.1	$7,011
Solid Waste Manager	0.2	7,237
Baler Operator	1	61,993
Baler Assistant	0.2	12,612
Seasonal Laborers	1	29,426
TOTAL ANNUAL LABOR COSTS		**$118,000**

OPTION 2A: Construct Local Landfill at 17 Mile (with liner)

COST SUMMARY FOR OPTION 2A: CONSTRUCT LOCAL LANDFILL (with liner)[1]

Capital Expenditures

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Site Development	LS		1	$3,100,000
» Permitting [1]	LS			49,500
» Equipment and Vehicles	LS	455,000	3 [2]	459,000
» Design/Administration Costs (15%)	N/A	N/A	N/A	624,000
TOTAL COSTS (approximate) in 1995 $s				**$4,233,000**

[1] Assume initial and 3 renewals (figures based on draft ADEC regulations)

[2] Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance)

Item	Unit	Cost/Unit	Quantity	Annual Cost
» Cover Material	CY	$10.00	2,000	$20,000
» Site Upkeep (e.g., fence repairs)	LS			5,000
» Building Maintenance	LS			3,000
» Equipment O&M	LS			5,000
» Transportation (fuel, vehicle O&M) [2]	MILE	$1.50	40*200 days	12,000
» Utilities	LS			22,000
» Salaries, Wages, and Benefits	FTE	N/A	2.5	118,000
» Monitoring (Leachate/Groundwater)		$10,000.00	20	10,000
ANNUAL O&M COSTS (1995 $s)				**$195,000**

[1] Totals have been rounded to the nearest thousand.

[2] This assumes no additional staff is required for transportation

NOTE: These summary figures do not include costs of municipal solid waste collection.

Account Requirements

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Closure Fund				$300,000
» Post-Closure Fund [1]	AC	10,000	10	$1,000,000
» Insurance	LS	10,000	20	$200,000
TOTAL ACCOUNT REQUIREMENTS (1995 $s)				**$1,500,000**

[1] The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 2A: BREAKDOWN OF SITE DEVELOPMENT COSTS (with liner) : CORDOVA

Item	Unit	Cost/ Unit	Quantity	Total Cost (20-yr Operating Period) [1]
» Predevelopment Engineering Svcs. (incl. EIS, Feasibility Report, System Design)	LS	$250,000	1	$250,000
» Land Acquisition or Value	AC	2,000	10	20,000
» Site Development [2]	AC	15,000	6	90,000
» Liner [2]	AC	250,000	6	1,500,000
» Leachate System [2]	AC	50,000	6	300,000
» Site Landscaping, etc.	AC	2,000	10	20,000
» Access Road	LS	50,000	1	50,000
» Utilities [3]	LS	25,000	1	25,000
» Ancillary Building	SF	150	1,000	150,000
» Leachate Holding	LS	150,000	1	150,000
» Monitor Wells	EA	10,000	4	40,000
» Contingency (20%)	LS			519,000
SITE DEVELOPMENT TOTAL COSTS (1995 $s)				**$3,100,000**
SITE DEVELOPMENT COST PER ACRE * (1995 $s)				**$517,000**

[1] The capital costs are assumed to occur in the first year except for the following. Site development, Liner, and permitting costs will be incurred in years 1, 6, 11, and 16 (equal amounts in each of the four years). The leachate system and leachate holding costs will be incurred in years 1 and 11. Equipment and vehicle costs will be incurred in years 1, 8, and 15.

[2] Assume only 6 acres of site is developed for disposal; remaining 4 acres are buffer.

[3] Without electric.

OPTION 2B: Construct Local Landfill at 17 Mile (without liner)

COST SUMMARY FOR OPTION 2B: CONSTRUCT LOCAL LANDFILL (without liner)[1]

Capital Expenditures

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Site Development	LS		1	$1,314,000
» Permitting [1]	LS			49,500
» Equipment and Vehicles	LS	$455,000	3 [2]	459,000
» Design/Administration Costs (15%)	N/A	N/A	N/A	273,000
TOTAL COSTS (approximate) in 1995 $s				**$2,096,000**

[1] Assume initial and 3 renewals (figures based on draft ADEC regulations)
[2] Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance)

Item	Unit	Cost/Unit	Quantity	Annual Cost
» Cover Material	CY	$10.00	2,000	$20,000
» Site Upkeep (e.g., fence repairs)	LS			5,000
» Building Maintenance	LS			3,000
» Equipment O&M	LS			5,000
» Transportation (fuel, vehicle O&M) [2]	MILE	$1.50	40*200 days	12,000
» Utilities	LS			22,000
» Salaries, Wages, and Benefits	FTE	N/A	2.5	118,000
» Monitoring (Leachate/Groundwater)		$10,000.00	20	10,000
ANNUAL O&M COSTS (1995 $s)				**$195,000**

[1] Totals have been rounded to the nearest thousand.
[2] This assumes no additional staff is required for transportation

NOTE: These summary figures do not include costs of municipal solid waste collection.

Account Requirements

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
» Closure Fund				$300,000
» Post-Closure Fund [1]	AC	10,000	10	$1,000,000
» Insurance	LS	10,000	20	$200,000
TOTAL ACCOUNT REQUIREMENTS (1995 $s)				**$1,500,000**

[1] The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 2B: BREAKDOWN OF SITE DEVELOPMENT COSTS (without liner) : CORDOVA

Item	Unit	Cost/ Unit	Quantity	Total Cost (20-yr Operating Period) [1]
» Predevelopment Engineering Svcs. (incl. EIS, Feasibility Report, System Design)	LS	$250,000	1	$250,000
» Land Acquisition or Value	AC	2,000	10	20,000
» Site Development [2]	AC	15,000	6	90,000
» Leachate System [2]	AC	50,000	6	300,000
» Site Landscaping, etc.	AC	2,000	10	20,000
» Access Road	LS	50,000	1	50,000
» Utilities [3]	LS	25,000	1	25,000
» Ancillary Building	SF	150	1,000	150,000
» Leachate Holding	LS	150,000	1	150,000
» Monitor Wells	EA	10,000	4	40,000
» Contingency (20%)	LS			219,000
SITE DEVELOPMENT TOTAL COSTS (1995 $s)				**$1,314,000**

[1] The capital costs are assumed to occur in the first year except for the following. Site development, Liner, and permitting costs will be incurred in years 1, 6, 11, and 16 (equal amounts in each of the four years). The leachate system and leachate holding costs will be incurred in years 1 and 11. Equipment and vehicle costs will be incurred in years 1, 8, and 15.

[2] Assume only 6 acres of site is developed for disposal; remaining 4 acres are buffer.

[3] Without electric.

OPTION 3: Regional Landfill at Glennallen

COST SUMMARY FOR OPTION 3: REGIONAL LANDFILL IN GLENNALLEN [1]

Capital Costs

Transfer Station Construction	$324,000

Annual Costs

Transfer Station O&M	$266,000
Transportation to Valdez	$125,000
Disposal Costs (including transport from Valdez)	$158,000 - $188,000
TOTAL:	**$549,000 - $579,000**

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land Acquisition [1]				
Access, Site, Building Construction	LS		Modifications	$100,000
Transfer Containers–Supplied by Carrier	N/A	N/A	N/A	N/A
Recycling Bins and Containers	LS			$10,000
Loader [2]	EA	$80,000	2	$160,000
Engineering and Contingencies (20%)				$54,000
TOTAL:				**$324,000**

[1] Plan to use existing site

[2] Assumes the loader will have to be replaced once over the twenty-year period.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount	*Subtotal*
Personnel					
Operators [1]	FTE	$50,000	3	$150,000	
Public Works Director	FTE	$125,000	0.2	$25,000	
Administration (12.5%)	LS	N/A	N/A	$11,000	*$186,000*
Equipment					
Vehicle Maintenance	LS			$10,000	
Fuel, misc.	LS			$20,000	
Utilities	LS	N/A	N/A	$20,000	*$50,000*
Site Maintenance	LS	N/A	N/A	$3,000	*$3,000*
Insurance	LS	N/A	N/A	$3,000	*$3,000*
SUBTOTAL:				**$242,000**	
10% Contingency:				*$24,200*	
TOTAL:				**$266,200**	

[1] Includes maintenance of inert landfill (equivalent to 1 FTE?)

LONG-HAUL TRANSPORTATION TO VALDEZ AND MILE 70

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Shipment to Valdez	$100,000 [2]	6,000 [3]	N/A	6,000 [3]
Wharfage in Valdez 4	$25,000	N/A	N/A	N/A
TOTAL TO VALDEZ:	**$125,000**	**$6,000**	N/A	**$6,000**
Truck from Valdez to "70 Mile" 5	$60,000 - $100,000	$5,000	$140,000 - $240,000	$5,000
TOTAL 70 MILE :	**$185,000 - $225,000**	**$11,000**	**$140,000 - $240,000**	**$11,000**

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)
2 Based on estimate received from Samson Tug & Barge of $760 per container.
3 Assume local hauler transports as "surplus" @ $500/container and one container is shipped each month.
4 This is based on Sampson Tug and Barge quote of $0.32 per 100 lbs for terminal handling and $4/ton for wharfage (for a total of $10.40 per ton).
5 Assume costs are 20% less than cost to Glennallen. High end of range is based on cost estmate from Samson Tug & Barge of $935 per container to Glennallen. Price includes containers and chassis. Low end of range is based on $550/container.

ANNUAL DISPOSAL COSTS BASED ON LANDFILL TIPPING FEES

Location	Cost/Ton	Annual Disposal Cost[1]			
		Valdez	Cordova	Tatitlek	Chenega Bay
Glennallen [2]	$68 - $81	$393,000 - $468,000	$158,000 - $188,000	$6,800 - $8,100	$6,800 - $8,100
Southeast Alaska	$100	$577,600	$231,700	$10,000	$10,000
Lower 48 [3]	$45	$259,920	$104,265	$4,500	$4,500

[1] These figures are based on each community's annual tonnage of solid waste disposed: Valdez–5,776 tons/yr; Cordova–2317 tons/yr; Tatitlek–100 tons/yr; and Chenega Bay 100 tons/yr.

[2] The Glennallen cost includes both transportation from Valdez and disposal costs, and is based on an estimate by Copper Basin Sanitation Service (October 1995)

[3] Seattle pays $45/ton for rail and tipping fee to Arlington, Oregon (telephone conversation with Deanne Mount, City of Seattle)

OPTION 4: Regional Landfill at 70-Mile

SUMMARY OF COSTS FOR OPTION 4: REGIONAL LANDFILL AT 70 MILE (OWNED BY REGION)

Capital Costs

Item	Total Costs–Regional Landfill	Cordova Costs [2]
Transfer Station Construction	N/A	$324,000
Regional Landfill Construction	$2,500,000	$700,000
TOTAL:		**$1,024,000**

Annual Costs

Item	Total Costs–Regional Landfill	Cordova Costs [2]
Transfer Station O&M	N/A	$266,000
Transportation	N/A	$185,000 - $225,000
Regional Landfill O&M	$445,000	$125,000
TOTAL:		$576,000 - $616,000

Account Requirements

Insurance	$25,000/year	$7,000
Closure	$250,000 total	$70,000

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

[2] The Cordova portion of the regional landfill construction and O&M costs is based on multiplying the total costs for these items by Cordova's contribution to the amount of solid waste to be disposed of at the regional landfill (2317 tons, or 28% of 8300 tons).

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land Acquisition [1]				
Access, Site, Building Construction	LS		Modifications	$100,000
Transfer Containers–Supplied by Carrier	N/A	N/A	N/A	N/A
Recycling Bins and Containers	LS			$10,000
Loader [2]	EA	$80,000	2	$160,000
Engineering and Contingencies (20%)				$54,000
TOTAL:				**$324,000**

[1] Plan to use existing site

[2] Assumes the loader will have to be replaced once over the twenty-year period.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount	*Subtotal*
Personnel					
Operators [1]	FTE	$50,000	3	$150,000	
Public Works Director	FTE	$125,000	0.2	$25,000	
Administration (12.5%)	LS	N/A	N/A	$11,000	*$186,000*
Equipment					
Vehicle Maintenance	LS			$10,000	
Fuel, misc.	LS			$20,000	
Utilities	LS	N/A	N/A	$20,000	*$50,000*
Site Maintenance	LS	N/A	N/A	$3,000	*$3,000*
Insurance	LS	N/A	N/A	$3,000	*$3,000*
SUBTOTAL:				**$242,000**	
10% Contingency:				*$24,200*	
TOTAL:				**$266,200**	

[1] Includes maintenance of inert landfill (equivalent to 1 FTE?)

LONG-HAUL TRANSPORTATION TO VALDEZ AND MILE 70

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Shipment to Valdez	$100,000 [2]	6,000 [3]	N/A	6,000 [3]
Wharfage in Valdez 4	$25,000	N/A	N/A	N/A
TOTAL TO VALDEZ:	**$125,000**	**$6,000**	**N/A**	**$6,000**
Truck from Valdez to "70 Mile" 5	$60,000 - $100,000	$5,000	$140,000 - $240,000	$5,000
TOTAL 70 MILE :	**$185,000 - $225,000**	**$11,000**	**$140,000 - $240,000**	**$11,000**

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)
2 Based on estimate received from Samson Tug & Barge of $760 per container.
3 Assume local hauler transports as "surplus" @ $500/container and one container is shipped each month.
4 This is based on Sampson Tug and Barge quote of $0.32 per 100 lbs for terminal handling and $4/ton for wharfage (for a total of $10.40 per ton).
5 Assume costs are 20% less than cost to Glennallen. High end of range is based on cost estmate from Samson Tug & Barge of $935 per container to Glennallen. Price includes containers and chassis. Low end of range is based on $550/container.

CONSTRUCTION OF A REGIONAL LANDFILL [1]

Capital Cost Estimate

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land	AC	$3,500	30	$105,000
Building	SF	$60	1 (50'x100')	$300,000
Equipment: D-6; Compactor; Lift; Trucks, etc. [2]	LS	$500,000	2	$1,000,000
Access Road	LS			$100,000
Utilities Installation	LS			$100,000
Fencing	LF	$25	2,000	$50,000
Site Preparation	AC	$10,000	20	$200,000
Landscaping	LS			$50,000
Permitting	LS			$100,000
Contingency (10%)				*$200,500*
Engineering (15%)				*$300,750*
TOTAL CAPITAL COSTS:				**$2,500,000**

[1] NOTE: These figures represent the estimated total costs required to construct a regional landfill. To determine Cordova's portion of the cost (as reflected on page 1), an annual cost per ton of the landfill was first determined by calculating the present value of the regional landfill costs (capital and operating costs) and dividing that by the total tons to be disposed of in the region (8,300 tons). This cost per ton figure was then multiplied by the total tons to be disposed by Cordova in a regional landfill (2,317 tons) annually.

[2] Assume 10-yr lifecycle

CONSTRUCTION OF A REGIONAL LANDFILL

Annual Operation and Maintenance Cost Estimate

Item	Unit	Cost/Unit	Quantity	Annual Cost
Labor	FTE	$60,000	3	$180,000
Building O&M, Utilities	LS			$100,000
Equipment Maintenance	LS			$75,000
Misc. Materials	LS			$50,000
Administration (10%)				*$40,500*
TOTAL ANNUAL COSTS:				**$445,000**

Account Requirements

Item	Unit	Cost/Unit	Quantity	Total Cost
Closure	LS			*$250,000 total* [1]
Post-Closure Fund	LS			*$1,000,000 total* [2]
Insurance	LS			*$25,000/year*

[1] Annual payments would be made such that at the end of the 20-year operating period this amount of monies would be in the fund.

[2] The actual cost of the post-closure fund may be the cost of insurance for this amount rather than the cost shown, depending on the city's approach to fulfilling the post-closure financial requirements.

OPTION 5A: Regional Balefill in Valdez
(lateral expansion of balefill)

OPTION 5B: Regional Balefill in Valdez
(vertical expansion with leachate cut-off wall)

COST SUMMARY FOR OPTION 5A: REGIONAL BALEFILL IN VALDEZ [1]
(lateral expansion of balefill)

Capital Costs	Total Costs–Regional Landfill	Cordova Costs [2]
Transfer Station Construction	N/A	$324,000
Regional Landfill Construction [3]	$9,332,000	$2,613,000
TOTAL:		**$2,937,000**

Annual Costs	Total Costs–Regional Landfill	Cordova Costs [2]
Transfer Station O&M	N/A	$266,000
Transportation to Valdez [4]	N/A	$125,000
Regional Landfill O&M [5]	$180,000	$50,400
TOTAL:		**$441,000**

Account Requirements

Insurance	$25,000/year	$7,000
Closure	$725,000 total	$200,000

[1] Figures in this table have been rounded to the nearest thousand.

[2] The Cordova portion of the regional landfill construction and O&M costs is based on multiplying the total costs for these items by Cordova's contribution to the amount of solid waste to be disposed of at the regional landfill (2317 tons, or 28% of 8300 tons).

[3] This is based on increasing the cost estimates for a Valdez-only landfill by 35%, to account for the increase in the amount of waste that would be disposed of from the region. (Although the actual increase in wastes would be approximately 45%, it is assumed that there is less than a one to one correspondence of waste to costs.)

[4] Transportation costs are based on $760/container and a $10.40/ton wharfage fee.

[5] Assumes 3 FTE are required to operate the landfill and related activities.

COST SUMMARY FOR OPTION 5B: REGIONAL BALEFILL IN VALDEZ [1]
(vertical expansion with leachate cut-off wall)

Capital Costs	Total Costs–Regional Landfill	Cordova Costs [2]
Transfer Station Construction	N/A	$324,000
Regional Landfill Construction [3]	$7,060,000	$1,976,800
TOTAL:		**$2,301,000**

Annual Costs	Total Costs–Regional Landfill	Cordova Costs [2]
Transfer Station O&M	N/A	$266,000
Transportation to Valdez [4]	N/A	$125,000
Regional Landfill O&M [5]	$180,000	$50,400
TOTAL:		**$441,000**

Account Requirements

Insurance	$25,000/year	$7,000
Closure	$725,000 total	$200,000

[1] Figures in this table have been rounded to the nearest thousand.
[2] The Cordova portion of the regional landfill construction and O&M costs is based on multiplying the total costs for these items by Cordova's contribution to the amount of solid waste to be disposed of at the regional landfill (2317 tons, or 28% of 8300 tons).
[3] This is based on increasing the cost estimates for a Valdez-only landfill by 35%, to account for the increase in the amount of waste that would be disposed of from the region. (Although the actual increase in wastes would be approximately 45%, it is assumed that there is less than a one to one correspondence of waste to costs.)
[4] Transportation costs are based on $760/container and a $10.40/ton wharfage fee.
[5] Assumes 3 FTE are required to operate the landfill and related activities.

OPTION 6: Ship to Southeast Alaska

OPTION 7: Ship to Lower 48

SUMMARY OF COSTS FOR OPTION 6: SHIP TO SOUTHEAST ALASKA [1]

Capital Costs

Transfer Station Construction	$324,000

Annual Costs

Transfer Station O&M	$266,000
Transportation	$150,000
Tipping Fee	$232,000
TOTAL:	**$648,000**

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

SUMMARY OF COSTS FOR OPTION 7: SHIP TO LOWER 48 [1]

Capital Costs

Transfer Station Construction	$324,000

Annual Costs

Transfer Station O&M	$266,000
Transportation	$240,000
Tipping Fee	$104,000
TOTAL:	**$610,000**

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Land Acquisition [1]				
Access, Site, Building Construction	LS		Modifications	$100,000
Transfer Containers--Supplied by Carrier	N/A	N/A	N/A	N/A
Recycling Bins and Containers	LS			$10,000
Loader [2]	EA	$80,000	2	$160,000
Engineering and Contingencies (20%)				$54,000
TOTAL:				**$324,000**

[1] Plan to use existing site

[2] Assumes the loader will have to be replaced once over the twenty-year period.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount	*Subtotal*
Personnel					
Operators [1]	FTE	$50,000	3	$150,000	
Public Works Director	FTE	$125,000	0.2	$25,000	
Administration (12.5%)	LS	N/A	N/A	$11,000	*$186,000*
Equipment					
Vehicle Maintenance	LS			$10,000	
Fuel, misc.	LS			$20,000	
Utilities	LS	N/A	N/A	$20,000	*$50,000*
Site Maintenance	LS	N/A	N/A	$3,000	*$3,000*
Insurance	LS	N/A	N/A	$3,000	*$3,000*
SUBTOTAL:				**$242,000**	
10% Contingency:				*$24,200*	
TOTAL:				**$266,200**	

[1] Includes maintenance of inert landfill (equivalent to 1 FTE)

LONG-HAUL TRANSPORTATION TO A LANDFILL IN LOWER 48 AND SOUTHEAST ALASKA

Cost Estimate

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Ship to Southeast [2]	$150,000	$10,000 [3]	$350,000	$10,000 [3]
Ship to Lower 48 [4]	$240,000	$14,000 [3]	$575,000	$14,000 [3]

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)
2 Based on costs from Samson Tug & Barge of $1,150/container from Cordova and $1,100/container from Valdez. (Costs do not include wharfage or terminal handling.)
3 Assume local hauler transports as "surplus" to Valdez or Cordova and one container is shipped each month.
4 Based on cost estimates from Samson Tug and Barge of $1,850/container from Cordova to Seattle and $1,800 from Valdez to Seattle.

ANNUAL DISPOSAL COSTS BASED ON LANDFILL TIPPING FEES

Location	Cost/Ton	Annual Disposal Cost[1]			
		Valdez	Cordova	Tatitlek	Chenega Bay
Glennallen[2]	$68 - $81	$393,000 - $468,000	$158,000 - $188,000	$6,800 - $8,100	$6,800 - $8,100
Southeast Alaska	$100	$577,600	$231,700	$10,000	$10,000
Lower 48[3]	$45	$259,920	$104,265	$4,500	$4,500

[1] These figures are based on each community's annual tonnage of solid waste disposed: Valdez–5,776 tons/yr; Cordova–2317 tons/yr; Tatitlek–100 tons/yr; and Chenega Bay 100 tons/yr.

[2] The Glennallen cost includes both transportation from Valdez and disposal costs, and is based on an estimate by Copper Basin Sanitation Service (October 1995)

[3] Seattle pays $45/ton for rail and tipping fee to Arlington, Oregon (telephone conversation with Deanne Mount, City of Seattle)

Costs of Collection

COST ESTIMATES FOR COLLECTION OF SOLID WASTE [1]

Collection Services - Capital Costs

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Equipment and Vehicles [2]	LS	$187,000	3	$561,000

Collection Services - Annual Operation and Maintenance

Salaries and Wages	FTE	Annual Cost (1995 $s)
Refuse Collector	1	48,961
Mechanic	0.1	6,851
Equipment Operator	0.4	26,901
Seasonal Laborers	1	29,426
TOTAL ANNUAL LABOR COSTS		**$112,000**

[1] The costs of collection are show for information purposes only and have not been incorporated into the total estimated cost of constructing a local balefill.

[2] Assume 7yr +/- year lifecycle. Equipment and vehicles used for collection and annual collection O&M are assumed to be approximately 50% of the overall cost of solid waste management equipment and vehicles and O&M, based on a telephone contact with the City's Public Works Director (September, 1995).

Recycling–Drop-Off Program Costs and Information on Selected Recycling Markets

ESTIMATED RECYCLING COSTS AND REVENUE
CORDOVA

Costs [1]	
Capital Costs	$1,800 [2]
Annual	
· O&M [3]	$22,000
TOTAL COSTS/YR:	**$24,000**
Total Revenues per Year [4]	**$25,000**
Net Revenue per year	**$1,000**

[1] Costs are presented in present value terms. 1995 dollars and an 8% discount rate were used to determine the present value.

[2] Annualized from total of $25,000 for 25 collection dumpsters.

[3] O&M includes $15,000 for labor (.5 FTE at $15/hr) plus funding for public education ($2000). Also includes transportation costs, estimated to be $5,000 (assumes shipping cost of $1000/container to Seattle, 18 tons per full container).

[4] Revenues are based on $125/ton for cardboard (86 tons recycled) and $1200/ton for aluminum (12 tons recycled).

INFORMATION ON SELECTED RECYCLING MARKETS

Markets	Port Location	Pick Up at Dock	Revenue Range	Comments
Weyerhaeuser 1962 77th Avenue Kent, WA 98032 (206) 682-1035 Doug Metz	• Seattle	**Yes** • Price includes pick-up from dock and freight	• Cardboard: $150/ton • Newsprint: $190/ton • Office Paper: $235/ton	• Cardboard and newsprint must be in bales of over 1,000 lbs. • Office paper must be in bales of over 1,200 lbs.
N.W. Recycling, Inc. PO Box R Bellingham, WA 98227 (206) 384-6313 Brian Parberry	• Bellingham	**Yes** • Price includes pick-up from dock	• Cardboard: $130/ton • Newsprint: $125/ton • Office Paper: $250/ton	• All materials must be baled
Canadian Fibre 3971 Boundary Rd. Richmond, BC V6V1T8 (604) 524-4627 Shawn Muir	• Vancouver • Facility is 12 miles from port	**No**	• Cardboard: $145/ton (bales under 1,000 lbs $200/ton (bales of 1,000 - 1,400 lbs.)	• Recycle newsprint and office paper through Belkin Paper Source (see below)
Belkin Paper Source 1050 United Blvd Coquitlam, BC V3K6V4 (604) 527-9968 Tim Purkiss	• Vancouver • Facility located at port; also accessible by rail and truck	**N/A**	• Cardboard: $140/ton • Newsprint: $165/ton • Office Paper: $200/ton	
Anchorage Recycling 6161 Rosewood Street Anchorage, AK 99518 (907) 562-2267		**No**	• Cardboard: $40/ton Newsprint: $20/ton Office Paper: $40/ton	
Waste Recovery 8501 N Borthwick Portland, OR 97217 (503) 283-2261 Mark Hope	• Seattle	**Yes** • Extra charge to pick up at dock and/or unload trailer	• Tires: (-) $.65/automobile tire (-) $3.50/truck tire • Tires with rim: (-) $2.50/automobile tire (-) 10.00/ truck tire	• Tires also accepted by trailer load: (-) $550 for a 27 foot trailer (-) $880 for a 40 foot trailer • Extra charge for larger tires

SCRAP METAL RECYCLING MARKETS

Markets	Port Location	Pick Up at Dock	Revenue Range	Comments
Seattle Iron & Metal 2955 11th Ave SW Seattle, WA 98134 (206) 682-0040 Alan Sidell	• Seattle • Facility is 2-3 miles from docks.	**Yes** • Cost varies depending on quantity & value of shipment: $0 - $10/ton	• Aluminum Cans: $1,240/ton • White Goods: $40/ton • Junk Vehicles: $60/ton • Scrap Metal: $80/ton (steel)	• Shipments of one type of item preferred to mixed batches • Facility will take baled and crushed metals, if contaminants removed
ABC Recycling 8081 Meadow Ave Burnaby, B.C. Canada V3N 2V9 Melvyn Yochlwitz	• Vancouver	**Yes** • Cost varies depending on quantity & value of shipment: $5 - $10/ton range	• Aluminum Cans: $1,200-$1,260/ton • White Goods: $45-$50/ton • Scrap Metal: $90/ton (steel)	• All prices listed are Canadian • For White Goods, the facility needs certification that freon was removed from each unit.
Skagit River Steel and Recycling P.O. Box 376 Burlington, WA 98223 (800) 869-7097 Lois Young	• Seattle • Bellingham is a possible pickup site	**Yes** • Facility uses trucks to transport recyclables from docks to site; $200/trip for Seattle, $150/trip to Bellingham	• Aluminum Cans: $960-$1,260/ton • White Goods: Free - $10/ton • Junk Vehicles: $10/ton Scrap Metal: $25 - $40/ton	• Can prices depend on volume, how clean they are, and packaging (baled is preferred) • Facility will charge $35/unit of White Good with no certification • Cars cannot have rubber, glass or upholstery, and must have a "junk title" • Preferred preparation for scrap steel: under 4 ft. block, at least 1/8" thick
Alaska Metals Recycling 9705 King St. Anchorage, AK (907) 349-4833 Robert Snell	• Anchorage (North Star)	**Yes** • Cost varies depending on packaging, volume, value: $10-$25/ton	• Aluminum Cans: $600-$900/ton • White Goods: Free • Junk Vehicles: $10-$30/ton • Scrap Metal (steel): $40/ton	• High end price for cans baled and boxed • Company will take White Goods if owner signs release saying freon was removed • Metal prices fluctuate between winter (low) and summer (high)
Joseph Simon & Sons 2202 E. River St. Tacoma, WA 98421 (206) 272-9364 Mark Simon	• Tacoma	**No**	• Aluminum Cans: $900-$1,200/ton	• Flattened/baled cans are preferred
General Metals 1902 Marine View Dr. Tacoma, WA (800) 562-9876 Ken Kushin	• Tacoma	• Facility has dock at the Port of Tacoma; no charge for pick-up	• White Goods: $48/ton • Junk Vehicles: $70/ton • Scrap Metal: $60 -$80/ton	• Baled equipment would get higher price. Compressors need to be removed • Cars must have batteries, tires, oil removed, gas tank emptied • High end of scrap metal price for bales 18" wide and 5 ft or smaller

CURRENT STATUS OF SCRAP METAL COLLECTION ACTIVITIES (1995)

I. STATUS OF SCRAP METAL PROGRAM

	Cordova	Valdez
Current Status	• Barge due 8/20, will haul estimated 500+ vehicles and scrap steel, totaling 2,000 tons	• Collection underway, crusher in town; 1300+ vehicles collected or targeted for collection
Items Collected	• Vehicles and steel; scrap steel collected at the cost of the contractor	• Vehicles • Scrap brass, bronze and copper
Contractors	• Toklat Inc.: J.R. Thompson (907) 243-2892 • General Metals: Ken Kushin (206) 572-4000 • Island Tug & Barge Co.: Frank Ellefson (206) 938-0403	• ABC Towing - Rod Lewis (907) 835-2030, Glenn Allen office
Equipment Provided by Contractor	• End Dumps, loader, 235 hoe/thumb mech. truck, waste oil tank	• Car crusher, wrecker to remove cars from private or city property
Contractor Fees	• $152/vehicle	• $96,200 total
Recycler	• General Metals (Tacoma, WA)	• Simon & Sons, General Metals (Tacoma, WA)
Community Responsibility	• City placed vehicles in three locations; contractor picks up all vehicles	• ABC Towing drains fluids, removes batteries and picks up vehicles
Estimated Costs to Community	• $100/vehicle; includes towing, disposal of most fluids, battery	• Community baler facility provides shrink wrap for collected batteries, coordinates w/Exide to ship off-site.

II. OVERALL ASSESSMENT OF CURRENT SCRAP METAL RECYCLING EFFORT

Positive Impacts of Scrap Metal Pickup	• Contractor removed vehicles from large lots, providing good working areas • Ultimate reduction of landfill use	• Contractor takes responsibility for preparation of car (battery and fluids), removal from property
Difficulties Encountered	• Contractor would leave an area prior to completing the cleanup.	
Unexpected Costs/Requirements	• None encountered	• None encountered
Lessons Learned	• City would set time and penalty clause	
Program Needs	• 75 vehicles abandoned/year, left on city ROW.	• 100 vehicles abandoned/year
Future Activities	• City plans to purchase compactor and CAT 235 w/Thumb	

Appendix C.3—Tatitlek and Chenega Bay
Introduction: Cost Estimates of Solid Waste Management Options

Appendix C to the Sound Waste Management Plan provides detailed cost estimates of municipal solid waste management alternatives for Valdez, Cordova, Tatitlek, and Chenega Bay.[1] Community representatives who developed the Sound Waste Management Plan will use this cost information as a foundation for discussions with their city/village councils and the general public to determine how best to manage municipal solid waste over the long term.

Appendix C is divided into three sections (C.1, C.2, C.3), each of which contain cost estimates for individual communities: Valdez, Cordova, and the villages (cost estimates for Tatitlek and Chenega Bay have been combined due to the similarity of population size and current solid waste management methods). For each community, a wide range of municipal solid waste disposal alternatives were analyzed. For Cordova and Valdez, the current costs of solid waste collection and the costs and revenues associated with operating a drop-off recycling program were also estimated.

The cost estimates were developed based on extensive discussion with and review by city and village personnel participating in the project. Site visits to each community were conducted to help ensure that a complete and accurate understanding of the community's current solid waste management program and management issues was achieved.

The information contained in each of the three community sections is organized as follows:

- **cost summary sheets**, which compare the total capital and annual costs of the different waste disposal options and identify the preferred options for each community;
- **cost estimates of individual disposal options**, which provides detail on the individual cost components of each option;
- **cost estimates of the current costs of solid waste collection** in Cordova and Valdez; and
- **cost estimates of operating a recycling program** in Cordova and Valdez.

The cost summary sheets present the costs for each option in three different ways:

- **total costs** over the life of the disposal option (a twenty year planning horizon was used);
- **annualized costs**, which is what the option would cost if it were paid for in equal annual payments over the project's life; and
- **cost per ton**, which divides the annualized costs by the tons of solid waste generated annually.

The information contained in this Appendix was used to develop Recommendation #5 ("Choosing Solid Waste Disposal Sites and Methods") of the Sound Waste Management Plan.

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[1] Cost estimates were not developed for Whittier, because the city recently made the long-term decision to privatize its solid waste collection and to dispose of its solid waste at the Anchorage landfill.

TABLE OF CONTENTS: TATITLEK and CHENEGA BAY
Cost Estimates of Solid Waste Management Options

February 29, 1996

COMPARISON OF SOLID WASTE MANAGEMENT OPTIONS [1]
Tatitlek and Chenega Bay

**** recommended options ****

Costs [2]		OPTION 1: **Cost to Bring Landfill into Compliance**	OPTION 2: **Operate Existing Landfill**	OPTION 3: Ship to Glennallen	OPTION 4: Regional Landfill: Mile 70	OPTION 5: Incineration	OPTION 6: Ship to Southeast	OPTION 7: Ship to Lower 48
Capital Costs	($)	N/A	$223,000	$80,000	$105,000	$180,000	$80,000	$80,000
Annual O&M Costs [2]	($/yr)	N/A	$9,500	$29,000	$31,000	$42,000	$35,000	$33,000
Closure	($)	N/A	$50,000	N/A	$2,500	N/A	N/A	N/A
Insurance	($/yr)	N/A	N/A	N/A	$250	N/A	N/A	N/A
Total Present Value of Costs [3]	($)	Ch Bay: $154,000 Tatitlek: $236,000	$321,000	$369,000	$608,000	$577,000	$617,000	$601,000
Annualized Cost (present value)	($)	N/A	$30,000	$35,000	$58,000	$54,000	$59,000	$57,000
Annual Cost/Ton (present value) [4]	($)	N/A	$303	$352	$578	$544	$586	$571

1 All costs (except annual costs) are based on a twenty-year period.
2 Collection and post-closure costs are not included in these figures. All costs have been rounded to the nearest thousand.
3 Present value calculations are in 1995 dollars and based on an 8% discount rate.
4 Annual cost per ton is based on an annual disposal rate of 100 tons.

TABLE 2: COST OF RECOMMENDED OPTIONS TATITLEK AND CHENEGA BAY

Cost to Bring Existing Landfill into Compliance with Regulations [1]

	Tatitlek	Chenega Bay
Total Cost	**$236,000**	**$154,000**
Village In-Kind Contribution	$65,000	$42,000
Total Cost to be Raised from Outside Funding Sources	$171,000	$112,000

Cost to Operate Existing Landfill in Compliance with Regulations [2]

CAPITAL COSTS:	Tatitlek	Chenega Bay
Total Capital Cost [3]	**$85,000**	**$85,000**
Village In-Kind Contribution	$3,000	$3,000
Total Cost to be Raised from Outside Funding Sources	$82,000	$82,000

ANNUAL COSTS:	Tatitlek	Chenega Bay
Total Annual Cost	**$9,500**	**$9,500**
Village In-Kind Contribution [4]	$2,000	$2,000
Monthly Cost/Household Required to Pay for Annual Cost [5]	$18	$25

[1] This option would put cover material and a geomembrane over the existing site and fence the entire perimeter. In Chenega, the stream would be diverted around the landfill. The cost includes funding to hire a contractor to perform this work, and would be completed within one year.

[2] This option includes capital costs to purchase equipment and vehicles to maintain the landfill and annual costs to hire .25 FTE to maintain the landfill (e.g., to apply regular cover). Additional information on these costs is included in Appendix E.

[3] These costs are the totals needed for the first five years of operation.

[4] This is for materials needed each year to cover the landfill.

[5] This figure is based on dividing the annual labor costs ($7,500) by 25 households in Chenega and 35 households in Tatitlek, respectively.

OPTION 1: Cost to Bring Landfill into Compliance

TOTAL COSTS TO BRING EXISTING LANDFILL INTO COMPLIANCE WITH ADEC REGULATIONS

Chenega Bay

Item	Unit	Cost/Unit	Quantity	Total Cost	Village Contribution to Total Cost	Funds Needed from Outside Sources
» Cover Material	CY	$12	2,000	$24,000	$24,000	
» Site Landscaping, Fencing, etc. [1]	LF	$25	1,000	$25,000		$25,000
» Geomembrane	SF	$2	25,000	$50,000		$50,000
» Labor/Equipment [2]	LS			$30,000	$10,000 [4]	$20,000
» Stream Diversion [3]	LS			$25,000	$8,000 [4]	$17,000
TOTAL:				**$154,000**	**$42,000**	**$112,000**

1 Assumes the entire site would be fenced.
2 Assumes $5000 for equipment lease (loader or caterpillar D4 at $50/hr for 100 hrs) and $25,000 for labor (5 people at $20/hr for 250 hrs).
3 Assumes $5000 for equipment lease (backhoe at $50/hr for 100 hrs) and $20,000 for labor (3 people at $20/hr for 300 hrs).
4 Represents cost savings from having work performed by village residents, at a lower rate (1/3 less) than amount shown in "total costs" column, which assumed hiring of outside contractors.

Tatitlek

Item	Unit	Cost/Unit	Quantity	Total Cost	Village Contribution to Total Cost	Funds Needed from Outside Sources
» Cover Material	CY	$12	4,000	$48,000	$48,000	
» Site Landscaping, Fencing, etc. [1]	LF	$25	1,500	$38,000		$38,000
» Geomembrane	SF	$2	50,000	$100,000		$100,000
» Labor/Equipment [2]	LS		1	$50,000	$17,000	$33,000
TOTAL:				**$236,000**	**$65,000**	**$171,000**

1 Assumes the entire site would be fenced.
2 Assumes $5000 for equipment lease (loader or caterpillar D4 at $50/hr for 100 hrs) and $25,000 for labor (5 people at $20/hr for 250 hrs).

OPTION 2:

Operate Existing Landfill in Compliance with Regulations

COST SUMMARY FOR OPTION 2: OPERATING THE EXISTING AND EXPANDED LANDFILL IN COMPLIANCE WITH REGULATIONS

Capital Expenditures

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Op. Period)	TOTAL COST: FIRST 5 YEARS Village Contribution to Total Cost	TOTAL COST: FIRST 5 YEARS Funds Needed from Outside Sources
» Site Development	LS		1	$68,000	$2,000	$32,000
» Permitting [1]	LS			$3,000	$1,000	
» Equipment and Vehicles	LS	$50,000	3 [2]	$150,000		$50,000
» Design/Administration Costs	LS	N/A	N/A	$2,000		
TOTAL COSTS (approximate) in 1995 $s				$223,000	$3,000	$82,000

[1] Assume initial and 3 renewals (figures based on draft ADEC regulations)

[2] Assume 7yr +/- year lifecycle

Annual Expenditures (Operation and Maintenance)

Item	Unit	Cost/Unit	Quantity	Annual Cost	TOTAL COST: FIRST 5 YEARS Village Contribution to Total Cost	TOTAL COST: FIRST 5 YEARS Funds Needed from Outside Sources
» Cover Material	CY	$10	200	$2,000	$2,000	
» Building Maintenance	LS			$0		
» Utilities	LS			$0		
» Salaries, Wages, and Benefits [1]	FTE	N/A	0.25	$7,500	$7,500	
ANNUAL O&M COSTS (1995 $s)				**$9,500**	**$9,500**	

[1] Includes site upkeep (e.g., fence repairs) and equipment O&M. Assumes an hourly wage of approximately $15/hour (including benefits).

Account Requirements

Item	Unit	Cost/Unit	Quantity	Annual Cost	Village Contribution to Total Cost	Funds Needed from Outside Sources
» Closure Fund [1]	AC	$50,000	1	$50,000	$50,000	
» Post-Closure Fund	AC	$10,000	1	$10,000	$10,000	
TOTAL ACCOUNT REQUIREMENTS (1995 $s)				**$60,000**	**$60,000**	

[1] The village would set aside a portion of this total amount each year, so that the total amount would be in the fund by the end of the 10-year operating period.

BREAKDOWN OF SITE DEVELOPMENT COSTS: FOR 20 YEARS AND FOR FIRST 5 YEARS

Item	Unit	Cost/ Unit	Quantity	Total Cost (20-yr Op. Period)	TOTAL COST: FIRST FIVE YEARS: Village Contribution to Total Cost	TOTAL COST: FIRST FIVE YEARS: Funds Needed from Outside Sources
» Predevelopment Engineering Svcs. (incl. EIS, Feasibility Report, System Design)	LS	$25,000	1	$25,000		$10,000
» Land Acquisition or Value	AC	2,000	3	6,000		
» Site Development [1]	AC	15,000	1	15,000		10,000
» Leachate System	AC		N/A			
» Site Landscaping, etc.	AC	1,500	3	4,500	2,000	
» Access Road [2]	LS	10,000	1	10,000		10,000
» Utilities	LS		N/A			
» Ancillary Building	SF		N/A			
» Leachate Holding	LS		N/A			
» Contingency (12%)	LS			7,000		2,000
SITE DEVELOPMENT TOTAL COSTS (1995 $s)				**$68,000**	**$2,000**	**$32,000**

[1] Assume only one acre of site is developed for disposal; remaining 2 acres are buffer.
[2] To upgrade existing road.

OPTION 3: Regional Landfill in Glennallen

COST SUMMARY FOR OPTION 3: REGIONAL LANDFILL IN GLENNALLEN [1]

Capital Costs		Village Contribution to Total Cost	Funds Needed from Outside Sources
Transfer Station Construction	$80,000		$80,000

Annual Costs		Village Contribution to Total Cost	Funds Needed from Outside Sources
Transfer Station O&M	$15,000	$15,000	
Transportation to Valdez	$6,000	$6,000	
Ground Transport and Disposal Cost	$6,800 - $8,100	$6,800 - $8,100	
TOTAL:	**$28,000 - $29,000**	**$28,000 - $29,000**	

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Site Development & Building (open sided) [1]	LS			$50,000
Transfer Containers with chassis	EA	$7,500	2	$15,000
Recycling Bins and Containers				$2,000
Engineering and Contingencies (20%)				$13,400
TOTAL:				$80,000

[1] 20' x 30' building at $50/sq. ft. = $30,000; site work = $15,000; fencing = $5,000.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount
Personnel/Operator (incl. site maintenance)	FTE	$50,000	0.25	$12,500
Equipment/Building	N/A			N/A
SUBTOTAL:				**$12,500**
20% Contingency:				*$2,500*
TOTAL:				**$15,000**

LONG-HAUL TRANSPORTATION TO VALDEZ AND MILE 70

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Shipment to Valdez	$100,000 [2]	6,000 [3]	N/A	6,000 [3]
Wharfage in Valdez 4	$25,000	N/A	N/A	N/A
TOTAL TO VALDEZ:	**$125,000**	**$6,000**	**N/A**	**$6,000**
Truck from Valdez to "70 Mile" 5	$60,000 - $100,000	$5,000	$140,000 - $240,000	$5,000
TOTAL 70 MILE :	**$185,000 - $225,000**	**$11,000**	**$140,000 - $240,000**	**$11,000**

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)

2 Based on estimate received from Samson Tug & Barge of $760 per container.

3 Assume local hauler transports as "surplus" @ $500/container and one container is shipped each month.

4 This is based on Sampson Tug and Barge quote of $0.32 per 100 lbs for terminal handling and $4/ton for wharfage (for a total of $10.40 per ton).

5 Assume costs are 20% less than cost to Glennallen. High end of range is based on cost estmate from Samson Tug & Barge of $935 per container. Price includes containers and chassis. Low end of range is based on $550/container.

ANNUAL DISPOSAL COSTS BASED ON LANDFILL TIPPING FEES

Location	Cost/Ton	Annual Disposal Cost[1]			
		Valdez	Cordova	Tatitlek	Chenega Bay
Glennallen[2]	$68 - $81	$393,000 - $468,000	$158,000 - $188,000	$6,800 - $8,100	$6,800 - $8,101
Southeast Alaska	$100	$577,600	$231,700	$10,000	$10,000
Lower 48 [3]	$45	$259,920	$104,265	$4,500	$4,500

[1] These figures are based on each community's annual tonnage of solid waste disposed: Valdez–5,776 tons/yr; Cordova–2317 tons/yr; Tatitlek–100 tons/yr; and Chenega Bay 100 tons/yr.

[2] The Glennallen cost includes both transportation from Valdez and disposal costs, and is based on an estimate by Copper Basin Sanitation Service (October 1995)

[3] Seattle pays $45/ton for rail and tipping fee to Arlington, Oregon (telephone conversation with Deanne Mount, City of Seattle)

OPTION 4: Regional Landfill at 70-Mile

SUMMARY OF COSTS FOR OPTION 4: REGIONAL LANDFILL AT 70 MILE (OWNED BY REGION)

Capital Costs

Item	Total Costs–Regional Landfill	Village Costs [2]
Transfer Station Construction	N/A	$80,000
Regional Landfill Construction	$2,500,000	$25,000
TOTAL:		**$105,000**

Annual Costs

Item	Total Costs–Regional Landfill	Village Costs [2]
Transfer Station O&M	N/A	$15,000
Transportation	N/A	$11,000
Regional Landfill O&M	$445,000	$5,000
TOTAL:		**$31,000**

Account Requirements

Insurance	$25,000/year	$250
Closure	$250,000 total	$2,500

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

[2] Each village's portion of the regional landfill construction and O&M costs is based on multiplying the total costs for these items by each village's contribution to the amount of solid waste to be disposed of at the regional landfill (100 tons, or 1% of 8300 tons).

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Site Development & Building (open sided) [1]	LS			$50,000
Transfer Containers with chassis	EA	$7,500	2	$15,000
Recycling Bins and Containers				$2,000
Engineering and Contingencies (20%)				$13,400
TOTAL:				$80,000

[1] 20' x 30' building at $50/sq. ft. = $30,000; site work = $15,000; fencing = $5,000.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount
Personnel/Operator (incl. site maintenance)	FTE	$50,000	0.25	$12,500
Equipment/Building	N/A			N/A
SUBTOTAL:				**$12,500**
20% Contingency:				*$2,500*
TOTAL:				**$15,000**

LONG-HAUL TRANSPORTATION TO VALDEZ AND MILE 70

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Shipment to Valdez	$100,000 [2]	6,000 [3]	N/A	6,000 [3]
Wharfage in Valdez 4	$25,000	N/A	N/A	N/A
TOTAL TO VALDEZ:	**$125,000**	**$6,000**	**N/A**	**$6,000**
Truck from Valdez to "70 Mile" 5	$60,000 - $100,000	$5,000	$140,000 - $240,000	$5,000
TOTAL 70 MILE :	**$185,000 - $225,000**	**$11,000**	**$140,000 - $240,000**	**$11,000**

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)
2 Based on estimate received from Samson Tug & Barge of $760 per container.
3 Assume local hauler transports as "surplus" @ $500/container and one container is shipped each month.
4 This is based on Sampson Tug and Barge quote of $0.32 per 100 lbs for terminal handling and $4/ton for wharfage (for a total of $10.40 per ton).
5 Assume costs are 20% less than cost to Glennallen. High end of range is based on cost estmate from Samson Tug & Barge of $935 per container. Price includes containers and chassis. Low end of range is based on $550/container.

OPTION 5: Incineration

COST ESTIMATES FOR INCINERATION (LESS THAN ONE TON PER DAY)

Capital Costs

Item	Description	Total Over 20-year Period	Village Contribution to Total Cost	Funds Needed from Outside Sources
Incinerator Unit [1]	$60,000 unit to be replaced once over 20 years	$120,000		$120,000
Building [2]	$30,000 to be replaced once over 20 years	$60,000		$60,000
TOTAL:		**$180,000**		**$180,000**

[1] Based on a quote from Consumat, Inc.
[2] Based on an open-sided shelter.

Operation and Maintenance

Item	Description	Amount/Year	Village Contribution to Total Cost	Funds Needed from Outside Sources
Equipment Maintenance		$12,000	$12,000	
Operator	.5 FTE	$25,000	$25,000	
Ashfill/Inert Landfill		$5,000	$5,000	
TOTAL:		**$42,000**	**$42,000**	

OPTION 6: Ship to Southeast Alaska

OPTION 7: Ship to Lower 48

SUMMARY OF COSTS FOR OPTION 6: SHIP TO SOUTHEAST ALASKA [1]

Capital Costs

		Village Contribution to Total Cost	Funds Needed from Outside Sources
Transfer Station Construction	$80,000		$80,000

Annual Costs

		Village Contribution to Total Cost	Funds Needed from Outside Sources
Transfer Station O&M	$15,000	$15,000	
Transportation	$10,000	$10,000	
Tipping Fee	$10,000	$10,000	
TOTAL:	**$35,000**	**$35,000**	

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

SUMMARY OF COSTS FOR OPTION 7: SHIP TO LOWER 48 [1]

Capital Costs

		Village Contribution to Total Cost	Funds Needed from Outside Sources
Transfer Station Construction	$80,000		$80,000

Annual Costs

		Village Contribution to Total Cost	Funds Needed from Outside Sources
Transfer Station O&M	$15,000	$15,000	
Transportation	$14,000	$14,000	
Tipping Fee	$4,500	$4,500	
TOTAL:	**$33,000**	**$33,000**	

[1] Assumptions used in estimating these costs are identified in the supporting spreadsheets attached to this table. Figures in this table have been rounded to the nearest thousand.

TRANSFER STATION CONSTRUCTION

Item	Unit	Cost/Unit	Quantity	Total Cost (20-yr Operating Period)
Site Development & Building (open sided) [1]	LS			$50,000
Transfer Containers with chassis	EA	$7,500	2	$15,000
Recycling Bins and Containers				$2,000
Engineering and Contingencies (20%)				$13,400
TOTAL:				$80,000

[1] 20' x 30' building at $50/sq. ft. = $30,000; site work = $15,000; fencing = $5,000.

TRANSFER STATION ANNUAL OPERATION AND MAINTENANCE

Item	Unit	Cost/Unit	Quantity	Amount
Personnel/Operator (incl. site maintenance)	FTE	$50,000	0.25	$12,500
Equipment/Building	N/A			N/A
SUBTOTAL:				**$12,500**
20% Contingency:				*$2,500*
TOTAL:				**$15,000**

LONG-HAUL TRANSPORTATION TO A LANDFILL IN LOWER 48 AND SOUTHEAST ALASKA

Cost Estimate

Item	Cordova	Tatitlek	Valdez	Chenega Bay
ANNUAL EXPENDITURES [1]				
Ship to Southeast [2]	$150,000	$10,000 [3]	$350,000	$10,000 [3]
Ship to Lower 48 [4]	$240,000	$14,000 [3]	$575,000	$14,000 [3]

1 Figures are based on the 1994 MSW disposal rates in each of the communities: Cordova 2317T, Valdez 5776T, Tatitlek 100T, Chenega 100T. In addition, it is assumed that each container load carries 18 tons of waste (except as noted in the villages.)
2 Based on costs from Samson Tug & Barge of $1,150/container from Cordova and $1,100/container from Valdez. (Costs do not include wharfage or terminal handling.)
3 Assume local hauler transports as "surplus" to Valdez or Cordova and one container is shipped each month.
4 Based on cost estimates from Samson Tug and Barge of $1,850/container from Cordova to Seattle and $1,800 from Valdez to Seattle.