Exxon Valdez Oil Spill
Restoration Project Final Report

Kodiak Island Borough
Master Plan for Waste Management

Restoration Project 97304
Final Report

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April 28, 1998

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Study History: Restoration Project 97304 has entailed the development of a Master Plan for Waste Management for the remote communities of the Kodiak Island Borough. Previously, a similar plan was developed for Prince William Sound (Restoration Project 95115), which has led to construction and implementation of improvements in handling used oil and other waste materials in coastal communities (Restoration Project 97115). Implementation of the Kodiak Island Borough plan is similarly expected to be funded in part by *Exxon Valdez* Oil Spill Trustee Council restoration funds. The plan is based on findings of a consultant study team led by Montgomery Watson and Alaska Village Initiatives, with direction from representatives from each affected community through the Kodiak Island Village Environmental Council, an *ad hoc* committee convened by the Kodiak Area Native Association (KANA). Montgomery Watson produced interim reports for the project, including inventories of waste streams and potentially affected resources in each community, as well as a review of alternative solutions. These interim reports are attached as appendices to the Master Plan.

Abstract: This project was designed to address marine pollution that is derived from land based sources and waste management practices of the remote communities of Kodiak Island, including: Akhiok, Chiniak, Karluk, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions. The study team developed an inventory of waste streams from each community and described existing and recommended systems for management of wastewater, solid waste, and used oil and household hazardous waste. Findings and recommendations include suggestions for implementation of four initiatives. First, there should be a permanent administrative entity for coordination of waste management system improvements in the coastal villages. This entity has been identified as a Borough-Wide Utility Council, which would promote sharing of resources and collaboration between villages to maximize the ability of remote communities to be self-reliant. Second, a comprehensive initiative of system development should be undertaken to provide not only capital improvements to existing waste management systems, but to further promote local responsibility. This would be accomplished in this second initiative through in-depth, hands-on training of a group of village residents with interests and aptitudes for operations and maintenance of wastewater, solid waste, and used oil/hazardous waste systems. Third, to promote the development of an ethic of environmental stewardship, a curriculum development initiative is proposed. Lastly, it is recognized that successful waste management systems reflect appropriate planning, organization, and communication on a community level. The fourth initiative provides for a process of community consensus building to ensure that improved waste management systems can be accepted and implemented under local control without resources or interference from outside entities. Costs for implementation of these initiatives are estimated.

Key Words: Kodiak Island, marine pollution, wastewater, solid waste, used oil

Citation: Montgomery Watson. 1998. Kodiak Island Borough master plan for waste management, *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 97304), Kodiak Island Borough, Kodiak, Alaska

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Appendices (Bound Separately)

1. INTRODUCTION

1.1 AUTHORIZATION

The Kodiak Island Borough (KIB) has retained Montgomery Watson to develop a Master Plan for Waste Management for the remote communities of Kodiak Island. This Final Report to the Exxon Valdez Oil Spill Trustee Council constitutes the final deliverable work product developed under the Agreement for Engineering Consulting Services for the Master Waste Management Plan, dated February 7, 1997. Kodiak Island Borough gratefully acknowledges grant support from Exxon Valdez Oil Spill Trustee Council under EVOSTC Project Number 97304.

1.2 BACKGROUND

Communities on Kodiak Island generate a large number of waste streams that may be entering, degrading, and preventing the recovery of the *Exxon Valdez* spill area. Examples of these waste streams include used oil from vessels and other sources, sewage discharges, household hazardous wastes, and windblown garbage and/or leachate from community landfills. Community leaders have recognized that they currently lack the resources - for planning, equipment, training, and development of infrastructure - to manage their wastes in an environmentally sound manner. As a result, wastes generated within the communities represent a chronic source of pollution that not only hinders full recovery of the marine environment but also has a negative impact on the general "quality of life".

By working together in a collaborative fashion, implementing waste management solutions will be easier and less costly.

This project is a unified regional effort among the remote coastal villages of Akhiok, Karluk, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions; the community of Chiniak; the Kodiak Area Native Association (KANA); and the Kodiak Island Borough (KIB) to produce and implement a waste management plan that identifies solutions to communities' most pressing pollution problems.

In order to involve the villages in the planning process, KANA established the Kodiak Island Village Environmental Council (KIVEC) with representatives from each of the villages. KIVEC ensured active participation of the communities in the development of the Master Plan. The membership of KIVEC is included in Appendix D of this report (separately bound).

The six remote coastal villages on Kodiak Island lack much of the basic planning, equipment, training, and infrastructure that is in place in other communities on the island. While Kodiak Island Borough has a waste management system in place for residents on the road system, the Borough also faces management issues related to certain waste streams, including used oil and wastewater sludge. The Borough will therefore play a role in the project as both an entity that may be an important part of the solution to the villages' waste management problems (because village wastes may be able to be incorporated into the Borough's existing waste management system), and as an entity which is also seeking solutions to some of its environmental management issues.

KIVEC met several times over the course of the study with the Borough, KANA, ADEC, the US Coast Guard and Montgomery Watson technical consultants to identify and prioritize problems, develop solutions, and to identify and pursue funding for the solutions from a variety of sources

including federal, state, and local government agencies, non-profit organizations, and private businesses.

Two documents that were produced as this project developed are the *Inventory of Pollution Sources and Problems* and the *Alternatives Analysis and Potential Funding Sources* which make up Appendices A and B, respectively, of this report. The focus of the project evolved during course of the study. This plan is the final result of discussions and decisions of the committee.

This project is modeled after the Sound Waste Management Plan project which was made possible through funding from the *Exxon Valdez* Oil Spill Trustee Council (EVOS). The Kodiak Island project, however, with its focus on the villages, the involvement of the Borough, and its somewhat different set of environmental problems is a unique effort. While the Prince William Sound communities do not have an organized borough, the Kodiak Island communities have the support and the administrative structure of the K.I.B. The Borough was instrumental in coordinating this planning effort and will continue to support waste management through the implementation phase.

1.3 APPROACH TO DEVELOPMENT OF THE MASTER PLAN

Through discussions with the KIVEC, it was decided that three themes would provide the basis for all of the recommendations in this report. First, a systems approach has been used for identification of problems and prospective solutions. Second, solutions have been sought that maximize sharing of resources between villages and encourage collaboration. Finally, solutions have been provided for community self-reliance and self determination. These themes are explained further below.

1.3.1 Systems Approach

Waste management involves implementation of a system - a complex arrangement of activities and materials. A system works when it provides for the needs of the community effectively. In order to be effective, all the system components and relationships between components provide a useful role in the operations. The system components can be mechanisms of transport, such as pipes or trucks. They could be storage or processing facilities, such as a used oil burner, or landfill. People have roles in the system, too, as generators of waste and operators of the system. And of course, money is needed in the system to buy parts and fuel and to pay for labor to operate and maintain the system. All components are necessary to provide for a successful system.

However, a fault in any one of the components or relationships can cause the system to break down. For example:

- If the money stops, the system fails;
- If people don't participate, the system fails;
- If the spare parts aren't available when the pump breaks, the system fails.

The success of the system requires all of the activities to be coordinated. As most communities can attest, having money to build a landfill is not sufficient to ensure that the solid waste system will function appropriately. Although most systems allow for small variations in the way things work, there are weaknesses in every system that make it vulnerable. More sophisticated systems

provide checks and balances and back-ups for critical processes. Village environmental systems tend to be less reliable because there is often no alternative, or back-up if something goes awry. This report reflects on the difficulties of present systems that are common to the KIB villages. By focusing resources to bolster the weaknesses of the present system, the reliability of the system as a whole can be improved.

1.3.2 Shared Resources - Collaboration Among All Communities

The remote coastal villages of the Kodiak Island Borough have small populations, no more than a few hundred people in any case. In this remote environment, there are generally few hands available to do the work of operating local government, and little money to accommodate the needs of the communities. Prioritization of the use of community time, money, and energy sometimes means that important and useful tasks get deferred in spite of the best intentions of the community. This has happened with respect to operating and maintaining waste management systems.

One means of overcoming the constraint of having too few resources is to pool the available resources to provide a larger base to draw from. This can be done in the villages by sharing equipment and expertise among neighboring villages, or collaborating with the other island villages, for mutual problem solving. This process has already started through initiatives such as the Kodiak Island Village Environmental Council and the Kodiak Island Village Utility Council. "The biggest bang for the buck" can be achieved by developing a network for support of waste management operations composed of all of the villages.

1.3.3 Provide Atmosphere of Self-Reliance And Self-Determination.

As noted by the Alaska Natives Commission (Joint Federal-State Commission on Policies and Programs Affecting Alaska Natives, Final Report, May, 1994), since contact with western culture, Alaska Natives (Koniagmiut/Alutuk) people have been subject to a continuous series of external influences, some good, some bad. Often, the work of the outsiders has been for the well-intended purpose of improving the lives of local villagers. Outsiders have provided a Christian tradition, an economy based on the use of money, a host of material goods, public housing, a school system, medical care, and a variety of social services. Many decisions regarding the development of the communities are being made by KANA, KIB, or the School District in Kodiak; or by State and Federal agencies in Anchorage, in Juneau, or in Washington, D.C. As a result, local people learned to depend on the activities and decisions of outsiders.

Only by re-establishing control of community systems locally can those systems be effective. This affects all community systems, including waste management.

The best approach to complete and strengthen waste management systems is to stimulate local responsibility and institute local control to the greatest extent.

Thereby, communities can build an atmosphere of self-reliance that will extend beyond the grants that are currently sponsoring many community efforts, including the development of this Master Waste Management Plan.

2. FINDINGS

The Montgomery Watson project team visited each of the remote coastal communities on Kodiak Island to learn first-hand about the operation of waste management systems and talk to the people about their concerns. The team investigated pollution issues that potentially affect marine resources and studied each of the waste management systems:

- wastewater,
- solid waste , and
- used oil and household hazardous waste.

Marine resources can be adversely affected by poor management of village waste systems: wastewater, solid waste , and used oil and household hazardous waste.

The team also investigated other associated village systems that impact or are impacted by waste management, namely:

- water supply and watershed,
- subsistence resources, and
- bulk fuel storage.

With assistance from many people, notably the participants in the Kodiak Island Village Environmental Council as well as City and Tribal Council staff, we conclude the following:

1. Raw sewage is being discharged onto the land and into surface waters in several communities. This is a result of poor system design and operation, and is creating an immediate health threat to persons living in affected villages and their surrounding resources. For example, this pollution affects schooling salmon and shellfish resources in shoreline areas. The affected communities should place a high priority on correction of the conditions leading to the discharges.

2. Used oil from boats, diesel generators, and vehicles is accumulating in the villages with a high potential for improper disposal, including discharge to the marine environment. Use of waste oil for heating fuel and incineration of refuse has been attempted, but technical and regulatory assistance for installation and operation of these systems is needed.

3. Improved waste management practices are needed for economic development. Clean air, clean water, and tidy solid waste management systems will help promote rural Kodiak Island as a destination for tourism and sport-fishing, and will assist in maintaining the marketability of commercial seafood.

4. Old fuel tanks present a potential hazard. Several communities have older fuel delivery and storage systems that do not provide for spill containment in accordance with modern standards. While there is no evidence that the tanks systems are presently polluting soil or water, the proximity of fuel tanks to the water's edge at Old Harbor, for example, in conjunction with their age and condition of structural supports, suggests that contamination from a major fuel spill may be more likely than from other chronic sources.

5. Septage facilities and methods have an impact on health and marine resources. Several villages use community septic tanks to remove solids from wastewater before discharging to the coastal waters. These tanks fill with solids (septage) unless pumped every couple of years. If left without maintenance, the solids overfill the septic tank and discharge raw sewage directly into the marine environment. Tidal flushing carries away some of these wastes, masking the effect of the discharge. Harbor and breakwater construction, such as in Ouzinkie, may reduce the flushing effect of the tides, and concentrate contaminants to the extent that toxic effects may occur.

6. Scrap metal removal is recommended to prevent release of associated contaminants and to build an environmental ethic. Junk vehicles, appliances, and heavy equipment harbor hydraulic fluid, petroleum hydrocarbons, and other fluids which pose a hazard for aquatic wildlife in the case of spills. Additionally, scrap metal lying uncontrolled on rights-of-way and public property can pose a hazard to children and visitors who casually encounter the materials.

7. Household hazardous wastes should be kept out of village landfills. Batteries, solvents, paints, fuels, and other materials can lead to toxic contamination of surface and ground water. These materials should be collected in a central location and disposed of through a regional cooperative effort.

8. Watershed protection is important. Ouzinkie and Port Lions have established watershed protection zoning to prevent certain activities which could contaminate local water supplies. This process should be extended to other communities.

9. Operations and Maintenance training is needed for local village technical staffs. Few village residents have the technical training necessary to implement appropriate waste management practices. Landfill operations, waste oil management, and sewer system management could be topics for local workshops provided by regional experts.

10. Landfill operations planning can improve the function, longevity, and visual quality of disposal sites. Site-specific documentation of how a system should be operated would provide a convenient instruction guide for landfill users and city staff. Operations planning could be used to prevent the development of water pollution, minimize the attraction of animals to the site, and encourage appropriate use of the site by residents and visitors.

11. Drainage control at landfills is needed to prevent leachate production. Upstream water sources should be diverted away from the landfill. Snowmelt and precipitation on the landfill should be drained off the site so that water does not come into contact with garbage.

12. The solution to bear encounters includes, but is not limited to, improved landfill operations. Incineration, improved grading, compaction, and cover placement will reduce attraction of bears. However, the long term presence of bears in the area, in addition to other attractions, such as fish processing at Larsen Bay, means that bears will not necessarily disappear solely as a result of changes to solid waste management.

13. Waste management activities need a sustainable source of funding. Short term grant-funded capital projects are not sufficient to provide for meaningful waste management. Communities should consider means of addressing long term operations and maintenance costs.

14. Local responsibility is needed for successful waste management. Although state and federal regulations mandate certain standards for solid waste management, building and maintaining a successful program comes from the ongoing commitment of the community.

15. Raising Pollution Prevention awareness is key to promoting local responsibility. A tailored education program is needed to help build an environmental ethic for children, focusing on local self-reliance. Further community education can be developed for specific concerns by targeting segments of the population, such as harbor users for waste oil and battery recycling.

16. Recycling of consumer packaging materials to off-island sources is not likely to be financially self-supporting. However, programs such as school collection of aluminum cans for recycling through the statewide "Flying Cans" program does provide for building of an environmental ethic among school children, as well as provide some modest revenue.

These conclusions were discussed at length with KIVEC and ADEC representatives over the course of a meeting in Kodiak. The Council agreed with the findings and directed Montgomery Watson to pursue potential solutions.

3. RECOMMENDATIONS

Based on the findings listed in Section 2 of this report, the KIVEC decided to pursue the following four initiatives:

1. A Borough-wide Utility Council: Establishing a Resource for Collaborative Problem-Solving
2. Systems Development: Fixing and Improving on What is There
3. Community and Environmental Curriculum Development: Building an Environmental Consciousness
4. Local Waste Management Implementation: Community-level Planning and Organization

The recommendations were developed to enhance protection of the marine environment while improving human and environmental health in the KIB communities. These projects focus on strengthening the KIB village-based technical capabilities and community self-determination and involvement. The effect will be to shift control and responsibility for community-based waste management systems from outside agencies to the communities. Each of the programs is described in more detail below.

3.1 A BOROUGH-WIDE UTILITY COUNCIL: *Establishing a Resource for Collaborative Problem-Solving*

Historically, the six remote communities of Kodiak Island have lacked a forum to meet and discuss waste management problems, exchange information, and develop regional solutions. For this Waste Management Master Plan project, KANA convened the Kodiak Island Village Environmental Council (KIVEC) to discuss issues and priorities for waste management system problems at a regional level. The KIVEC has been effective in getting communities together and significant issues onto the table for discussion. An extension of KIVEC is envisioned for the long term as:

The borough-wide utility council will be an outgrowth of KIVEC which has been the voice of the community and KIVUC which has provided technical support for utility operations.

- A permanent resource for coordination between KIB communities and between communities and outside agencies
- A forum for collaboration to solve problems
- An administrative center to manage the business aspects of utility operations
- A resource for technical and utility expertise

People from the KIB villages have also established the Kodiak Island Village Utility Council (KIVUC) to provide technical support for a variety of utilities concerns. In the past the KIVUC has obtained funding and hired a remote maintenance worker, arranged for installation of Powerstat devices for Akhiok and Karluk, and undertaken other projects as funding allows. Currently, it operates as a non-profit, volunteer agency that is dormant without specific project funding. The borough-wide utilities council is envisioned as a combination evolving from the

two existing councils. The council will expand to provide more time and resources for information sharing and exchange, as well as provide a recognized administrative structure, with formal membership and support from both tribal and city governments. Utility system improvements would be coordinated through the council on an area wide basis.

As envisioned, the borough-wide utility council will be the next step to strengthen and formalize the work of the existing informal groups.

With a director and a legal structure, the council will be positioned to empower the communities, support community projects, and provide ongoing project administration.

The successful development of this borough-wide resource for collaboration will be the key to the implementation of the remaining three initiatives.

3.2 SYSTEMS DEVELOPMENT: *Fixing and Improving on What is There*

The objective of the systems development initiative is to establish a network of operations and maintenance specialists within each KIB village that has the knowledge, tools, equipment, budget, and motivation to make the KIB waste management systems perform reliably and well. The long-term objective includes creating a program to retain the necessary skills and experience in the villages and continually improve them.

The program consists of a comprehensive operations and maintenance training program for maintenance workers selected from each village, plus the equipment, spare parts and tools necessary for the work.

The program focuses on hands-on training and will involve the training group fixing the malfunctioning waste management systems in each village.

As envisioned, each village will hold a competitive selection for several community residents to be trained as operations and maintenance workers. Waste management systems operations are carried out differently in each community. Flexibility is required to tailor the structure of the training to the needs of the community.

The formalized, hands-on training program would consist of the training group under the guidance of an experienced specialist, to troubleshoot and fix existing problems in the KIB communities. Trainees would be provided a stipend during the training. Trainees that are found to be unsuited to the program or unwilling to commit the time, would be released from service immediately and replaced, so that the community would not suffer. The communities may want to consider matching an experienced person and a young high school graduate, so the village experience base is increased.

The curriculum would consist of, at a minimum, achieving a thorough grasp of the following aspects of operations and maintenance:

- read and understand existing drawings

- troubleshoot problems in facilities and equipment
- identify and order spare parts
- compile and be responsible for complete tool kit
- cleaning and maintaining of tools and parts
- have, read and understand maintenance manuals or checklists
- have, read and understand operations manuals or checklists
- develop a preventative maintenance program
- identify and plan for routine maintenance requirements
- inventory planning and control
- budgeting and prioritization
- keep maintenance logs and budgets
- routine systems inspections
- identify suppliers and vendors for unmet needs for parts and services
- develop a work ethic that is responsive to the needs of the community
- work alongside peers from other KIB villages
- meet and talk with system designers, experts and other resources from outside Kodiak
- identify, evaluate and contract outside experts, when needed
- provide feedback to the community on waste management issues
- develop standard safety and environmental practices

A preliminary list of activities for each of the waste management systems is shown below to provide a flavor of the training program and show the value that will be provided by the program to each community.

3.2.1 Wastewater Treatment

1. Repair sludge pumping trucks
2. Identify/construct a septic sludge disposal pit
3. Develop a preventative maintenance schedule for pumping and disposing of septic tank sludges, changing oil on pumper trucks, etc.
4. Routinely pump and dispose of septic tank solids into the pit
5. Inspect tanks and piping for plugs or restrictions
6. Remove any blockages
7. Identify and fix any systemic problems (such as the excess use of water)
8. Community education (e.g., provide feedback on any community practices that may break the septic system – such as disposal of plastic bags through the septic system)

3.2.2 Solid Waste

1. Consolidate materials at landfill, make structural improvements to improve drainage and operations (e.g., trench for depositing solid waste, install a burn box)
2. Identify source of cover material
3. Improve road access and fence landfill
4. Obtain and post signage directing residents in the proper procedures at the landfill (e.g., where to deposit solid waste, areas for household hazardous waste, scrap metal, etc.)

5. Purchase waste collection vehicles
6. Build and maintain heavy equipment storage area
7. Develop an operations plan for the landfill
8. Perform all tasks associated with the plan (e.g., collection, temporary storage, put solid waste into cell, burn, compact and cover)
9. Community education starting with scrap metal marshaling and recycling to create an environmental awareness and immediate, noticeable improvement in the community.

3.2.3 Used Oil and Household Hazardous Waste

1. Build or set up a household hazardous waste and used oil collection facility
2. Develop a streamlined operations plan, including safety and regulatory issues
3. Develop a preventative maintenance checklist to routinely change oil and filters, etc.
4. Practice all items on the operations and preventative maintenance plan
5. Purchase and install additional used oil burners and smart ash burners
6. Install any new, uninstalled oil burner systems
7. Identify appropriate disposal for oily rags, filters, oily water, etc.
8. Identify transportation and disposal facilities for collected materials
9. Formalize used oil storage area and transfer procedures
10. Rig piping and pumps to streamline used oil transfers at existing systems
11. Remove hazardous materials from the scrap metal and transfer to the household hazardous waste facility for transportation and disposal or recycling.
12. Set up a hazardous materials waste posting and exchange, and information area for alternative products.
13. Develop standard operating procedures that minimize spillage at the bulk fuel tanks and at the home tanks or systems
14. Oversee bulk fuel loading and unloading operations
15. Interface with DCRA and ADEC to prioritize the Kodiak Island bulk fuel storage systems for upgrade.
16. Perform monthly fuel inventory to demonstrate that fuel tanks are not leaking
17. Complete HAZWOPER training
18. Procure and maintain spill response materials

As evident from the list of subjects, many of the most urgent waste management problems will be fixed by the trainees during the training program. For example, when in Akhiok, the training group will troubleshoot the overflowing septic system, when in Port Lions, it can develop an operations plan for the landfill and start a routine of daily cover.

This approach fixes frustrating, reoccurring waste management problems in each village using local labor. It builds a network of trained experts in each village and encourages ongoing collaboration between KIB villages, so that when a system breaks, the local experts can bring in additional manpower from other KIB villages, rather than Seattle or Anchorage.

3.3 COMMUNITY AND ENVIRONMENT CURRICULUM DEVELOPMENT: *Building an Environmental Consciousness*

Curriculum development would take place through a close association between the school district and village tribal council leaders.

The special curriculum project would introduce and emphasize an ethic of environmental stewardship in the schools and in community meetings. Closely related would be the development and encouragement of citizenship among village children, providing insight into the way that their community functions. Through education, the public is better able to reduce the impact of human pollution affecting the marine environment.

In the long run, the community and environment curriculum could assist in identifying prospective utilities system operators and managers, leading to mentorships.

Since local teachers are fully committed to existing duties, a teacher (or teachers) with specialized expertise would venture from village to village. The roving teacher would introduce the community environmental systems curriculum, working with the local tribal councils and teaching staff to optimize the interaction with students and residents in each village. The close and extended contact allows the teacher to build trust and develop a level of communication that is impossible for day visitors and substitute teachers.

The curriculum would be developed in conjunction with KIVEC and local tribal and city councils and would focus on issues germane to local village life: the hydrologic cycle; use of water and the production and disposal of wastewater; health hazards from exposure to pollutants; protection of subsistence resources; generation, collection, and disposal of garbage; definition and handling of hazardous materials; energy use and conservation; duties and responsibilities of citizens and government; and (for older children) costs and cost recovery mechanisms for waste management systems.

3.4 LOCAL WASTE MANAGEMENT IMPLEMENTATION: *Community-Level Planning and Organization*

The Waste Management Implementation program establishes and implements the procedures for an ongoing community-based waste management system within each KIB village. The objective is a broad-based, collaborative process for addressing critical on-going waste management issues, as well as to develop a long-term waste management action plan for each village that can and will be self-sustainable.

3.4.1 Participation

Unlike public participation processes in government based planning, community initiatives require full-scale participation from village residents. Public participation in government processes involves providing the opportunity for public comment and input. On the other hand, the process required to engage village residents actively in sustaining on-going effective waste management requires broad-based, widespread resident participation, with the first step being to engage community members. This process will allow the village members themselves, not outside agencies, and not only village leaders, but all members of the village to have a role in the process and be a part of the village goals.

Sustaining on-going effective waste management requires broad-based, widespread resident participation.

3.4.2 Approach

In order to accomplish the objective of establishing and implementing ongoing community-based waste management systems, a necessary starting point will be to engage the villages in the process and provide an action plan for development.

The following activities will be included in the initial community process:

- Village residents will prioritize environmental concerns against other village issues and opportunities, both short and long-term. This allows the village to prioritize waste management goals that fit the village needs and to choose methods of achieving those waste management goals that are compatible with their level of commitment and their vision of the village's future.

- Village resources will be identified and allocated to environmental concerns and other waste management issues as village members feel is most appropriate. Village residents will identify regional activities and on-going initiatives for further local implementation, and/or identify additional local waste management priorities and activities.

- A written action plan will be developed for each village.

Possible topics for community discussion include the following issues:

Technical Issues

- Ranking of waste management against other community priorities
- Allocation of community funding for waste management
- Environmental oversight for projects implemented in and around the community
- Participation in regional transportation initiatives
- Watershed protection (e.g., zoning, ordinances)

Community Issues

- What are the community's waste management priorities and how do they fit into overall community priorities?
- What resources will the community commit to ongoing management and implementation of waste management systems?
- What community factors, including business environment, capital, infrastructure, education, quality of life, and natural resources, must be considered in the waste management planning process?
- What community problems, needs and assets must be considered in the waste management planning process?
- How does the community sustain resident support for the ideas and projects outlined during the community waste management planning process?

4. ACTION PLAN SUMMARY: WHAT WILL BE DONE, SYSTEM BY SYSTEM

Waste management in the six remote villages consists of three interrelated systems:

- Wastewater
- Solid waste (consisting of landfills, burn boxes and recycling)
- Used oil and household hazardous waste

The specific recommendations for actions under each waste management initiative, as discussed in Section 3, and as approved by the KIVEC, is provided in this section. This listing addresses all of the findings summarized in Section 2 of this report, which were identified during the first phase of this work, the Identification and Inventory of Pollution Sources.

4.1 WASTEWATER SYSTEMS

4.1.1 Systems Development

In coordination with an ADEC sponsored Remote Maintenance Worker and trainers, local wastewater system operators will:

- Collect all available "as-built" information on the existing system in the community
- Understand how the system should work
- Develop a site-specific written operation plan, including:
  - what needs to be done
  - how often it needs to be done
  - how to do it
- Repair and maintain engine and pumps for septic tanks
- Establish communications with remote maintenance worker
- Attend training workshops for small system operators
- Obtain certification for system operators
- Develop sampling program where wastewater discharge is suspected of polluting the marine environment:
  - Obtain equipment
  - Get training
  - Choose sampling locations and develop QA/QC plan
  - Collect water samples and test
- Provide for septage disposal
- Establish and practice septage pumping

4.1.2 Community Education

Through a community program, information will be prepared and distributed or presented to demonstrate to citizens:

- Importance of the wastewater system to community and environmental health
- Household operations
- Community ownership of the wastewater system

- Responsibility to pay utility bill
- Support the system operator

The Community and Environment curriculum will be introduced to students and will include the areas noted above.

4.1.3 Local Planning

With the assistance of the ADEC Rural Utilities Business Assistance (RUBA) program, workshops will be produced for local City, IRA Traditional Council, and utility staff on:

- Utility Administration
  - establishing appropriate charges
  - collecting fees
  - hiring and paying the system operator

Communities will meet to discuss and make community decisions on:

- Planning for expansion or improvements
- Location for septage disposal
- Communication with the Public Health Service (PHS) / Village Safe Water (VSW)

4.1.4 Local Community-specific Wastewater System Needs

Akhiok

Investigate outfall line and improve outfall capacity
Fix overflowing septic tanks
Repair / replace septic tank pumper
Develop site for septage disposal
Train operators

Chiniak

Provide public information about septic tank pumping
Provide public information about watershed protection
Train operators

Karluk

Provide a facility for housing and maintaining equipment
Hire and train operator to maintain system

Larsen Bay

Repair / replace septic tank pumper
Develop site for septage disposal
Train operators

Old Harbor

Evaluate current system and test for marine pollution
Train operators

Ouzinkie

Evaluate current system and test for marine pollution
Improve septage disposal site
Train operators

Port Lions

Develop site for septage disposal
Repair sludge pumper.
Train operators

4.2 SOLID WASTE SYSTEMS

4.2.1 Systems Development

With technical assistance provided by trainers, local solid waste staff will:

- Construct improvements to existing landfill
- Purchase and install a burn box
- Develop a site-specific written operations plan for each local landfill, addressing:
  - how to get the most out of the existing site
  - access
  - trench construction
  - cover
  - placing and compacting waste
  - use of incinerator or burn-box
  - how to segregate special wastes
  - septage disposal
- Identify sources of cover and build a stockpile.
- Develop a spare parts inventory.
- Develop signage providing direction to landfill users
- Construct improvements to existing landfills
- Develop a site-specific written operations plan for the management of scrap metal
  - identifying a collection area
  - acceptable wastes
  - managing fluids associated with the scrap metal
  - means to transport and recycle collected scrap
- Collect and manage fluids and batteries at the household hazardous waste facility

4.2.2 Community Education

Information will be prepared and distributed to demonstrate to citizens.

- Relationship between garbage and environmental health

- How to use the landfill: when to burn, how to dump, etc.
- Segregating hazardous waste at home
- Responsibility for utility bills
- Support for the system operator
- Relationship between fluids with scrap metals and environmental health
- Problems with scrap metal in landfills
- Where and when scrap metal can be stockpiled for recycling
- Transportation and disposal for recycling aluminum cans collected in the community

The Community and Environment curriculum will be introduced to students and will include the areas noted above.

4.2.3 Local Planning

With the assistance of the ADEC RUBA program, workshops will be produced for local City, IRA Traditional Council, and utility staff on:

- Utility administration
  - establishing appropriate charges
  - collecting fees
  - hiring and maintaining personnel for operations and maintenance

Communities will meet to discuss and make community decisions on:

- Planning for landfill site expansion or selection
- Waste segregation requirements
- Garbage collection
- Location and use of burn box
- Location of scrap metal storage and fluids handling
- Transportation of scrap out of the community

4.2.4 Local Community-specific Solid Waste System Needs

Akhiok

Upgrade or relocate landfill
Purchase and install burn box
Provide technical assistance to develop a scrap metal handling plan
Provide training and equipment for scrap metal processing / fluids removal
Provide transportation of scrap metal out of the community on a scheduled basis

Chiniak

Improve zoning enforcement for public nuisances regarding scrap collection
Provide transportation of scrap metal out of community on a scheduled basis

Karluk

Upgrade or relocate landfill based on operations plan
Purchase and install burn box
Obtain dump truck for solid waste collection
Provide technical assistance to develop a scrap metal handling plan
Provide training and equipment for scrap metal processing / fluids removal
Provide transportation of scrap metal out of the community on a scheduled basis

Larsen Bay

Upgrade landfill (install fence)
Obtain collection vehicle - dedicated for purpose
Negotiate landfill usage and fee schedule with cannery
Upgrade incinerator
Provide technical assistance to develop a scrap metal handling plan
Provide training and equipment for scrap metal processing / fluids removal
Provide transportation of scrap metal out of the community on a scheduled basis

Old Harbor

Modify burn box to facilitate use and ash handling
Establish garbage collection service
Improve drainage at the landfill by directing runoff from landfill trench through constructed wetland for treatment prior to contact with running surface water
Provide technical assistance to develop a scrap metal handling plan
Provide training and equipment for scrap metal processing / fluids removal
Provide transportation of scrap metal out of the community on a scheduled basis

Ouzinkie

Improve drainage to existing wetland to avoid sludge lagoon
Consider burn-box installation in lieu of burning in trench
Replace existing dump truck
Provide technical assistance to develop a scrap metal handling plan
Provide training and equipment for scrap metal processing / fluids removal
Provide transportation of scrap metal out of the community on a scheduled basis

Port Lions

Provide public drop box at existing landfill
Establish burn box
Close existing landfill and establish operations plan for expanded (or new) site
Purchase land and arrange engineering of new or expanded site
Provide access control - fences and gate
Provide technical assistance to develop a scrap metal handling plan
Provide training and equipment for scrap metal processing / fluids removal
Provide transportation of scrap metal out of the community on a scheduled basis

4.3 USED OIL AND HOUSEHOLD HAZARDOUS WASTE SYSTEMS

4.3.1 Systems Development

With technical assistance provided by trainers, local staff will:

- Build facilities to manage used oil and household hazardous waste
  - building
  - used oil burner
  - tanks or drums for used oil and antifreeze
  - SmartAsh burner
  - fish totes for batteries and aerosol cans
  - desk and file cabinets for recordkeeping
  - material exchange bulletin board and alternative materials display
  - safety and spill equipment
- Develop a site-specific written operations plan for the management of used oil and household hazardous waste, including:
  - identifying a collection area and location for the used oil burner
  - acceptable wastes
  - means to transport and dispose of collected wastes
- Get training in:
  - handling and storing used oil and household hazardous waste
  - employee health and safety
  - regulatory do's and don'ts

4.3.2 Community Education

Through a community program information will be prepared and distributed or presented to demonstrate to citizens:

- Damage possible to fishing and residents by oil and hazardous waste, especially ocean dumping of batteries or oil
- What materials are hazardous
- Information on local oil and household hazardous waste disposal
- Demonstrations of less hazardous products and where to get them
- Inspecting and fixing home heating oil drums and tanks

The Community and Environment curriculum will be introduced to students and will include the areas noted above.

4.3.3 Local Planning

With the assistance of the ADEC RUBA program, workshops will be produced for local City, IRA Traditional Council, and utility staff on:

- Administering the oil and hazardous waste system
- Community participation

- Community funding

Communities will meet to discuss and make community decisions on:
- Location of storage facility and used oil burner
- Transportation and recycling contracts for used batteries and fuel tank bottom sludge
- Expanding the system to collect other wastes

4.3.4 Local Community-specific Used Oil and HHW System Needs

Akhiok

Establish a household hazardous waste (HHW)/Used oil collection center, including:
Tanks or drums for used oil and antifreeze
Fish totes for used batteries and aerosol cans
SmartAsh burner
Provide equipment and training for appropriate handling and disposal

Chiniak

Establish a regular household hazardous waste collection effort as part of annual clean-up day

Karluk

Establish a household hazardous waste (HHW)/used oil collection center
Provide equipment and training for appropriate handling and disposal
Establish burners for used oil

Larsen Bay

Establish a household hazardous waste (HHW)/used oil collection center
Improve existing solid waste / used oil burner for loading and unloading
Provide equipment and training for appropriate handling and disposal

Old Harbor

Establish a household hazardous waste (HHW)/used oil collection center near the harbor
Install existing used oil burner
Provide equipment and training for appropriate handling and disposal

Ouzinkie

Add to the existing household hazardous waste (HHW)/used oil collection center
Install used oil burner
Provide equipment and training for appropriate handling and disposal
Provide for transportation of HHW collections.

Port Lions

Establish a household hazardous waste (HHW)/used oil collection center
Purchase and install additional used oil burner and Smart Ash burner
Provide equipment and training for appropriate handling and disposal
Provide for transportation of HHW collections.

5. COST ESTIMATE

Initial cost estimates were developed for the four waste management initiatives:

- A Borough-wide Utility Council
- Systems Development
- Community and Environmental Curriculum Development
- Local Waste Management Implementation

These initiatives have been described in Section 3 and the specifics details for the three waste management systems: Wastewater, Solid Waste (including landfills and burn boxes), and Used Oil and Household Hazardous Waste, described in Section 4. Table 5-1 shows a rough order-of-magnitude cost estimate for the costs associated with these four initiatives. The basis for the cost estimate is attached as Appendix C. Actual costs may vary as the scope and timing of the initiatives are honed with time.

Table 5-1
Kodiak Island Borough
Waste Management Improvements
Budget Overview

Borough Wide Utility Council — $269,000

Annual costs for 3 year program	First Year	Second & Third Year
Administrator (new hire)	$46,000	$46,000
Travel	$20,000	$20,000
Supplies	$1,000	$1,000
Computer	$3,000	-0-
Organiz. Cost	$5,000	-0-
KANA Admin cost (29%)	$22,000	$19,000
Annual Subtotal	$97,000	$86,000

Systems Development — $2,222,000

Total Cost	
Construction	$1,061,000
New Equipment/Spare Parts	$360,000
Waste Transportation/Outside Services	$293,000
Tools	$17,500
Misc Parts	$35,000
O & M Labor/Training	$338,500
Airfare	$12,000
Per Diem	$80,000
KIB Admin	$25,000

Community and Environmental Curriculum Development — $180,000

Annual costs for 3 year program	
Teacher Aide	$20,000
Travel	$10,000
Materials	$20,000
Production Costs and Demos	$10,000
Admin cost	$0
Annual Subtotal	$60,000

Local Waste Management Implementation $168,000

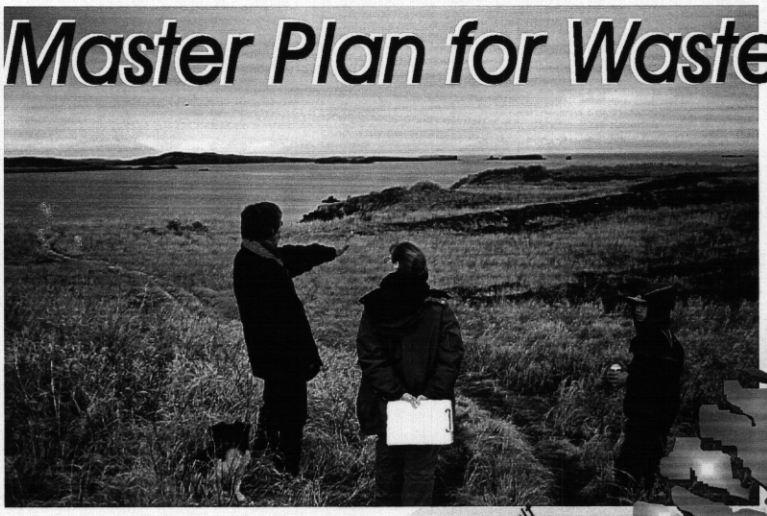
Annual costs for 3 year program	
Facilitators	$48,000
Travel	$7,000
Supplies	$1,000
Admin costs	$0
Annual Subtotal	$56,000

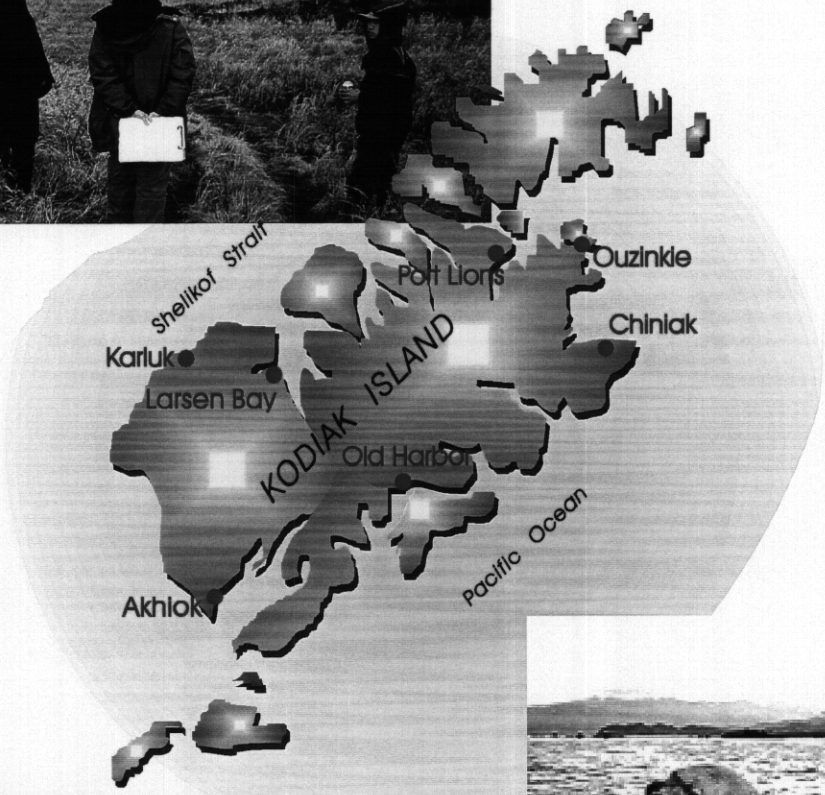
Total $2,839,000

The following items have not been included in this budget either because they are community-specific or funding is anticipated to be available from other sources.

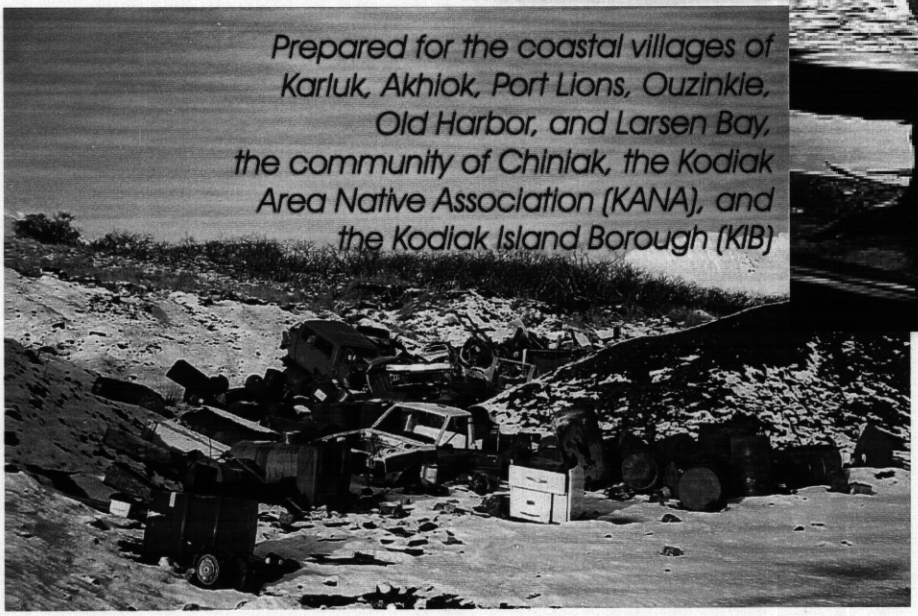
1. Supplemental salaries for trainees. Base pay, vacation pay, fringe.
2. Shortfalls in labor/training salaries due to variations from the average training time (e.g., a community with lots to fix).
3. Labor for routine community services (e.g., trash collection, utility fee collection).
4. Transportation and disposal costs for household hazardous waste.
5. Land for siting new facilities (heavy equipment storage, landfills, burn box, HHW center, etc.)
6. Administrtive costs in each community – Meeting/work space, communications, computers, support services.
7. Administrative costs for community education and implementation initiatives.
8. On-going operations and maintenance costs for new facilities (e.g., burn box, used oil burners, etc.)
9. Use of heavy equipment and fuel in community.
10. Disposal/recycling cost of the scrap metal.
11. Hazwoper training - Trainer and materials.
12. Community-specific issues - e.g., Chiniak school leachfield, Akhiok septic outfall repair , etc.

Kodiak Island Borough
Master Plan for Waste Management
APPENDICES





Prepared for the coastal villages of Karluk, Akhiok, Port Lions, Ouzinkie, Old Harbor, and Larsen Bay, the community of Chiniak, the Kodiak Area Native Association (KANA), and the Kodiak Island Borough (KIB)



MONTGOMERY WATSON

APPENDIX A

Master Plan for Waste Management
Inventory of Pollution Sources and Problems
Kodiak Island Borough

Revised with minor corrections
April 28, 1998

Supported by EVOSTC Grant
Project Number: 97304
Montgomery Watson
Project Number: 1189056.010101

MONTGOMERY WATSON

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Section 1.0
INTRODUCTION

1. INTRODUCTION

1.1 Authorization

The Kodiak Island Borough has retained Montgomery Watson to develop a Master Plan for Waste Management for the rural communities of Kodiak Island. This Inventory of Pollution Sources and Problems constitutes the initial deliverable work product developed under the Agreement for Engineering Consulting Services for the Master Waste Management Plan, dated February 7, 1997.

1.2 Background

Communities on Kodiak Island generate a large number of waste streams that may be entering, degrading, and preventing the recovery of injured resources in the Exxon Valdez spill area. Examples of these waste streams include used oil from vessels and other sources, sewage discharges, household hazardous wastes, and windblown garbage and/or leachate from community landfill practices. Many of the communities currently lack the resources - for planning, equipment, training, and development of infrastructure - to manage their wastes in an environmentally sound manner. As a result, wastes generated within the communities represent a chronic source of pollution that not only hinders full recovery of the marine environment but also has a negative impact on the general "quality of life".

This project is a unified regional effort among the six remote coastal villages, the community of Chiniak, the Kodiak Area Native Association (KANA), and the Kodiak Island Borough (KIB) to produce and implement a waste management plan that identifies solutions to communities' most pressing pollution problems. By working together in a collaborative fashion, the villages, KANA, and the Borough anticipate that finding and implementing solutions will be easier and less costly than if each party attempted to work independently.

The six remote coastal villages will be an important focus of the project, as these villages currently lack much of the basic planning, equipment, training, and infrastructure that is in place in other communities on the island. While Kodiak Island Borough has a waste management system in place for residents on the road system, the Borough also faces management issues related to certain waste streams, including used oil and wastewater sludge. The Borough will therefore play a role in the project as both an entity that may be an important part of the solution to the villages' waste management problems (because village wastes may be able to be incorporated into the Borough's existing waste management system), and as an entity which is also seeking solutions to some of its environmental management issues.

The project is structured around a committee comprised of at least one representative from each of the villages, the Borough, KANA, ADEC, and the US Coast Guard. The

committee will meet several times over the course of the study to identify and prioritize problems, develop solutions, and to identify and pursue funding for the solutions from a variety of sources including federal, state, and local government agencies, non-profit organizations, and private businesses.

This project is modeled after the Sound Waste Management Plan project which was made possible through funding from the Exxon Valdez Oil Spill Trustee Council (EVOS). The Kodiak Island project, however, with its focus on the villages, the involvement of the Borough, and its somewhat different set of environmental problems will make this project an unique effort.

1.3 Project Goals and Objectives

The goals of the project as stated in the Agreement are to identify the major sources of marine pollution, and to identify solutions to be implemented by the communities, state, federal government, private industry, or non-profit groups to reduce the amount or the effects of that pollution.

Specific objectives of the project have been identified by the Borough as follows:

1. Identify and prioritize the major sources of marine pollution and solid waste in the communities.
2. Establish a public participation program to understand and address community concerns and needs.
3. Develop waste management recycling and disposal alternatives. The development of alternatives will include estimating costs, identifying regulatory requirements, and exploring logistical and other implementation considerations for each of the waste management alternatives. Primary focus will be on the waste streams of used oil, household hazardous waste, solid waste, sewage, and leachate.
4. Pursue the funding, technical assistance, and other resources needed to implement the solutions. Funding will be pursued from a variety of sources, including Kodiak Island Borough, non-profit organizations, state and federal government agencies, and private industry.

1.4 Project Team Site Visits

Members of the Montgomery Watson project team traveled around Kodiak Island visiting all of the rural villages as well as the City of Kodiak during the period from February 18 to February 28, 1997. The purpose of the travel was to develop an understanding of existing and potential pollution problems from first-hand observation and from discussions with local residents. The project team stayed overnight in each village and attempted to contact as many interested people as possible. Community meetings were held to ensure that anyone having an interest could talk to members of the project team.

The project team involved in the site visits included:

- Brett Jokela, Project Manager, a civil/environmental engineer from Montgomery Watson in Anchorage;
- Deborah Luper, Project Team Leader, a chemical engineer from Montgomery Watson in Anchorage;
- Chris Allard, an associate civil engineer from Montgomery Watson in Anchorage; and
- Jeff Brown, a specialist in waste materials processing and recycling, a subconsultant of Sound Resource Management Group, based in rural Washington state.

A kickoff meeting was held in the Kodiak Island Borough offices on Tuesday, February 18, with the Montgomery Watson project team and:

- Ron Riemer, Project Manager, Environmental Engineer for Kodiak Island Borough (KIB);
- Brenda Schwantes, Kodiak Area Native Association (KANA);
- Bill Rieth, Alaska Department of Environmental Conservation (ADEC);
- Steve Russell, Remote Maintenance Coordinator for Kodiak Island Village Utilities Council (KIVUC); and
- Martin Owen, Harbormaster, City of Kodiak.

The Montgomery Watson project team was also provided a tour of Threshold's recycling center facilities, operated under the direction of the Americorp volunteer, and the Kodiak Island Borough baler facility and landfill, where we met with Tom Dunham, landfill manager.

On Wednesday, February 19, the team proceeded by Island Air Charter to Ouzinkie. KIVEC representative, Tom Quick, gave us a tour of the community, including the old and new landfill sites, water plant, hydroelectric facility, bulk fuel storage, and diesel generators.

We visited the store, the Village Corporation offices, city dock, and fuel storage facilities. In addition to Tom Quick, we also spoke with:

Katherine Panamarioff, Public Utilities Clerk
Elena Kelila, City Clerk
James Anderson, Resident
Dave Campfield, Telecommunications Maintenance (volunteer)
Roger Johnson, Fuel Delivery
Zack Chichenoff, Mayor
Love Chichenoff, Health Aide

Joan _____, Village Corporation Clerk
Rosie Anderson, Storekeeper
Tim Mauerus, School Principal

Team representatives attended the evening basketball game and held a public meeting (no attendees) in an effort to meet and talk with residents.

On Thursday, February 20, the team proceeded by Island Air Charter to Port Lions. KIVEC representative, Wayne Lukin, met us at the airport and gave us a tour of the community, including the landfill site, harbor and harbormaster office, fuel facilities, and the locations of several sites where scrap metal and junk vehicles were accumulating. We visited the store, the school, City offices, and Port Wakefield dock. In addition to Wayne, we also spoke with:

Evelyn Mullan, City Clerk/Treasurer
Bob Nelson, Tribal Council President
Russ Gundersen, Harbormaster
Dave Mullen, Resident
Mel Squartsoff, Storekeeper
Frank Wicks, School Principal
Kevin and Kate Atkins, Owners, Lion's Den Lodge
Dave Shortland, Health Aide
Nattie Boskoffsky, Health Aide

Helen Harris, the other KIVEC representative, was out of town. In the evening, team members attended a community meeting at the tribal offices. Bob Nelson, tribal council president, was the only attendee.

On Friday, February 21, Chris Allard and Deb Luper visited Larsen Bay, while Brett Jokela, and Jeff Brown went on to Karluk. Randy Christensen met Deb and Chris at the Airport. Other contacts in Larsen Bay included:

Charles Christensen, Mayor
Frank Carlsen, Vice Mayor
Eli Squartsoff, KIVEC Representative
Lynn Lacey, Head Teacher
Mile Carlsen, Lodge Owner, Commercial Fisherman
Valen Moss, Health Aide
Charlie Aga, Resident
Alberta Aga, Resident
Carla Aga, Resident
Jimmy Johnson, Store Owner

Chris Anneson, Equipment Operator
Virginia Squartsoff, City Clerk

Team members attended dinner at the Senior Center in order to meet and talk with community residents.

Due to weather constraints, the project teams were able to spend Saturday and Sunday in Larsen Bay and Karluk, respectively, before returning to Kodiak on Monday, February 24, when the weather permitted air travel. Unfortunately, several Karluk residents traveled with schoolchildren to Kodiak over the weekend, preventing discussions with the project team. Dale Reft, however, spent a considerable amount of time with the project team in Karluk, pointing out the fuel facilities, existing dump, water system, and sewage facilities, as well as showing us the old buildings and scrap metal near the river mouth. Dale provided considerable input on the issues of concern to the village, including the increasing development of sport-fishing in the Karluk drainage and problems with design and maintenance of the existing community infrastructure. We also spoke with:

Betty Lind, Health Aide
Emil Sugak, Member, IRA Traditional Council
Nick Charlieaga, Fuel Delivery Operator.

Monday afternoon also gave the project team a chance to visit Chiniak. Betty O'Dell met us at Thumb's Up Cove and provided a tour of the area, including the school, a variety of developments and dump sites, and the old Chiniak Naval Air station, which has been demolished, but remains uncontrolled. We also met:

Larry LeDoux, Principal of the School District's "Areawide" Program
Ned Griffin, Head Teacher for Chiniak School

On Tuesday, February 25, Chris Allard and Brett Jokela visited Old Harbor. Jim Nestic met Brett and Chris at the Airport. Jim provided a tour of the community including the old and new landfills, water plant, city shop, diesel generator and fuel storage facilities, community fuel storage, city dock near the old-town sewage outfall, and sewage lagoon serving mid-town and new-town. Other contacts in Old Harbor included:

Jeff Peterson, Village Tribal Council President
Jonetta Cratty, City Clerk/Treasurer
Arthur Matfay, Harbormaster (and "Go-To Guy" for most all utility problems)
Charlie Powers, Proprietor of Sitkalidak Lodge
Anne-Marie O'Brien, School Principal
Naomi Peterson, Community Meeting Participant
Todd_____, Community Meeting Participant
Leroy Gregory, Community Meeting Participant

In Kodiak, on Tuesday and Wednesday, Deb and Jeff visited the harbor, U.S. Fish and Game, U.S. Coast Guard facility, and several vessels, and met with:

Steve Hunt, U.S. Coast Guard
Lt. Commander Frost, U.S. Coast Guard
Roger Smith, U.S. Fish and Game
Karen Ligon, KIB Village Principal (by telephone)
Ray Slaigle, Marina
Tom Dunham, KIB Landfill Operator

On Wednesday, February 26, Brett returned to Anchorage, stopping in Kodiak to compare notes on utility findings with Steve Russell. Deb met with KANA and KIB staff in Kodiak in the morning, and traveled to Akhiok in the afternoon, via Old Harbor, where she joined forces with Chris.

In Akhiok on Wednesday night and Thursday, Chris and Deb toured the community, and met with:

David Eluska Sr., Mayor and KIVEC Representative
Mary Peterson, Resident
Judd Brenteson, Health Aide
Eddie Phillips, Jr., Trash Collector
Cathy and Sonny Cook, Teachers
Speridon Simeonoff, Former Americorp Volunteer
William Eluska, Resident
Lawrence Peterson, Water and Wastewater Operator

Edward Phillips, Sr., the other KIVEC member, was out of town due to illness and was not available. Deb and Chris returned to Anchorage on Friday, February 28, bringing a close to the site visit component of our inventory task of the project.

1.5 Format of Findings

This document discusses our findings in a manner that is intended to broaden our view beyond a village-by-village recounting of existing practices and problems. A number of previous efforts have successfully catalogued issues that pertain to individual villages. In some cases, trip reports drafted by visitors to villages have only served to document that nothing has changed since the last guy came to town. We are attempting here to identify commonalties between villages to underscore the need for a broader scope for potential solutions.

Section 2.0 identifies what immediate threats to human health and marine resources exist due to common waste management practices.

Section 3.0 recognizes sensitive habitats, resources, and land uses which may be affected by waste management.

Section 4.0 provides a picture of the structure and function of rural communities of Kodiak Island, including discussions of the provision of drinking water, the importation and use of fossil fuels, the movement of goods into and out of the villages, the importance of the school system as a communication link, and finally, the variety of economic activities and entities that have influence in the communities.

Section 5.0 presents a discussion of the generation of wastes, with tables comparing the types and quantities of wastes that are produced in each community.

Section 6.0 compares the development of facilities for waste management in the rural communities, including collection, processing, and disposal of solid and liquid waste streams.

Section 7.0 recognizes that appropriate waste management systems are a necessary part of a healthy community. By considering how each community's waste management system is composed, and comparing the composition of these systems between communities, we can identify common weaknesses in the systems which can potentially be corrected by a regional approach.

We anticipate that there are solutions to existing problems that threaten marine resources. We trust that the discussion that follows is an important first step in identifying those solutions.

Section 2.0
IMMEDIATE IMPACTS OF WASTE MANAGEMENT PRACTICES

2. IMMEDIATE IMPACTS OF WASTE MANAGEMENT PRACTICES

Several high-priority problems exist in the Kodiak communities due to current waste management practices. These were documented through conversations with community residents, regulators, borough employees and native corporation employees, and on-site observations.

These high-priority issues are well-know to Kodiak residents and include:

- ❑ Bears, which are a danger to residents, especially children in landfills in Port Lions, Larsen Bay, and to a lesser extent in Old Harbor and Karluk.
- ❑ Raw sewage overflows in town in Akhiok, Karluk, Ouzinkie (one residence).
- ❑ Gastro-intestinal problems that may be linked to beavers periodically living in the Akhiok drinking water reservoir and trash/wounded animals in the Larsen Bay watershed.
- ❑ Visual impacts of scrap metal, such as junk cars, trucks, drums and appliances, accumulated over the years in each community.
- ❑ Threats to marine resources, such as the quantity of fish.

Section 3.0
IDENTIFICATION OF RECEPTORS

3. IDENTIFICATION OF RECEPTORS

Each community has unique resources whose protection is key to the health and livelihood of the residents. In the seven rural Kodiak communities, these resources include:

- ❑ The community's drinking water source,
- ❑ Subsistence food sources,
- ❑ Commercial resources, such as fishing,
- ❑ Local recreational areas, and
- ❑ State and federal parks, forests and refuges.

These resources require protection because they could be harmed by waste management practices and adversely impact borough residents. The importance of each resource to the communities is described below along with Kodiak-specific factors of concern.

Community Drinking Water Source. All of the Kodiak communities collect and store surface water run-off in small surface water reservoirs for use as drinking water. Wastes located nearby or in the drinking water source can potentially cause an immediate, harmful effect on the residents. Because rainfall on uphill or adjacent land flows into the reservoirs, those lands, called the watershed, should be kept free of wastes and waste management facilities. In the Kodiak borough communities, good planning resulted in locating the drinking water source up-gradient of the villages. Any village-generated wastes flow downhill and away from the community drinking water source. Other sources of wastes entering the Kodiak watersheds include trash or wounded animals left by hunters or fishers that camp in the watershed, or animals, such as beavers that are drawn by the dam and live in the water source. During the site visits, the village health aide was queried about the incidence of some diseases typically associated with contaminated drinking water (e.g., diarrhea, intestinal upsets, such as from amebas, giardia shigella, typhoid, hepatitis, cholera). Akhiok and Larsen Bay both reported periodic incidences or outbreaks of gastro/intestinal problems (e.g., diarrhea, nausea, vomiting) and periodic notices to the community to boil drinking water. Occasionally beavers are reported to inhabit the Akhiok drinking water reservoir and have been associated with outbreaks of gastro-intestinal problems. Sport hunters and fishers are reported to camp and leave trash in the Larsen Bay watershed. A recent outbreak of gastro-intestinal problems was coincident in time with a dead deer, wounded by hunters, found in a stream entering the water reservoir.

Subsistence Food Sources. Kodiak Island Borough residents rely on traditional subsistence food sources including deer, ducks, shell fish (e.g., clams, chitin),

octopus, salmon, halibut, berries, and sometimes, marine mammals for a significant portion of their diet. As shown on the community maps (Figures 1-7), the subsistence resources are typically located in the village itself or very nearby. In some cases, they are located adjacent to waste management facilities or potential pollution sources such as sewage outfalls, landfills or fuel tank farms.

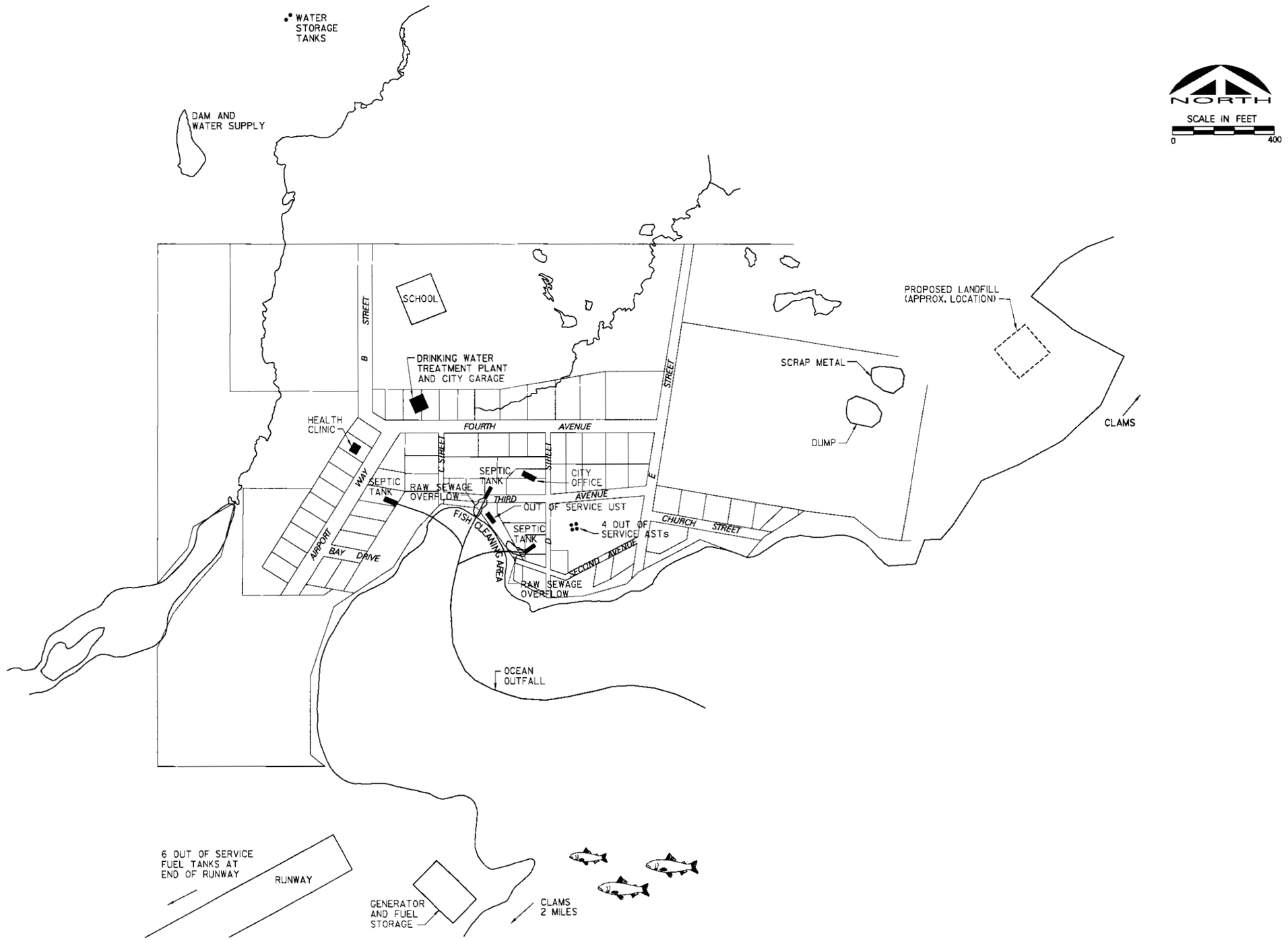
Both quantity and quality are critical measures for protection of food resources. Quality of the food source can be impacted by pollution. For example, bacteria and viruses can be transmitted by the ingestion of shellfish contaminated with raw sewage, especially the solid components. Additionally, shellfish are excellent accumulators of heavy metals (such as lead from batteries disposed adjacent to shellfish) and other contaminants.

Contaminants discharged to soil or water adjacent to the food resources can cause decreases in the quantity of the resource, as well. For example, petroleum from fuel spills, bilge water discharged at sea, or cleaning solvents discharged through the sewer outfall can impair reproduction or otherwise decrease the population of fish or animals used for food. Decreases in the amount of food may mean that Kodiak borough residents would need to rely more heavily on expensive, imported foods, or that nutrition may suffer. The expense of imported foods decreases the quality of life, while poor nutrition can make residents more susceptible to other ailments.

Recreational Use. Protection of land or waters used for picnicking, swimming, sport fishing, kayaking, hiking, camping, boating, sport hunting and fishing is important, because appeal is deceased by trash, stained soils, distressed vegetation and/or the absence of wildlife. These resources include local recreational areas in the village as well as state and federal parks, forests and refuges.

Some recreational uses, such as swimming, increase contact with contaminants, if the areas are impacted by waste management. For example, residents sometimes swim near the docks at Ouzinkie in the vicinity of the sewage outfalls.

Other recreational uses benefit the economic health and livelihood of the community. For example, junk cars and trucks, old drums and other scrap metal destroy the pristine-Alaska image that attract many tourists to Alaska. When given a choice, sport hunters, fishers and recreational users will choose communities where recreational resources are protected from the negative impacts of waste management. The economic benefits of tourism (e.g., income from guide services, lodging, food) will flow to those communities that have visual appeal.



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 1

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

AKHIOK

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NORTH

SCALE IN FEET

0 3000

CHINIAK BAY

ISTHMUS BAY

DUMPSTERS

THUMBS UP COVE

ROSLYN BEACH

ROSLYN CR.

W. FORK TWIN CR.

E. FORK TWIN CR.

DUMPSTER

SCHOOL

DRINKING WATER SOURCE FOR SCHOOL

CHINIAK LAKE

CAPE CHINIAK

LANDING STRIP

OLD LANDFILL

US COAST GUARD

CHINIAK RIVER

LEGEND:

RECEPTORS

WASTE DISPOSAL

PUBLIC BUILDINGS

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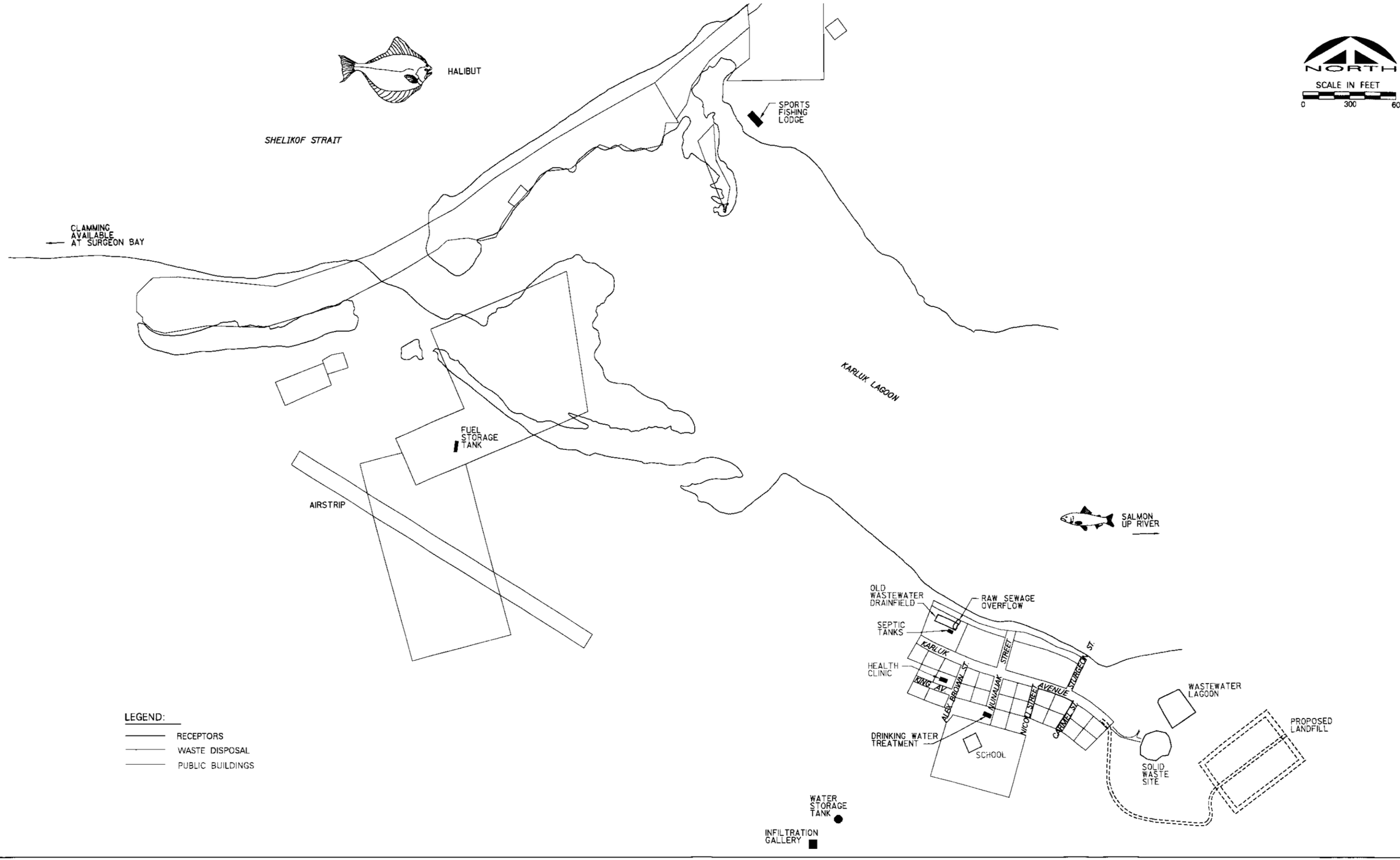
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

CHINIAK



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MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 3

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

KARLUK

NORTH

SCALE IN FEET
0 500

CLAMS AND SETNET SITES ACROSS BAY

SEWER OUTFALL
CLAMS
CHITON
OCTOPUS

CLAMS

STORE

SEWER OUTFALL

FIRST ST.
SECOND ST.
THIRD ST.
A ST.
B ST.
C ST.
D ST.
E ST.
F ST.
G ST.

BULK FUEL STORAGE CANNERY

POSSIBLE SEWER OUTFALL

DOCK

CANNERY

FUEL SUPPLY LINE

CANNERY ST.

CITY SHOP

SCHOOL

HEALTH CLINIC

CITY OFFICE

SCRAP TANKS

BULK FUEL STORAGE

GENERATOR

AST AND USED OIL STORAGE

SCRAP EQUIPMENT

CRABS

STREET

RUNWAY

PUBLIC RESERVE

FIRST STREET

H STREET

I STREET

J STREET

SECOND STREET

SCRAP METAL

WATER TREATMENT PLANT

WATER STORAGE TANK

GRAVEL PIT

HYDRO ELECTRIC GENERATOR AND WATER SUPPLY INTAKE

TO INCINERATOR AND LANDFILL

TO LARSEN BAY DAM

LEGEND:

- RECEPTORS
- WASTE DISPOSAL
- PUBLIC BUILDINGS

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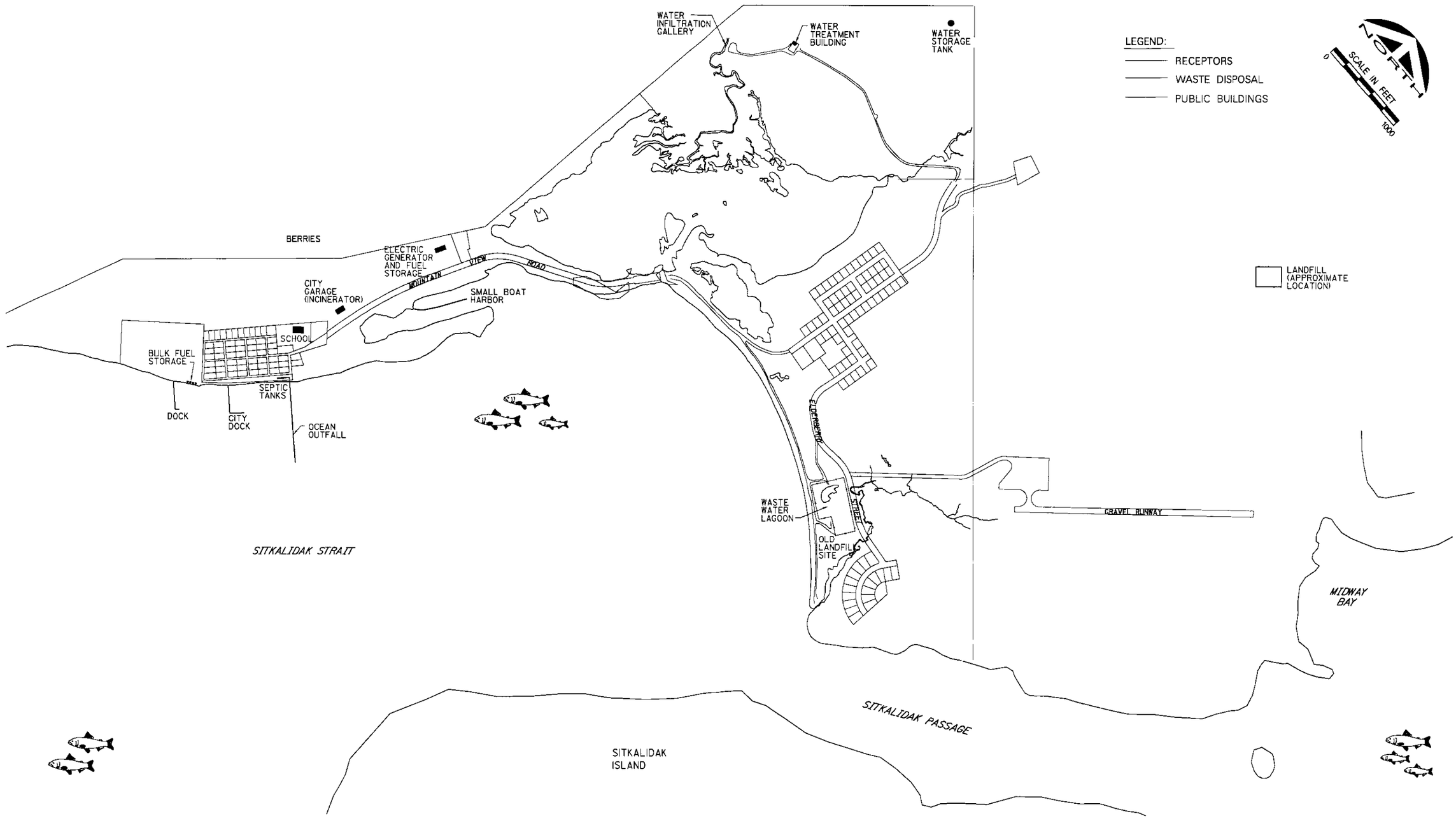
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 4

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

LARSEN BAY



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

OLD HARBOR

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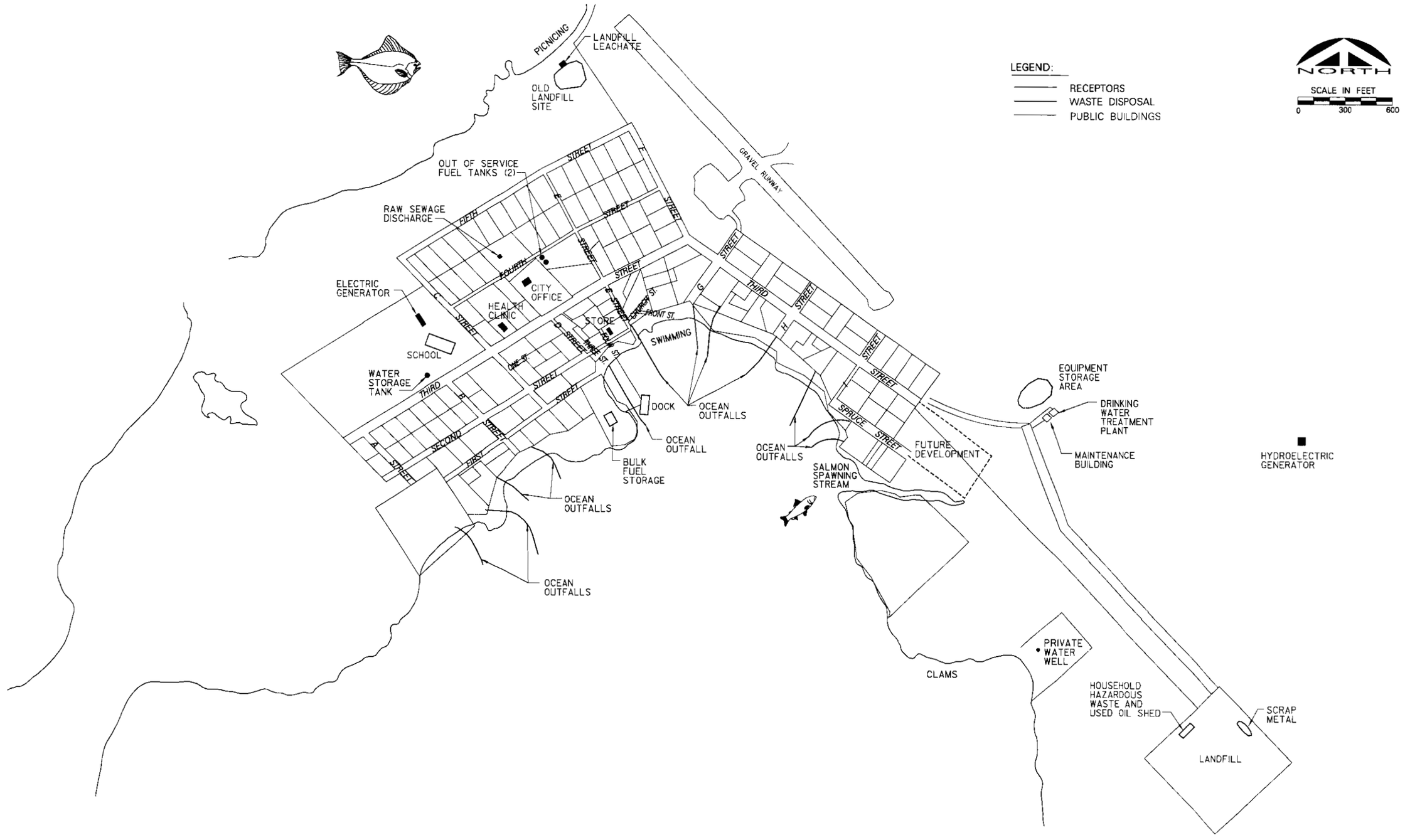

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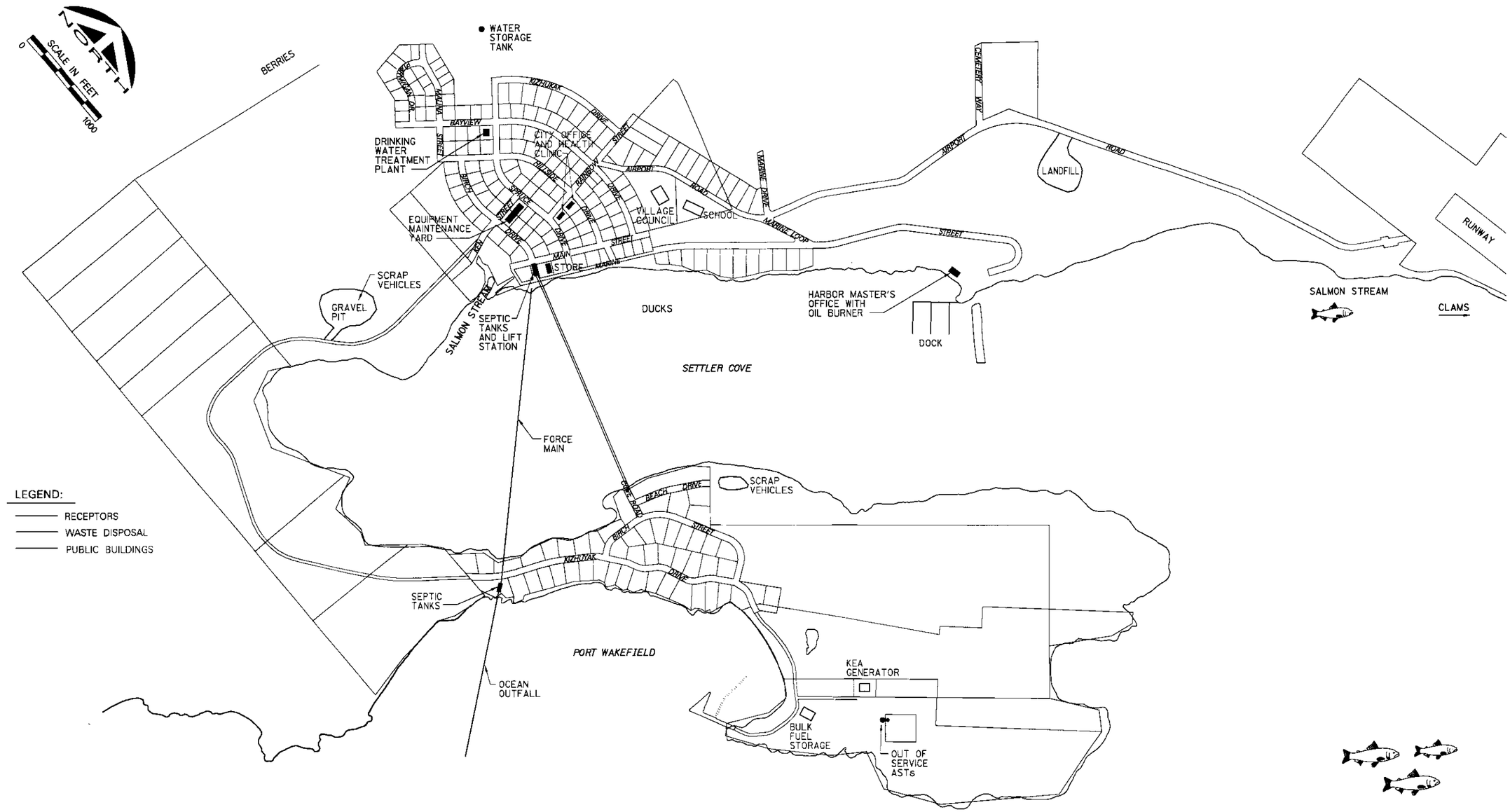
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 6

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

OUZINKIE



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 7

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

PORT LIONS

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Commercial Resources. Commercial fishing is the major factor in the economic health of Kodiak communities, because fishing is the primary source of income for many residents. However, the quantity of fish can be decreased by pollution. Although laws and regulations prohibit ocean discharge of pollutants, the lack of alternative disposal facilities and cost of those that do exist, reportedly results in discharges of bilge water, used oil, and trash at sea.

Figures 1-7 show the receptors/resources in each community and their proximity to waste management facilities and other potential sources of pollution. Table 3-1 shows the data on resources and impacts documented for each community. These data were evaluated to develop the following list of situations of particular concern to the protection of precious community resources.

- ❑ Raw sewage overflow in Akhiok, where fish are traditionally cleaned and split and children play. The concern is exacerbated because there is a hepatitis B carrier in town and hepatitis B is a long-lived pathogen.
- ❑ Raw sewage overflow in Karluk.
- ❑ The planned breakwater at Ouzinkie will reduce ocean mixing dilution of the sewage outfall. Plans for the breakwater should incorporate provisions that will ensure that with the new breakwater, the sewage discharge will not adversely impact human health or the environment.
- ❑ Watershed protection in Akhiok, Karluk, Larsen Bay, and Old Harbor.
- ❑ Raw sewage overflow in Ouzinkie from Donald Morrison's residence.

Table 3-1 Identification of Receptors

	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Use of Marine Resources for Subsistence Food	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Use of Marine Resources for Commercial Fishing	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Drinking-water Borne Disease	Periodic episodes of gastro-intestinal problems			Periodic episodes of gastro-intestinal problems			
Watershed Issues	Beavers periodically inhabit drinking water reservoir			Sport hunter usage of watershed resulted in dead deer in drinking water source			

Section 4.0
COMMUNITY INFRASTRUCTURE

4. COMMUNITY INFRASTRUCTURE

4.1 Commercial Enterprises

Today the remote coastal villages of Kodiak Island Borough depend on subsistence resources, commercial fishing, and increasingly, tourism for livelihood. Logging also contributes to the local economy, particularly in the easternmost communities. Each of the communities are dominated by Native Alaskan populations, who are shareholders in Koniag Regional Corporation. Local village corporations also exist for the communities of Akhiok, Old Harbor, Ouzinkie, and Port Lions. Village corporations for Larsen Bay and Karluk areas were amalgamated with Koniag. The Lesnoi village corporation has significant land holdings in the Chiniak area. Each of the village corporations pays shareholder dividends in the realm of thousands of dollars per year, in addition to several hundred dollars paid in dividends by Koniag. Table 4-1 provides a comparison of basic information from each community.

About 123 commercial fishing vessels are ported in Kodiak village communities. While salmon is the most important harvest, long-lining, crabbing, trawling, and jigging are practiced by village commercial fishermen. Fishing is strongest in Old Harbor, Port Lions, and Larsen Bay where there are active harbors and busy processing activities. Sport-fishing lodges exist in Larsen Bay, Karluk, Port Lions, and Old Harbor.

4.2 Drinking Water Supply

Drinking water systems throughout the state of Alaska are regulated by the Alaska Department of Environmental Conservation under 18 AAC 80. The water supply systems of the communities in the Kodiak Island Borough (KIB) were built as Public Health Service (PHS) projects and the PHS continues to assist the communities with operation and maintenance and to plan and carry out projects to improve the systems.

The PHS uses a "sanitation deficiency system" to prioritize the water, sewer, and solid waste needs of the communities throughout the state. Proposed upgrade projects are rated in several areas including the potential health impact of the project, the capital cost, and the capability of the community to operate and maintain the system. Water and sewer projects tend to score higher than solid waste projects in the health impact area because of the immediate and direct effect on public health of water and sewer systems. There are ten proposed projects in the KIB that PHS has identified and rated as part of their sanitation deficiency system. None are likely to be funded this year and only the top two or three projects have a reasonable probability of being funded in the next few years.

Table 4-1
Basic Community Data

Community	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Incorporation Status	2nd class	Unincorporated	Unincorporated	2nd class	2nd class	2nd class	2nd class
City KIVEC Representative	Edward Phillips	Betty Odell	na	Eli Squartsoff	Jim Nestic	Tom Quick, Vice Mayor	Wayne Lukin
Telephone	836-2229	486-5597	na	847-2211	286-2204	680-2209	454-2332
Tribal Council KIVEC Contact	David Eluska	na	Dale Reft	Randy Christiansen	Jeff Peterson	Larry Chichenoff	Helen Harris
Telephone	836-2213	na	241-2218	847-2207	286-2215	680-2259	454-2234
Date of visit	27-Feb-97	24-Feb-97	21-Feb-97	21-Feb-97	25-Feb-97	19-Feb-97	20-Feb-97
POPULATION							
Population (various sources)	**60**	**80**	**60**	**140**	**250**	**210**	**260**
# of households (local estimate)	19	30	21	44	87	68	73
Pop. trend (% per year - local est.)	0%	0%	0%	0%	0%	4%	0%
Summer Population Change	10 3 months	50 3 months	30 4 months	340 3 months	82 3 months	70 3 months	70 3 months
Annual Population Equivalent	62	92	70	224	270	227	277
School Enrollment	32	35	14	24	92	42	65
COMMERCE							
Store	0	0	1	1	2	1	1
Cannery	0	0	0	1	0	0	0
Lodges	0	1	3	3	1	0	3
Restaurants	0	1	0	0	1	0	0
Commercial fishing vessels	0	0	0	4	30	2	20
Boat harbor capacity	0	0	0	35	100	Mooring only	80
1989 Median Household income	$42,500	$44,375	$31,250	$39,750	$16,875	$48,393	$40,938
Estimated # of jobs	26	37	30	36	42	77	85
VEHICLES							
Personal autos/trucks	3	30	4	20	15	10	20
4-wheelers	22	5	8	20	25	25	40
Heavy equipment	2	0	2	6	5	5	9
UPCOMING PROJECTS							
	None funded	USCG remedi.	Landfill '97	Harbor '97	None funded	Breakwater '97	Replace Dam '97
		Missile range					

With the exception of individual wells in Chiniak, the communities in the KIB use surface water sources for their water supply systems. Port Lions and Ouzinkie have instituted watershed protection by zoning the watershed off limits to recreational uses such as hunting and camping.

The Surface Water Treatment Rule, part of 18 AAC 80, requires that 99.9% of the Giardia present in the water source be removed before distribution to the users. This is generally accomplished with a combination of filtration and chlorination. Most of the communities, except Ouzinkie, would benefit from additional filtration. This would provide greater protection to the community water supply.

Akhiok. The water source is a small earth dam located above the community. Water flows down to the water treatment plant where there are a pair of pressure filters and chlorine and fluoride are added. The treated water is pumped up to a pair of 10,000 gallon water storage tanks and distributed by gravity from there. The storage tanks were observed overflowing.

The PHS has proposed renovating the water treatment plant to comply with the surface water treatment rule. Other aspects of the proposal include improved storage, investigating source improvement, and providing operations and maintenance training. This project is ranked number two of the ten projects on Kodiak in their sanitation deficiency system.

Chiniak. Most of the homes have individual wells. Some of the other households haul their water from the school.

Karluk. The water source is an infiltration gallery on the hillside above the town. Water is stored in a 50,000 gallon water tank near the source and is piped to the water treatment plant. Treatment includes chlorine and fluoride addition but these systems are not always in service.

There is no paid operator for the system.

The PHS has proposed upgrades to the water system to comply with the Surface Water Treatment Rule. They would also like to help establish an operations and maintenance organization. This project is ranked number eight out of the ten projects in their sanitation deficiency system.

Larsen Bay. The primary water source is the wet well and water infiltration gallery adjacent to and under Trout or Humpy Creek. The backup source is the reservoir for the hydroelectric system. The water treatment consists of a pressure filter and chlorine and fluoride addition.

After treatment, water is stored in a 100,000 gallon wooden storage tank that has some leaks and was observed to be overflowing. Water is distributed by gravity to the community.

In the community some concern was expressed about the effectiveness of the chlorine disinfection because of "boil water alerts." The recent repair of a water service line to a home included the opening of a hydrant. A quantity of very silty water was flushed from the system suggesting that the filtration is not always effective.

The PHS has proposed upgrading the system by replacing the water treatment plant and the water storage tank. Operations and maintenance training, tools, and equipment are also part of their proposed project. This project is ranked number five out of the ten projects in their sanitation deficiency system.

Old Harbor. The water source is an infiltration gallery and wet well by Old Harbor Creek. Water treatment consists of pressure filtration and the addition of chlorine and fluoride. Treated water is pumped up to a 120,000 gallon water storage tank and distributed by gravity to the community. The 100,000 gallon water storage tank above the Old Town portion of Old Harbor is no longer in service.

The PHS has proposed upgrades to the water treatment system to meet the requirements of the surface water treatment rule. Operation and maintenance training and support would be part of the project. This project is ranked number six of the ten projects on Kodiak.

Ouzinkie. The primary water source for Ouzinkie is Mahoona Lake. Water travels through the penstock for the hydroelectric system and is drawn off just upstream of the turbine. The backup source for water is Katmai Creek near the water treatment plant. Water treatment consists of a pair of 60-inch sand filters, two pairs of bag filters, and the addition of chlorine and fluoride.

Water is distributed to two zones; about half of the town is served directly from the water treatment plant and the other half is served from the 200,000 gallon water storage tank near the school. The effect of this distribution system is that the water that comes directly from the water treatment plant has a higher chlorine concentration than the water that comes from the water storage tank. People in the community who have the higher chlorine concentration do not like the taste of their water.

The PHS has proposed operation and maintenance assistance to Ouzinkie in the form of training and tools as part of their sanitation deficiency system. This proposal is ranked seven out of the ten proposals in the KIB.

Port Lions. The water source is the Branchwater Creek Reservoir located west of the community. The watershed is protected by zoning by the KIB. The dam was built in 1965 and reportedly is in need of repair. Water treatment consists of sand filters and the addition of chlorine and fluoride. The use of chlorine gas for water disinfection has been replaced with a more standard hypochlorite system.

Treated water is pumped to a 125,000 gallon water storage tank and from there it is distributed by gravity feed. A recent water and sewer project replaced portions of the water distribution piping.

The PHS has proposed replacing the dam at the water source and upgrading the water treatment to meet the Surface Water Treatment Rule. The other component of their project is to provide operation and maintenance training. This proposal is ranked number one out of the ten proposals for Kodiak in their sanitation deficiency system.

Fortunately, all of the watersheds are located above the communities and their fuel storage and all provide an adequate supply of water. It is important, however, to protect the watersheds by zoning to exclude recreational use. This may be one of the easiest steps to take in relation to the benefits realized.

The operation and maintenance of most of the systems could be improved. The water system operator should:

- ❑ Receive training,
- ❑ Have a set of tools dedicated to the water treatment plant,
- ❑ Have written procedures, and
- ❑ Keep written records.

In addition to helping ensure the quality of the water supply, these recommendations, if followed, will help the communities to secure funding from public agencies. Funding agencies look at the effort being spent on operations and maintenance when they are deciding which projects to support.

The two communities where we heard reports of people getting sick from the water were Akhiok and Larsen Bay. For this reason we would consider these communities to be a priority for system improvement. It was also in these two communities that water storage tanks were observed overflowing. While this is not a health risk, it is a symptom of an operational problem. Wasting treated water causes increased costs for chemicals and for pumping.

Another operational problem observed may have greater consequences. Some water taps in homes are left open to prevent pipes from freezing. This practice can place a great burden on not only the water supply system but on the wastewater system as

well. Ideally, pipes should have adequate insulation, along with proper system design, to prevent freezing. If there are specific portions of a system that require constant water flow they should be evaluated and the most efficient remedy used.

4.3 Fuel Storage

Each community has one or more bulk fuel storage facilities. The facilities are identified on Figures 1 through 7. In addition to the community bulk fuel facilities there are tanks at the school and generator and most homes are heated by a small tank or drum of fuel oil.

Fuel storage and use often results in petroleum wastes and contamination. In the KIB communities, fuel is off-loaded from a vessel into the community's bulk fuel storage tanks. Then the fuel is transferred to a fuel truck or drums and transported across the community and transferred to the home heating oil tanks. Spills during transfer, overfilling and accidents result in small amounts of fuel spilled repeatedly and often on the soil. Taken together, the spills add up.

Large fuel tanks are of particular concern, especially if they are designed, built or maintained in a way that fuel can spill or leak into soil or water. Based on experience, tanks that are placed directly in or on the ground often develop an unseen hole and fuel leaks into the ground unnoticed for a long time. Large tanks in the Kodiak communities are of particular concern because most are staged on or near the ocean and a catastrophic release (e.g., rupture, broken pipe, open valve) will result in a large fuel spill to the water. Because many fuel tanks have leaked significant amounts of fuel into the soil or water in the past, fuel storage systems are strictly regulated by the Alaska Department of Environmental Conservation (ADEC), Environmental Protection Agency (EPA) and U.S. Coast Guard (USCG). Besides design and maintenance criteria, most tanks require a Spill Planning, Control and Countermeasures (SPCC) Plan and Emergency Response Plan. Having the proper equipment and supplies, trained spill response personnel and taking immediate action are the most important items in minimizing harm to the environment.

Table 4-2 lists the in-service and out-of-service bulk fuel storage facilities in each community, and some of the system components. Tanks that are out-of-service should be empty and soils should be checked to verify they are uncontaminated. In-service tanks should be designed, maintained and operated to prevent spills or leaks.

The Alaska Department of Community and Regional Affairs, Division of Energy, maintains a database of bulk fuel storage facilities throughout Alaska and has some funds available to upgrade high priority systems. Their listings for Kodiak communities is shown in Appendix A.

Table 4-2
Bulk Fuel Storage Tank Systems

Community Bulk Fuel Storage	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Number of Tanks	3			3	4	6	3
Storage Capacity (approx. in gallons)	30,000		50,000	50,000 6,000 7,000	10,000 and 4 @ 15,000	70,000	30,000 each
System Age	New			Unknown		before 9/84	about 6 years
Tank condition	Excellent			Fair	fair, but structural supports failing	good	good
Diked	Yes			Earthen berm	no	yes	no - double wall
Fenced and locked	Yes			Yes	no	yes and no	no
Maintenance	Tesoro			City	private		
Visible leaks	None			No	no	no	no
Proximaty to ocean	Adjacent			500 feet	adjacent	150 feet	200 feet
Contaminated soil	Unknown			Unknown	Unknown	Unknown	Unknown
Planned upgrades	Unknown			Unknown	Unknown	Unknown	In design phase
Priority	Low			low	high	low	low
Electrical Generators							
Number of Tanks	Same as community bulk fuel storage			1	4	2	
(approx)				4900	10,000 each	500 each	
System Age					4 years		
Tank condition					good		
Diked					yes	no	
Fenced and locked				yes	yes	no	
Maintenance					AVEC		
Visible leaks					no		
Proximaty to ocean				600 feet	300 feet	1000 feet	
Contaminated soil				visible staining	none seen	?	
Planned upgrades							
Priority					low		
School							
Number of Tanks	1 UST	5 AST; 3 UST	4 UST	1 UST	4 UST	2 AST	1 UST
Storage Capacity (approx)	5,000 gal.	5 AST at 500 gal. ea. 1 UST at 12,000 gal. 2 UST at 500 gal.	2 at 500 gal. 2 at 12,000 gal.	2,000 gal.	3 at 2,000 gal. 1 at 300 gal.	500 gal. 5,000 gal.	1,000 gal.
System Age	15 years	13 years	15 years	10 years	10 years	years	9 years
Tank condition	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Diked	N.A.	Unknown	N.A.	N.A.	N.A.	Unknown	N.A.
Fenced and locked	No	No	No	No	No	No	No
Maintenance	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Visible leaks	No	No	No	No	No	Unknown	No
Proximaty to ocean	800 feet	700 feet	800 feet	500 feet	500 feet	1,000 feet	500 feet
Contaminated soil	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Other							
Location				Cannery	Water Plant	KIB	KEA
(volume)				11 (128,900 gal)	AST	5200 gal	1100
Contaminated soil				Unknown		Unknown	Unknown
Location					Guard	City of Ouzinkie	
(volume)					5300	1400	
Contaminated soil					Unknown	Unknown	
Out-of-Service Tanks							
Location	Beach near septic outfall			Cannery	Above Old Town	Behind City Offices	Port Wakefields
(volume)	1 (60,000 gal)			8	60,000		90,000 25,000
Contaminated soil	Unknown			Unknown		Unknown	
Location	End of runway						
(volume)	4-6						
Contaminated soil	Unknown						
Location	in town						
(volume)	4 @ 5,000 each						
Contaminated soil	Unknown						

Fuel storage is included in this report because spills and leaks from substandard systems and operations can result in significant waste, pollution and damage to the marine environment. The recommended action is:

- ❑ Verifying that in-service tanks in direct contact with the ground are not leaking by maintaining a fuel inventory and sampling the soil
- ❑ Planning spill response actions, equipment and supplies
- ❑ Full documentation of the tank system condition and developing an upgrade program
- ❑ Sampling soils at out-of-service fuel systems to verify that the soils are uncontaminated.

As shown in Table 4-2, the condition of the fuel storage facilities varies from community to community. Akhiok's new community bulk fuel storage tanks appear to be exceptional, while Old Harbor's bulk fuel storage represents an immediate threat to nearby marine resources.

4.4 Transportation

The transportation infrastructure serving the Kodiak Island area is well developed, with existing operators available to handle most shipping requirements. Materials move in and out of Kodiak City and villages via ferry, barge, ship, landing craft and aircraft. Villages have varying levels of marine transportation facilities. Port Lions, Larsen Bay and Old Harbor have barge loading facilities. Ouzinkie, Karluk and Akhiok are accessible by landing craft with varying degrees of difficulty. All villages have airstrips. The following sections address the various transportation resources available to Kodiak and the rural villages.

4.4.1 Marine

Kodiak City is served by a number of ship and barge lines connecting the city with Puget Sound and other Alaska communities. Major marine operators include American President Lines, SeaLand, Samson Tug & Barge, Western Pioneer and Crowley Marine Services. These operators generally have the ability to handle both containerized and bulk goods and offer regularly-scheduled service to and from off-island population centers. Western Pioneer and Samson Tug & Barge also serve some outlying communities.

Western Pioneer offers direct service from Seattle to Ouzinkie, Larsen Bay and Port Lions, using a fleet of several 190-foot freighters. Western Pioneer's twice-monthly route leaves Seattle, stops at Kodiak Island communities, continues to the Aleutians and then returns to Seattle. Goods are loaded on pallets and off-loaded via forklift and crane. Deck space is available for larger items such as vehicles and equipment. The freighters do not handle standard shipping containers. Two of Western Pioneer's freighters have regulatory certification to serve Kodiak City.

Samson Tug & Barge provides barge service to Kodiak City twice each month. During the summer season, weekly routes are operated to Larsen Bay and Uganik to serve canneries. Their barge service handles both bulk and containerized materials.

The Alaska Marine Highway system provides regular ferry service to Kodiak and Port Lions. The M/V Tustumena travels a regular loop from Valdez to Seward, Kodiak, Port Lions, Homer and Seldovia, with scheduled variations. Service to Port Lions is weekly, with more frequent stops in Kodiak.

Several landing craft of varying sizes are available in the Kodiak Area. There are several operators with smaller craft (30 to 60-foot) that run supplies, vehicles and small equipment to remote communities. The Cape Douglas is an older landing craft capable of handling scrap metal. The Cape Douglas is based in Kodiak harbor and was used for the 1995 Ouzinkie scrap metal cleanup. The Polar Bear is a 5-year old 120-foot landing craft with a 250-ton capacity. The Polar Bear is based in Cook Inlet and provides service to the Kodiak Island area on request. Other operators, such as Coastal Freight & Salvage out of Homer, also provide landing craft services.

Most villages also have private small craft, including both pleasure and fishing boats, that may traverse between their home village and Kodiak. These craft may serve as an informal transportation service on some occasions. Similarly, some US Coast Guard vessels also travel between Kodiak city and the villages. Although Coast Guard buoy tenders and cutters might have some space available for transporting materials, this may be outside of the scope of the USCG's mission.

4.4.2 Air

Air transportation is the most common method of travel for both residents and tourists. Regularly-scheduled air service is available to each of the subject remote communities. Schedules vary with season, with summer travel peaks for tourists. PenAir currently offers scheduled service twice daily from Kodiak to Old Harbor, Larsen Bay, Ouzinkie and Port Lions. Service to Karluk, Old Harbor and Akhiok is daily, with twice-daily flights starting in the summer in Karluk and Old Harbor. Island Air and other companies also provide scheduled or unscheduled service to these communities.

Five to nine seat aircraft are used to serve these communities. Mail, school meals, and freight are shipped on the regularly-scheduled flights. A fair amount of goods arrive by mail due to subsidized postal rates. Numerous retail stores in Kodiak and elsewhere regularly ship goods to customers in remote villages. For example, the Safeway store in Kodiak ships groceries to customers throughout the Borough. Most of these goods are shipped via air, either as freight or mail. Some heavy, bulky or dangerous goods are shipped on special charter flights. For example, drums of gasoline for outboard motors are shipped via charter to support Karluk sport fishing operators. Prior to going out of business, MarkAir backhauled crushed aluminum cans free of charge for recycling.

4.4.3 Road Systems

In general the local road access within the communities is adequate to allow the use of wheeled equipment to gather and transport scrap metal from the various stockpiles to a location where it could be loaded onto a landing craft and shipped off-site. Possible exceptions to the easy access are the scrap tanks in Larsen Bay located north of the bulk fuel storage, the junk vehicles in Port Lions located past the end of Beach Road, and the two old fuel storage tanks in Port Lions located northeast of the existing bulk fuel storage.

Road access to a new landfill site in Akhiok will be an important consideration. The site preferred by the community, north of the existing dump site, will require the extension of the existing road for less than a quarter of a mile. The convenience to the community and the relatively short access road are both factors that favor this site.

4.5 Education

Our understanding of how our actions impact the environment have undergone significant changes over the last 40 years and continue to evolve. Teaching current information on environmental practices in schools is critical to having a population well-informed and attentive to environmental issues. Children taking the environmental protection message home to their siblings and parents is often a significant force for changing environmental awareness and action within a community. During the site visits, the teachers in each community were interviewed to understand the current status of environmental education in KIB.

Each of the rural KIB communities has a local school for first through twelfth grade. The school populations range from 12 to about 90 students and vary significantly year to year because of the transient populations. Each school has several teachers who together teach all grades. Grades are typically combined because of the small numbers of students.

Environmental curriculums in the KIB school systems are left to the discretion of the individual teachers. The teachers indicated that they typically cover environmental topics in the science courses using prepared texts and other materials. Often the texts address global warming or ozone depletion, which are not pertinent to everyday life in rural Kodiak communities. None of the teachers were aware of teaching materials that focus specifically on topics and actions pertinent to protection of human health or the environment in a rural Alaskan coastal community. The teachers in each community indicated an interest in reviewing and/or using pertinent resources, if they are available.

The 1995 Americorp program in Akhiok focused heavily on teaching environmental issues in the local school and motivating youth to undertake local environmental projects, such as collecting aluminum cans and lead acid batteries for recycling. Since the Americorp volunteer's term has ended, no further programs have been targeted at

the schools. The AmeriCorps volunteer indicated that there was a high level of interest in environmental issues among the students.

High school students are often unaware of career options open to them and this is often exacerbated in villages where students do not have exposure to a large variety of people and industries. The environmental field offers a diverse assortment of careers many of which can be practiced in Alaska. Residents holding environmental jobs in the village (e.g., maintenance of the drinking water and wastewater systems and the landfills) have not been invited into the schools to discuss their responsibilities. Similar positions in larger facilities, AmeriCorps positions, and other environmental careers (e.g., environmental engineering, design, new product development) are also absent from the current curriculums.

4.6 Local and Regional Business Resources

4.6.1 Tribal Entities

A number of tribal entities are active in the Kodiak Island Borough area and provide a central point of contact for specific issues. The table below presents a list of tribal corporations functioning in Kodiak.

Corporation	Function
Regional	
Kodiak Area Native Association (KANA)	Regional Health/Social Native Non-Profit Corporation
Koniag, Inc.	ANSCA Regional Native For-Profit Corporation
Village	
Akhiok Kaguyak, Inc.	Akhiok For-Profit Village Native Corporation
Lesnoi, Inc.	Village Corporation for Kodiak area
Ouzinkie Native Corporation	Ouzinkie For-Profit Village Native Corporation
Old Harbor Native Corporation	Old Harbor For-Profit Village Native Corporation
Afognak Native Corporation	Port Lions For-Profit Village Native Corporation
Natives of Kodiak	Village Corporation

4.6.2 KIB Landfill

Recycling efforts at the KIB Landfill include Borough operations for used oil, lead acid batteries, refrigerator decommissioning and a contracted scrap metal operation. Refrigerator decommissioning occurs on a concrete slab behind the baler building. Refrigerators are stockpiled and then batch processed for Freon® recovery and compressor removal. The remaining shells are then processed with other scrap metal by the Borough's metal contractor.

The Borough is currently in the third year of a four-year scrap metal handling contract with Northern Exploration & Equipment Company. This contractor is responsible for handling all scrap metal delivered to the Borough facilities. Scrap includes derelict

vehicles, appliances, iron, structural steel, and miscellaneous metal scrap. Both ferrous (e.g., iron and steel) and non-ferrous (e.g., copper, brass, aluminum) metals are handled at the site. The Contractor also processes lead acid batteries for shipment, although the ownership of the batteries remains with the Borough.

Scrap handling operations occur at various areas at the landfill facility, with stockpiles of vehicles and scrap piles occurring throughout the site. Actual processing occurs in a relatively small area immediately adjacent to the Borough's car crusher. Processing includes draining fluids from vehicles, filling vehicles with light scrap, crushing the vehicles and stacking them on flatbed shipping containers for transport to General Metals in Tacoma, Washington. Non-ferrous, cast iron and heavy scrap is prepared to specification and shipped separately to General Metals.

The current scrap contractor also operates a truck and auto parts business at the landfill site. This has caused some operational difficulties for the Borough, since the contractor has an incentive to keep unprocessed abandoned vehicles as long as possible to maximize revenues from parts sales. The resulting proliferation of vehicles and stockpiled parts (axles, engine blocks, etc.) substantially expands the footprint of the scrap operation to the point of interfering with landfill maintenance. The Borough expects this situation to be corrected with the next contract.

Under the current contract, the Borough pays the contractor $97.77 for each ton of metal shipped to market. The contractor also retains revenues from the sale of parts and scrap. In 1995, 1,549 tons of metal were shipped and in 1996, 1,307 tons were shipped. The 1995 quantities exclude the 250 tons of metal recovered from Ouzinkie under a separate Borough contract.

4.6.3 Threshold Recycling

During the early 1990s, the Borough operated some paper recycling programs. Average annual quantities ranged from 36 to 133 tons, with an annual average of approximately 80 tons per year during the 1990 to 1995 period. In 1996, Threshold Recycling was established in an existing warehouse within the City of Kodiak. With this additional capacity, Borough paper recovery increased to 262 tons in 1996.

During the last four months of 1996, Threshold Recycling was handling an average of 38 tons per month.

Threshold Recycling is a non-profit organization which is financially-supported by the Borough. Facility equipment includes a forklift and a small downstroke baler capable of low density bales. At this time, the facility handles paper fiber exclusively. Most of the recycled tonnage is baled cardboard (185 tons in 1996), with roughly equal amounts (20-23 tons each in 1996) of newspaper, white ledger and magazines handled in gaylords. Minor amounts of colored ledger and computer paper were also recycled.

Materials are shipped by Sea Land to markets in Seattle and Tacoma. At this time, Sea Land provides the "backhaul" shipping at no cost to Threshold Recycling.

The Threshold Recycling operation has significant potential for expansion. If containerized transportation continues to be available at no cost, a number of additional materials could be recovered, baled and shipped to markets in the Seattle area. At the present time, the primary bottleneck is the downstroke baler. The use of this baler is labor-intensive and it produces low density bales that must be rebaled in Seattle for forwarding to domestic or Pacific Rim markets. If a more efficient high density baler were obtained, the per-ton baling costs would be reduced and more revenues would be realized from the sale of baled materials. As long as free transportation to Seattle is available, it is likely that office pack, mixed waste paper, tin cans, HDPE plastic and possibly clear and brown glass could be economically recycled by Threshold Recycling. (See Photos titled Kodiak Facilities Potentially Available for Regional Use).

4.6.4 Boy Scouts

Aluminum cans are collected by the Boy Scouts throughout the Kodiak city area. Containers are provided in central areas for drop-off delivery by area residents. The containers are periodically emptied by a specialized vehicles that vacuums the cans into an on-board briquette. The briquettes are then shipped to market in Tacoma, with revenues retained by the Boy Scouts.

4.6.5 Locally-Available Equipment and Labor

Each of the Kodiak communities has some heavy equipment, fuel and skilled heavy equipment operators available for hire. Equipment is generally owned by the community and could be rented for a one-time or annual scrap metal removal action. Additionally, semi-skilled and unskilled labor is generally available within the communities, especially outside of fishing season.

Kodiak Facilities Potentially Available for Regional Use

Lead-acid batteries consolidated at Kodiak Landfill for recycle.

Treshold, Inc. Baler.

Freon® recovery performed at Kodiak Landfill.

Locally-Available Heavy Equipment

Heavy equipment, such as this dump truck in Larsen Bay, is available for rental in all communities.

Larsen Bay dozer available for rental during a scrap metal removal action.

4.7 Community Economics

The city budgets of the communities of the KIB rely on state and federal transfer payments and revenues collected from residents to fund city operations.

In Port Lions about 15% of the city operating budget goes toward utilities: water, sewer, and solid waste. As budgeted for FY 1997, the water, sewer, and refuse assessment fees match the expenses for those departments.

The utility budget in Old Harbor indicates that the water, sewer, and garbage revenues cover less than half of the operational expenditures for those utilities. It appears that the sale of electric power along with the state Power Cost Equalization and the revenue from pole/line rental help to pay for water, sewage, and garbage.

KODIAK UTILITY COSTS ($)

	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Monthly Water	5	individual	0	15	23.50		30
Monthly Wastewater	5	individual	0	included	included	15	included
Monthly Solid Waste	5	21.50	0	included	included	5	included
Electricity (KWH)	0.24			0.40	0.32	0.30	0.17
Diesel (gal)				1.35	1.68		
Gasoline (gal)				1.45			
Propane (lb)				0.65			

4.8 Military Installations

Kodiak has been used for numerous military bases by all branches of the U.S. military since the onset of World War II. Abandoned military sites often have debris and contaminated soil associated with them from the past use of fuels, pesticides/herbicides, solvents and other materials.

Cape Chiniak is the only abandoned military facility adjacent to the existing communities. Investigation and cleanup at Cape Chiniak is underway under the direction of the Army Corps of Engineers. KIB may be asked to accept non-hazardous waste, debris and soil generated during the cleanup at the Kodiak landfill. No other remediation sites were identified that would contribute significant amounts of waste to the KIB rural community landfills.

Section 5.0
WASTE CHARACTERIZATION

5. WASTE CHARACTERIZATION

Waste characterization is the preparation of a waste inventory by identification of the types of waste and their approximate amounts. In this study, two methodologies were used to characterize the waste in the seven rural Kodiak Island communities:

- On-site observation, and
- Calculations based on pertinent community statistics.

Using two separate methodologies provides a "check and balance" where data collected by one method can be compared with the other and any discrepancies examined and resolved prior to use. The benefit is the improvement in data quality.

On-site observation involved traveling to each community and inspecting the waste sources and waste management facilities (e.g., dump, used oil storage, septic systems) and interviewing residents. The value of this method is that it identified specific situations where the Kodiak communities varied from the norm documented in urban areas. For example, the recognition that the Kodiak communities tend to have elevated amounts of animal carcasses (e.g., bones, fur) compared to urban communities.

In the second method, calculations were made using pertinent community statistics, such as the population, number of vehicles and vessels and other indicators described below to estimate various wastes. The benefit of this method was that it identified high-priority, low volume waste streams that were not always evident during the on-site visits (e.g., used oil, unmanaged wastes left by sport fishers and hunters).

5.1 Basic Community Data and Identification of Waste Sources

Table 4-1 (page 21) shows a tabulation of pertinent community statistics, such as population, number of households, seasonal population changes, commercial entities, vehicles and vessels for each of the seven rural Kodiak Island communities. These data are used, along with the on-site observations, to estimate the current waste generation rate and make projections for future requirements.

Population. In general, the data show that each of the seven communities is small (typically 80 to 500 permanent residents). During the summer, seasonal influx resulting from the canneries, commercial fishing, sport fishing and hunting, and tourists swells the population in the communities and increases the waste generation, often dramatically.

Increases in permanent and seasonal populations result in increases in municipal solid waste (e.g., paper, cans, bottles, food waste) and sewage. Permanent residents and seasonal residents based in town (e.g., cannery workers) typically increase the load on fixed waste management systems (e.g., dump, sewage

system). Commercial fishers, sport fishers and hunters often dispose of wastes in isolated areas around the community.

Commercial/Industrial Enterprises. Commercial/industrial enterprises are the community store, health clinic, fuel storage and dispensing facility, electric generator(s), lodge/restaurant(s), a cannery (Larsen Bay only), timber harvest (Chiniak only) and ferry (Port Lions only).

Waste generation is unique to the enterprise and typically breaks down as:

Enterprise	Typical Wastes
Store	Packaging materials, pallets
Health clinic	Syringes and other sharp objects, products contaminated with blood, feces or urine.
Cannery	Fish wastes, petroleum products, batteries, paints, solvents, scrap metal and wood, municipal solid wastes
Electric generators and fuel storage and dispensing facilities	Used oil, fuels, fuel-contaminated soils, fuel-contaminated water, fuel sludges, scrap metal (upon decommissioning)
Lodges/restaurants	Food wastes, municipal solid waste
Domestic livestock	Manures
Timber harvesting	Scrap wood

Vehicles and Vessels. Maintenance of vehicles and vessels results in numerous waste materials with a high potential for causing environmental damage, for example, used oil, oily filters and rags, oily water, oily sludges, lead-acid batteries, cleaning solvents and degreasers, antifreeze, transmission and brake fluids, refrigerants (Freon®) and paints. Because of their high potential for adversely impacting human health and the environment, these materials are often targeted for special management.

Construction Programs. Various types of construction projects are scheduled throughout the communities, such as renovation/improvements to HUD housing units, fuel tank system improvements, port/harbor improvements and environmental cleanups (e.g., U.S. Army Corps of Engineers at Cape Chiniak). Wastes generated by construction projects typically consist of rock and construction rubble, waste wood and metal, concrete, and contaminated soils. Construction projects usually result in one-time generation of large amounts of material. Although typically not an immediate danger to human health or the environment, these materials are often difficult to manage because of their size

and volume. When left unmanaged, they degrade the community's appearance and discourage an environmental ethic within the community.

Past Accumulation. Over the years, scrap materials (e.g., drums, vehicles and appliances) have accumulated in the communities because of the lack of waste management infrastructure and priority for alternative waste management. The unmanaged scrap metals degrade the community's appearance and discourage an environmental ethic within the community.

No situations were identified that would dramatically increase or decrease the population and commercial profiles of the Kodiak Island communities. Therefore, projections of waste generation rates over the next 20 years was assumed to be stable and comparable to current rates.

5.2 Waste Quantification

5.2.1 Solid Waste

Solid waste in rural Alaska includes a variety of materials either imported or produced from local sources. Most materials are imported by plane or boat. Packaging constitutes a large component of the waste stream, including canned food and drinks, cardboard, and plastic containers. Glass packaging is a much smaller proportion of the solid waste load than is typical in urban areas due to the weight and potential for breakage. Newspapers, although common in urban wastes, are almost non-existent in rural Alaska.

Locally generated materials would be limited to carcasses of game, especially deer and caribou. Fish waste is normally disposed at sea or along the riverbanks. Commercial fish processing waste is ground and discharged to the sea via slurry outfalls. Brush, grass clippings, and other organic "yard wastes" common to urban landfills are uncommon, as ornamental gardening and lawn care is rare.

Durable goods form a significant portion of the rural waste stream, in the form of discarded outboard motors, other engine parts, and old washers, refrigerators and other "white goods". Junk vehicles and white goods become significant in the total volume of waste produced in rural areas, due to the difficulties in handling and disposing of these items. Construction wastes occur occasionally, often in conjunction with major public housing initiatives or rehabilitation projects. Excess building materials for small private projects are often held as resources for future efforts, so little waste results.

Construction / Demolition / Remediation Debris

Large amounts of demolition debris, a one-time waste, at Cape Chiniak may significantly impact the volume of solid waste.

Recent improvement to HUD housing in Akhiok resulted in one-time generation of numerous water heaters.

For planning purposes, we have set the gross production of solid waste at 5 pounds per capita per day, slightly below the typical value for the state as a whole. Alaska stands a bit higher than the national average due to our propensity for consumer goods. Rural Alaska incomes are lower and prices are higher due to transport costs, so consumption is assumed to be lower, and this is reflected in reduced waste generation rates. Table 5-1 shows the quantities of municipal solid waste generated in each community.

The principal concern associated with municipal solid waste materials is for the contamination of ground water and surface water by leaching of chemicals from the garbage . Excessive nutrient enrichment and toxic effects can result. Food waste found in garbage can also attract animals, including rats, foxes, bears, and birds. The proliferation of animals near garbage can harbor disease, as well as being a direct threat from attack.

5.2.2 Sewage

The wastewater of the communities of the KIB consists almost entirely of domestic wastewater from individual households. The general exception is the wastewater generated in the schools which is similar to domestic wastewater.

Domestic wastewater is made up of the water from toilets, sinks, tubs, and laundry. An effective wastewater system will collect the wastewater, treat it, and properly dispose of the treated product. The collection portion of the system should remove the wastewater from the home so that people do not come in contact with it. Treatment should neutralize the hazardous components of the wastewater and disposal should get rid of the end product.

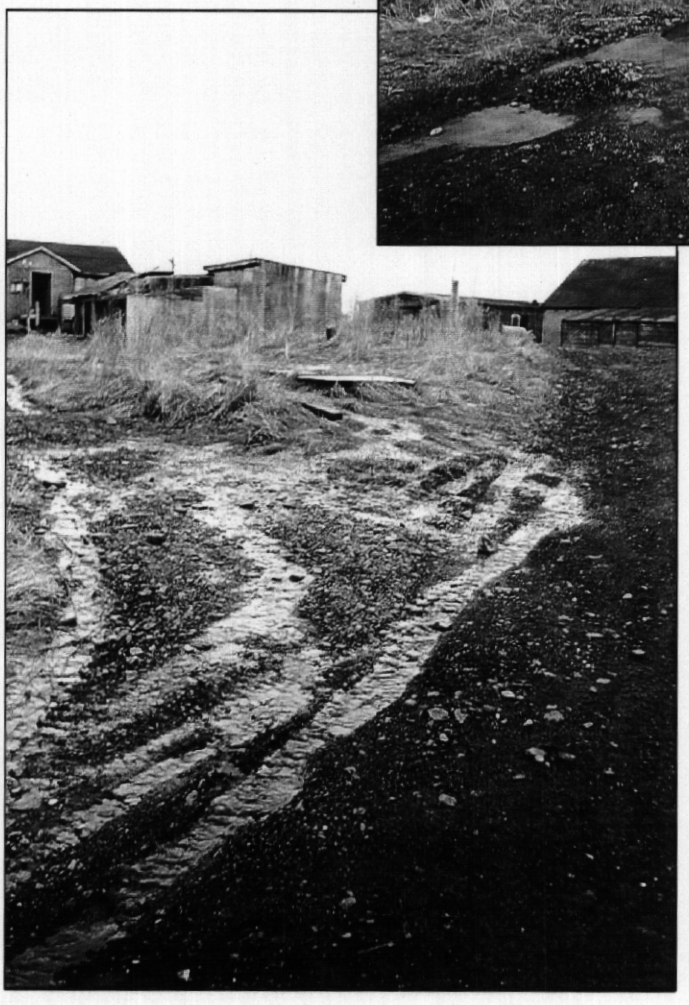
From a health perspective, the most important characteristic of wastewater is that it contains pathogens, organisms that can cause disease. Other components of wastewater are important from the perspective of the environment: organic compounds that can be food for microorganisms, suspended solids that can, under certain conditions, limit the amount of oxygen available and cause anaerobic conditions, and nutrients that can pollute groundwater or change the balance of aquatic life. In addition, cleaners and solvents that go down the drain may pass through the wastewater system and into the environment. Because of their harmful effects their use should be minimized.

The quantity of wastewater produced is essentially the same as the quantity of water that is used. Typical design values are 60 to 100 gallons per capita per day (gpcd). This amount, however, can vary greatly if faucets are allowed to run in order to keep water pipes from freezing. In one home that was visited about 900 gallons of water per day was allowed to go down the drain.

Table 5-1
Quantities of Scrap Metal and Muncipal Waste

Community		Akhiok		Chiniak		Karluk		Larsen Bay		Old Harbor		Ouzinkie		Port Lions	
EXISTING METALS (pounds/unit)															
Light Vehicles	3000	6		10		10		57		20		5		100	
Heavy trucks	12000	1		0		0		0		0		0		7	
Heavy equipm	13000	1		1		1	in river	3		0		0		3	350/D7/loader
55 Gallon Drur	50	150		0		150		170		100		40		40	
Tanks	75	0		0		18	res. fuel	0		0		5		0	
Appliances	200	50		0		18	gensets	0		40		10		0	none noted
Miscellaneous	2000	20	large tank	5	Landing mat	5	boat equip.	20	cannery	0		15	harbor	40	lg. tanks/pots
Total Existing Scrap Inventory		**50**	**Tons**	**27**	**Tons**	**33**	**Tons**	**129**	**Tons**	**37**	**Tons**	**25**	**Tons**	**253**	**Tons**
WASTE GENERATION															
MUNICIPAL SOLID WASTES (annual)															
Refuse collected (5#/cap/day)		57	tons/year	84	tons/year	64	tons/year	204	tons/year	247	tons/year	207	tons/year	253	tons/year
Volume (uncompacted@250#/CY)		456	cu.yd.	674	cu.yd.	510	cu.yd.	1634	cu.yd.	1973	cu.yd.	1659	cu.yd.	2024	cu.yd.
Reduction by burn/compaction		50%		50%		50%		50%		50%		80%		50%	
Subject to salvage/recycling		10%		10%		10%		10%		10%		10%		10%	
Annual Solid Waste Disposal Volume		**205**	cu.yd.	**303**	cu.yd.	**230**	cu.yd.	**735**	cu.yd.	**888**	cu.yd.	**299**	cu.yd.	**911**	cu.yd.
SEWAGE SLUDGE (septic tanks)		5000	gal/year	15000	gal/year	5000	gal/year	7000	gal/year	7000	gal/year	22500	gal/year	30000	gal/year
Volume of existing pumper		500	gal	Various private haulers		500	gal	500	gal	800	gal	500	gal	800	gal
Trips req'd for emptying		10				10		14		9		45		38	
Dry Sludge Volume (20% solids)		5	cu.yd.	15	cu.yd.	5	cu.yd.	7	cu.yd.	7	cu.yd.	22	cu.yd.	30	cu.yd.

Wastewater System Failure



Overflowing septic tank in Akhlok exposes community to serious health hazards.

The quality, or strength, of the wastewater is a function of the amount of wastewater, the number of people served, and the average contribution of those served. A typical value of the amount of biodegradable organics, expressed as BOD_5, is 0.2 pounds per capita per day. A typical value of suspended solids is 0.25 pounds per capita per day.

The following table is based on the current population estimate from Table 4-1 and the following assumptions:

- Average water usage of 100 gallons per capita per day,
- BOD5 quantity of 0.2 pounds per capita per day, and
- Suspended solids of 0.25 pounds per capita per day.

WASTEWATER PRODUCTION, DAILY BASIS

Community	Current Population	Volume Wastewater (gallons)	Organics BOD 5 (pounds)	Suspended Solids (pounds)
Akhiok	62	6,200	12.4	15.5
Chiniak	92	9,200	18.4	23
Karluk	70	7,000	14	17.5
Larsen Bay	224	22,400	44.8	56
Old Harbor	270	27,000	54	67.5
Ouzinkie	227	22,700	45.4	56.75
Port Lions	283	28,300	56.6	70.75

Most of the wastewater systems in the communities of the KIB use septic tanks to treat the wastewater and then ocean outfalls to dispose of the effluent.

Septic tanks, which are always full when they are in service, act like a settling pond and allow solids to settle out. They also provide an anaerobic environment to help break down the organics in the wastewater and to kill the pathogens. Septic tanks are most effective when they have an adequate volume to hold the wastewater for at least a day. For example a 1,000 gallon septic tank would provide a detention time of one day for a flow of 1,000 gallons per day.

The maintenance of a septic tank consists of pumping out the contents, generally once every two years. This removes the solids that have settled out and also the scum layer that may form on the surface. Performing this maintenance safeguards the quality of the effluent by allowing the septic tank to function properly and reduces the chances of having a discharge line plug up.

Proper maintenance of the septic tank does, however, result in another disposal problem. The concentrated wastewater pumped from a septic tank, called septage, needs to be disposed. One method being used is ocean disposal at a time and place where tidal conditions will allow maximum dispersal. A preferable method, that safeguards the marine environment, is to treat the septage with lime for disinfection and then discharge it to a lagoon.

The primary advantage of ocean outfalls is that they allow dilution of the septic tank effluent. As long as tidal flow is sufficient to disperse the wastewater, the marine environment has a great capacity to assimilate the organics and suspended solids of domestic wastewater. The outfalls must, however, be away from food sources, especially clams which are filter feeders.

Properly operated and maintained these systems can provide satisfactory service and help to safeguard the health of the community and the health of the environment. In most cases the basic physical components, the pipes, the septic tanks, and the outfalls, are in place in the communities. It is the operation and maintenance of the systems that is the key to their proper functioning. The individual systems will be discussed in the facilities section.

5.2.3 Used Oil and Household Hazardous Waste

In simple terms, used oil[1] is lubricating oil that results from changing the oil in cars, trucks, four-wheelers, snow machines, the engines of fishing vessels and skiffs, electric generators and similar equipment. Hazardous waste[1], as used in this document, refers to waste materials that are recognized to cause serious harm to people or the environment, such as petroleum products, solvents, batteries and medical wastes.

Because of the high potential for small quantities to harm people and the environment, disposal of these materials is often strictly regulated by law. In general, hazardous wastes generated by private citizens in their homes (i.e., household hazardous waste) and in small amounts by businesses (i.e., a conditionally-exempt small quantity generator) are often exempted from many of the legal requirements. For ease of understanding, this document focuses on identifying the materials and technical issues. Regulatory implications will be fully considered in the selection and evaluation of alternatives, but are only noted in this document when they are anticipated to significantly help or hinder the identification of alternative solutions and funding sources.

Table 5-2 presents a tabulation of the major sources and quantities of used oil and hazardous waste by community. Both waste inventory methods described in section 5.0 were used to prepare the inventory, however, emphasis was placed on estimates made by extrapolating from the number of vehicles, vessels and other pertinent indicators because the materials are often managed outside of existing waste management systems or could not be observed due to the large volume of other, commingled materials. Table 5-3 presents the basis for the calculations and lists the assumptions.

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[1] In both cases, the exact definition is defined by law for used oil (40 CFR 260.10) and hazardous waste (40 CFR 261) and must be used when determining regulatory requirements.

Table 5-2
Used Oil and Household Hazardous Waste Generation By Community

	Units	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Waste petroleum								
Used vehicle and generator oil	gallons/year	72	318	453	603	678	191	568
Waste diesel fuel, oils	gallons/year	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Unusable gasoline	gallons/year	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Transmission and brake fluids	gallons/year	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Bilge water	gallons/year	3,750	3,750	3,750	13,750	16,250	10,500	12,500
Oily water (from fuel tanks)	gallons/year	38	60	36	88	174	136	146
Oily filters/rags	pounds/year	100	225	105	405	555	285	895
Petroleum sludges	gallons/year	Variable	Variable	Variable	Variable	Variable	Variable	Variable
Lead-acid batteries	batteries/year	4	9	4	16	22	11	36
Antifreeze	gallons/year	5	11	5	20	28	14	45
Solvents	gallons/year	15	35	16	62	85	44	136
Refrigerants	gallons/year	2	4	2	5	11	8	9
Medical Waste								
Sharps								
Biohazard								
Dry cells	batteries/year	950	1,500	900	2,200	4,350	3,400	3,650
Explosive hazards								
Ammunition	pounds per year							
Aerosol cans	cans/year	57	90	54	132	261	204	219
Contaminated Soil	cubic yards/year	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined

Statistics								
Bulk fuel storage (excl. cannery)	gallons	30,000	12,500	50,000	75,500	121,700	78,000	92,000
Vehicles	Number	5	30	6	26	20	15	29
ATVs	Number	22	5	8	20	25	25	40
Vessels (including skiffs)	Number	15	15	15	55	65	42	50
Households	Number	19	30	18	44	87	68	73
Full-time generators	Number	0	1	2	2	2	0	0
Backup/auxiliary generators	Number	0					2	5

Table 5-3
Assumptions for Estimating Used Oil and Hazardous Waste Quantities

Waste	Assumed Generation Rate	Backup
Waste petroleum		
Used vehicle and generator oil	2.5 gal/vehicle/year; 200 gal/full-time generator/year; 24 gal./backup generator/year	Typical 250 KW generator has 4-6 gallon capacity and requires oil change every 250 hours or 3 months,
Waste fuel, oils	Minimal	
Transmission and brake fluids	Minimal	
Bilge water	250 gallons/vessel/year	
Oily water (from fuel tanks)	2 gallon/household/year; 5% of bulk fuel	
Oily filters/rags	5 pound/vessel&vehicle/year	
Petroleum sludges	10 gallons/10,000 gal storage capacity/year	
Lead-acid batteries	One battery/vehicle/5 years	
Antifreeze	1 quart/vehicle/vessel/year	
Solvents	0.1 quart/home/year, 3 quarts/vehicle or	
Refrigerants	0.5 quart/household/year	
Medical Waste		
Sharps	Not applicable	
Biohazard	Not applicable	
Dry cells	50/household/year	
Explosive hazards		
Ammunition	Undefined	
Aerosol cans	3/household/year	
Contaminated Soil	Undefined	

In the Kodiak Island communities, the most prevalent used oil and hazardous wastes appear to be:

- ❑ Petroleum products (e.g., used oil, waste fuels and oils, transmission and brake fluids, bilge water, oily water, oily filters and rags, and petroleum sludges),
- ❑ Lead-acid batteries from automobiles, trucks, four-wheelers, snowmobiles, heavy equipment, and fishing vessels,
- ❑ Antifreezes (i.e., ethylene glycol),
- ❑ Chlorinated engine-cleaning solvents and degreasers,
- ❑ Refrigerants (Freon®), and
- ❑ Medical wastes.

Other hazardous wastes in the Kodiak Island communities include: paints, household cleaners (e.g., bleaches, scouring powders, oven cleaners, dry cleaning fluid), waste medications, household batteries (e.g., flashlight and watch), computer disks, audio and video tapes, fire alarms, light bulbs and ballasts and pesticides/herbicides.

In some cases, soils are already contaminated because of past practices, for example from fuel spills or leaks. Fuel tanks and military installations typically require soil sampling and laboratory analysis to determine whether soils are contaminated, because contamination is not always easy to see. In the rural Kodiak Island Borough facilities the quantity of contaminated soil, if it exists, is not known. Contaminated soils often require special handling and often are generated in large quantities. However, existing information is not sufficient to document or even estimate a quantity for Kodiak. Since little top soil is present, it is anticipated that contaminated soil will not be a major source of waste in the rural Kodiak Island communities.

Once the biggest waste streams are identified integrating them with site-specific disposal practices and receptors shows which wastes have the biggest effect on the people or the environment on Kodiak Island and therefore are the highest priority. Using this criteria, used oil and hazardous wastes rank as high priority waste management issues.

Petroleum Products. Petroleum products play a critical role in the operation and welfare of all of the Kodiak Island communities. Large quantities of fuel are used for heating, generation of electricity, and to fuel and lubricate personal vehicles and fishing vessels. When petroleum products reach the water in high concentrations (such as the Exxon Valdez oil spill), they kill fish, birds and other sealife. Over time the petroleum products become diluted, biodegrade and cause less harm. Effects of diluted petroleum, such as from the discharge at sea of used oil, ballast or bilge water, are not fully understood, because they are harder to document. In general, scientific research typically discovers that smaller and smaller amounts of petroleum does impact the environment.

When petroleum is spilled in soil, it kills or damages plants, and the hazardous substances in it can effect the health of humans and wildlife exposed to it. Humans and wildlife are exposed to it by airborne dust. When it gets on hands and shoes it is tracked in houses. Over time, petroleum products biodegrade in soil, but some of the most dangerous parts (e.g., the polynuclear hydrocarbons) are the slowest to degrade. If a large amount of petroleum is in the soil, it can travel horizontally and seep into the sea. In other areas, petroleum in soil can migrate to groundwater and contaminate the drinking water, but ground water is not used in Kodiak as a drinking water sources, so this is not an issue. Any used oil or other petroleum disposed on the ground within the watershed could potentially enter the drinking water.

Table 5-2 shows that large amounts of petroleum products are generated in the Kodiak Island Borough. The wastes are generated by vehicles, vessels, and the power generators and are in different forms: oils (used oil, waste fuels and oils, transmission and brake fluids), aqueous liquids (bilge water, oily water), and solids (oily filters and rags, and petroleum sludges). Often times the petroleum is mixed with other materials (e.g., water, antifreeze, solvents) for storage and disposal. Mixing petroleum products with water, antifreeze and/or solvents often triggers compliance with more stringent environmental regulations and increases the complexity and cost of waste disposal.

Three communities had facilities for disposal of waste petroleum products. Ouzinkie has a household hazardous waste collection shed (although no permanent disposal facility). Port Lions has a used oil burner, however, the capacity is not sufficient for the community's generation. The Larsen Bay incinerator is equipped to burn used or waste oil as an alternative to fuel oil, though it may not be used consistently. Old Harbor has an used oil burner, but it is not yet connected to a supply tank and filter. There are several used oil burners in the city of Kodiak, one at public works, two at the marina, one at the fish meal processing plant and one at USCG. The Kodiak marina maintains a used oil and oily water collection facility and burns the oil in two used oil burners and has secured agreements with the USCG to burn excess used oil. Vessels stopping at the Kodiak marina may dispose of their used oil and oily water (bilge water and ballast water) for a fee.

Comparing the quantities of waste petroleum products observed in the villages to the waste calculations based on the number of vehicles and vessels indicates that much of the petroleum wastes are probably being disposed in the landfills, at sea or on the land. Typically, it is assumed that small quantities of petroleum become diluted and do not result in environmental damage; however, this thinking is generally recognized as out of date because the shear numbers of small discharges together become a significant amount of petroleum. (See photos titled Potential Impacts Due to Petroleum Storage).

Because of the rare and precious resources in and around the Kodiak Island borough communities and the heavy reliance of the residents on these resources for food (e.g., subsistence food sources) and livelihood (e.g., commercial fishing, tourism), developing alternative, inexpensive methods for collection and disposal of waste petroleum

products is viewed as a high priority waste management issue. Evaluation of alternative waste recycling/disposal facilities will need to address the different types of petroleum wastes (used oil vs. sludges vs. oil filters), segregation of wastes, collection schemes, transportation, recycling/reuse/disposal and regulatory constraints. There are a number of regulatory exemptions that facilitate appropriate management of petroleum products, however, different exemptions apply to different waste streams. For example used oil and waste oil could be managed the same way, but for different reasons.

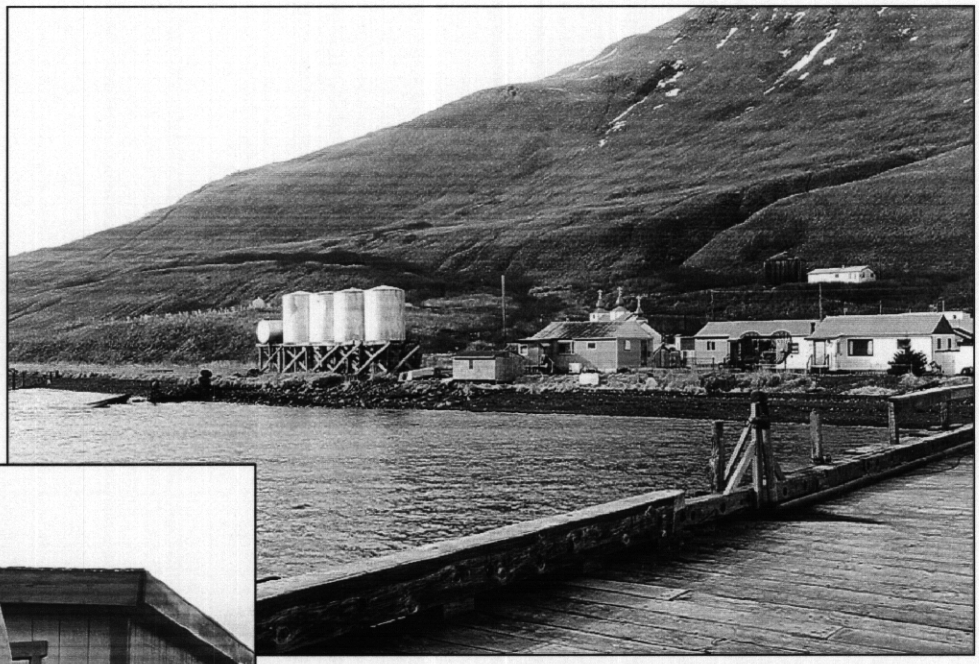
Lead Acid Batteries. Lead-acid batteries are the batteries from automobiles, trucks, four-wheelers, snowmobiles, heavy equipment, and fishing vessels, not the disposable household ones. The liquid in the battery is a strong acid that can cause severe burns and contains high levels of dissolved lead. The metal core is lead, which chips or dissolves into soil or water and is harmful to humans and wildlife. Lead is not biodegradable, so it never goes away. The body accumulates lead rather than eliminating it as a waste product, so small amounts ingested over a whole lifetime add up. Shellfish typically bioaccumulate heavy metals and lead, so lead in batteries disposed near the shore can be concentrated in the shellfish eaten by residents.

Two communities have lead-acid battery collection procedures. Ouzinkie collects batteries at the household hazardous waste collection shed at the landfill. The AmeriCorps volunteer in Akhiok started lead acid battery collection through the school. In both cases, there is no permanent program for transportation and recycling/disposal of the batteries. In other communities, lead acid batteries were observed in the dump and scrap metal piles.

Comparing the number of batteries observed to the number of vehicles and vessels, it appears that many batteries are disposed in the dump, at sea or on the land. Because of the health and environmental hazards associated with lead, its persistence in the environment and the quantity of batteries, developing alternative systems for the collection, transportation and recycling/disposal of lead acid batteries is a high-priority waste management issue.

Antifreezes. Antifreeze in vehicles and vessels (i.e., ethylene glycol) is a strong, but sweet poison. Although biodegradable under the right conditions, when it is disposed to soil or water it generally persists for a long time. Because of its sweetness, wildlife, domestic animals (e.g., dogs) and children have been reported to readily eat or drink it.

Potential Impacts Due to Petroleum Storage



Deteriorating Old Harbor Tank Farm staged adjacent to marine resources.

Stained soils resulting from spills and leaks over time at Larsen Bay illustrate the potential for soil contamination.

Out of service fuel tanks in Akhiok are visually unappealing and could be removed with scrap metal. Underlying soils can be checked for fuel contamination.

The Ouzinkie household hazardous waste collection shed is the only facility for the collection of antifreeze, however, there are no established practices for transportation and disposal. Typically antifreeze is mixed with used oil and other wastes for disposal. As used oil collection and reuse/recycling programs are developed, an alternative disposal method for antifreeze will be needed. The majority of antifreeze is probably being disposed in the dump, with used oil, or to the land or sea.

Because antifreeze is poisonous and attractive to wildlife, domestic animals and children, but not generated in large quantities, developing an alternative waste disposal option is a medium-high priority.

Chlorinated Engine-Cleaning Solvents and Degreasers. Chlorinated engine-cleaning solvents and degreasers are typically used to clean greasy or oily parts. When these cleaners reach the soil or water, they typically do not biodegrade and, in quantity, can harm humans, wildlife and sealife populations.

Typically chlorinated cleaning solvents are mixed with used oil and other wastes for disposal. As used oil collection and reuse/recycling programs are developed, an alternative disposal method for the cleaning solvents will be needed. The majority of chlorinated solvents are probably being disposed in the dump, with used oil, or to the land or sea.

Because chlorinated solvents are persistent and pose significant danger to human health and the environment, but are not generated in large quantities, developing an alternative waste management option is a medium-high priority.

Refrigerants. Refrigerants (e.g., Freon®) are used as the heat transfer liquid in home and industrial refrigerators and air conditioners. Although alternative refrigerants are commercially available, the old, junk appliances and existing equipment in the Kodiak Island communities typically use Freon®. Refrigerants are very volatile, so they typically are not found in soil or water. However, they have been linked to depletion of the ozone layer and associated problems.

No facilities for managing refrigerants are present in the Kodiak Island Borough communities. Typically, refrigerants appear to be left in unused equipment, which, with time, will rust and discharge the refrigerants to the soil or water.

The dangers associated with the discharge are global (e.g., reduction in the ozone layer) and would effect Kodiak residents in the same way it would the rest of the world. Although diverting refrigerants from release to the atmosphere is a high-priority issue globally, Kodiak Island borough residents have other issues that have a more immediate impact on their health and livelihoods. Therefore, collection of refrigerants is viewed as a low priority issue.

Medical Wastes. Medical wastes that contain sharp objects (e.g., syringes) and bodily fluids (e.g., blood, feces and urine) are hazardous because of their potential to spread disease. Sharp objects, referred to simply as "sharps", and materials containing bodily fluids, referred to as "biohazards", are typically containerized and disposed of separately.

In the rural Kodiak Island communities, the health clinic is the primary generator of medical wastes. In all communities, the sharps are sent outside by air for disposal and the biohazard wastes are burned. The health aide containerizes the biohazard wastes in red bags and burn it in a burn barrel at the health clinic. The exception is Larsen Bay where the health aide has trained a sanitation worker to pick up the red-bagged biohazard waste and burn it at the community incinerator.

The medical waste segregation, collection and disposal practices in all the Kodiak communities are excellent and appear to adequately protect the community from the dangers of medical waste. No changes are needed.

5.2.4 Commercial/Industrial Wastes

Commercial and industrial facilities generate wastes that are often addressed in other sections and will not be repeated here, for example,

- Municipal solid wastes (e.g., paper, plastic, cans, packaging, pallets) covered in section 5.2.1.
- Hazardous wastes (e.g., medical wastes, used oil, petroleum products) covered in section 5.2.3.

The cannery in Larsen Bay is the only large industrial facility in the rural Kodiak Island communities. Generally, the cannery contracts with Larsen Bay for use of the dump for disposal of municipal solid wastes, as discussed in section 5.2.1. The cannery appears to collect and ship hazardous wastes off-site. Fish processing wastes are ground and discharged subsurface into the ocean. According to some residents, the fish waste discharge is another factor in attracting bears to Larsen Bay. Solutions to the bear problem in Larsen Bay will need to take into account the cannery fish discharge.

Livestock (e.g., chickens and horses) in Larsen Bay and Ouzinkie, generate manures which are managed on-site. In other communities around Alaska, manures have been a significant problem because of the odor, and migration of nitrates to ground or surface water. Due to the small numbers of livestock in Larsen Bay, manure management does not appear to be an issue.

Timber harvest in Chiniak results in wood wastes that are typically left in the forest to degrade with time. Taking of the timber has an environmental impact, and transporting the cut timber by floating the product in open waterways potentially has an adverse environmental impact. However, leaving the wood wastes in the forest does

not appear to be a significant problem. The issues of timber harvest and transportation are outside the scope of this waste management study.

5.2.5 Scrap Metal

Scrap metal is one of the most visible solid waste issues within Kodiak Island Borough communities. Although scrap has traditionally been considered more of a visual problem than environmental issue, there are a number of environmental concerns associated with stockpiled scrap metal. Many scrap items contain a number of potentially hazardous materials that can cause significant damage to marine and freshwater environments. Example include mercury switches in older appliances; PCB-containing fluorescent lighting ballasts; Freon® and/or PCB-containing compressor oils in old refrigerators and freezers; residual oil in fuel drums and tanks; batteries, fuel, motor oil, gear oil and brake fluid in abandoned vehicles; and hydraulic, fuel and lube oils in abandoned equipment. In several villages, potentially hazardous scrap items are stockpiled or abandoned in environmentally sensitive areas such as tidal areas, saltwater marshes or adjacent to surface waters that drain into marine areas. (See photos titled Hazardous Waste Associated with Scrap Metal). Thus, the potential impact on the marine environment of existing scrap metal stockpiles in KIB villages may be of greater concern than initially anticipated. Additionally, scrap metal piles are a physical hazard, because of the sharp edges and instability of the decaying objects.

All of the surveyed villages had accumulations of scrap metals, although not necessarily proportional to village size. Stockpiled scrap metal in the villages includes derelict vehicles, oil tanks and drums, old equipment and miscellaneous light scrap. Scrap diversion effort varies among villages. In some communities, (e.g. Ouzinkie and Akhiok) a substantial effort is made to separate essentially all scrap metal. In these cases, the scrap metal mix includes everything from lawn chairs and toaster ovens to automobile parts. In other communities, metal segregation is limited to vehicles; with no segregated stockpiles of drums, appliances or light scrap items noted. In these other communities, it appears that all light scrap (including unprocessed appliances) is directly landfilled. Thus, the surveyed scrap quantities only reflected current segregation practices, not necessarily potential generation if metal segregation were actively enforced and practiced.

Table 5-1 provides an estimate of existing scrap stockpiles in each community. These estimates are order-of-magnitude due to the difficulties of visually estimating weights. This is particularly true for heavy equipment and large tanks. The reported quantities do not include abandoned fuel tanks unless specifically noted. Most of these tanks should be available for future recycling, once fully decommissioned.

Hazardous Waste Associated with Scrap Metal

Scrap metal pile at Ouzinkie Landfill ready for removal.

Batteries stored with scrap metal in Port Lions.

Submerged heavy equipment in Karluk contains oil, battery and antifreeze.

Junk vehicles in Chiniak are visually unappealing and contain hazardous fuids and battery.

In 1995, the Borough initiated a scrap metal removal project for the Village of Ouzinkie. A contractor was retained to prepare the stockpiled scrap at the Ouzinkie landfill and transport to an off-Island scrap recycler. The stockpiled scrap at the landfill was loaded into 20 foot shipping containers and transported to the main harbor. A scrap bulldozer located at the site of the older closed Ouzinkie landfill was cut up in-place and also transported to the harbor. The landing craft "Cape Douglas" was used to transport the containers of metal to Kodiak where the scrap was consolidated and shipped to market in Tacoma.

The contractor retained revenues from the sale of scrap. At the time the bid documents were prepared, the available scrap quantity was estimated at about 600 tons. The Borough received three bids: $117,777; $207,000; and $248,500. The low bidder was Northern Exploration & Equipment Co., the same contractor currently used by the Borough for landfill scrap handling.

After the low bid of $117,777 was accepted, it was determined that the actual quantity of scrap was lower than originally forecast. The original contract amount remained the same for handling only 250 tons, which increased the cost per ton removed from $196 to $471. The unexpectedly high total and unit costs of this program shelved plans to continue removing metals from area villages, until further investigations could be made.

Section 6.0
WASTE MANAGEMENT FACILITIES

6. WASTE MANAGEMENT FACILITIES

6.1 Landfills

Every community generates garbage and needs facilities for disposal of waste materials. At Chiniak, the KIB has provided dumpsters at several locations for the local residents. These dumpsters are emptied weekly, with the wastes trucked back to the baler facility in Kodiak. Each of the other remote communities has established a garbage dump for disposal of wastes. Dump sites that are controlled to minimize potential pollution and attractiveness to bears are commonly referred to as "sanitary landfills", or just "landfills". Landfill design and operation varies considerably between the Kodiak Island communities in terms of the level of attention provided to the management of the landfill sites. Table 6-1 compares landfill facilities at each of the communities. Table 6-2 shows ratings for each landfill, scored according to long-standing ADEC standard criteria.

Animals. Dumps are commonly attractive to bears, small animals, and birds seeking that free meal. Some communities, such as Akhiok and Ouzinkie, do not have a large population of bears in the vicinity, so bear problems at the landfill are uncommon. At Port Lions and Larsen Bay, however, bears have commonly made use of the dumps for decades, and are accustomed to the presence of people and the scent of garbage. In these communities, the dump habits of the bears will be difficult to break. Karluk and Old Harbor dump sites have occasional bear visits, but they are regarded more as an infrequent nuisance than as a chronic problem.

Birds tend to congregate near landfills, and will pick at trash and spread it around when the trash is accessible. Birds near landfills are also viewed as a threat to aviation, so much so that the Federal Aviation Administration has established a policy to limit funding of airports located near landfills unless it can be clearly demonstrated that the presence of the landfill does not increase the potential for bird-aircraft collisions. New landfills cannot be located within 5,000 feet of an airport - 10,000 feet if jet aircraft use the airport - without special permission from regulatory agencies. Presently, none of the existing landfills in Kodiak's villages meet those siting criterion - all are within 10,000 feet of their respective community airstrips. Only Larsen Bay's airstrip is nominally outside of the 5,000 foot setback from the landfill.

Table 6-1
Solid Waste Disposal Facilities

Community	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
PRESENT SOLID WASTE PRACTICES							
COLLECTION							
Means	self haul	local dumpsters	self haul	self haul	self haul	self haul	City pick-up
Equipment	private	by Borough	private	private	private	Hire City truck	Pick-up truck
Frequency	as needed	as needed	as needed	as needed	as needed	as needed	weekly
DISPOSAL FACILITY (Year built)	1960's	Kodiak	1980's	1970's	1994±	1992	1966±
Dimensions of existing unit	40*50	n/a	100*100	10*150	150*200	150*12	100*450
Total facility area	1 acre+/-	n/a	0.2296 acres	5 acres	1.1478 acres	5 acres	1.0 acres
Land Ownership	church	Borough	Tribal Council	City	City	City	City???
Distance to town	1000 feet	36 mi.	300 feet	1 mile	2500± feet	2800 feet	3500 feet
Distance to airstrip	2600 feet		3600 feet	1 mile	3600± feet	3200 feet	3500 feet
Access	gravel road	24 hr dumpster	muddy path	gravel road	gravel road	gravel road	at highway
Fence	yes	n/a	no	no	yes	yes	no
Gate	no		None	no	Open	Open	None
Hazmat Segregation	no	No provision	None	No provision	No provision	facility available	No
Scrap metal segregation	yes	local junk dealer	None	yes	yes	yes	No
Controlled burning	some	not at dumpsters	not used	incin. not in use	some unattended	burned in trench	some uncontrolled
Landfill method	area	balefill	area	trench	modified ramp	trench in bedrock	area spreading
Cover frequency	None	daily	None	rare	weekly	None	rare
Cover available	limited	n/a	Not in use	No stockpile	Yes	No stockpile	No stockpile
Local soil quality	sandy silt	n/a	sandy silty clay	Fair	silty sand	silty sand	silty clay
Diversion of run-on drainage	Fair	n/a	intersects stream	drains off-site	fair	good	road helps
Runoff control	fill in wetland		runoff to lagoon		drains to stream	drains to sludge lagoon	no water evident
Landfill area needed (3.3 SF/CY/YR)	677	n/a	757	2426	2929	985	3006
Area left in current unit (sf)	2000	n/a	0	1500	30000	1800	0
YEARS REMAINING	**3**	n/a	**0**	**1**	**10**	**2**	**0**
Operating under permit?	N	n/a	N	N	N	N	N
Operator responsible	None	n/a	None	None	weekly	None	Weekly by contract

Table 6-2
Landfill Ratings by ADEC Scoring Criteria

Community	Akhiok		Chiniak		Karluk		Larsen Bay		Old Harbor		Ouzinkie		Port Lions	
LANDFILL EVALUATION	Score	Out of	Score	Out of	Score	Out of	Score	Out of	Score	Out of	Score	Out of	Score	Out of
1) Access road	3	3	n/a	3	1	3	1.5	3	3	3	3	3	1	3
2) Fire Protection	0	3	n/a	3	1	3	0	3	0	3	1	3	0	3
3) Limited Access (Locked, attended)	1	3	n/a	3	0	3	0	3	2	3	2	3	0	3
4) Working face limited in size	0	3	n/a	3	0	3	2	3	1	3	3	3	0	3
5) Litter controlled by fence/pickup	2	3	n/a	3	0	3	1	3	2	3	3	3	0	3
6) Spreading and compaction	1	3	n/a	3	0	3	1.5	3	2	3	1	3	1	3
7) Operational cover	0	10	n/a	10	0	10	2	10	2	10	0	10	0	10
8) Final cover	0	2	n/a	2	0	2	1	2	0	2	na	2	0	2
9) Haz. wastes excluded	0	1	n/a	1	0	1	0	1	0	1	1	1	0	1
10) Septage contained, limed, covered	1	3	n/a	3	1	3	0	3	3	3	2	3	0	3
11) Burning controlled	0	3	n/a	3	2	3	2	3	1	3	0	3	2	3
12) Salvage controlled	0	2	n/a	2	0	2	0	2	1	2	0	2	0	2
13) Vector/bears: cover, lime, fence	0	5	n/a	5	0	5	0	5	1	5	3	5	0	5
14) Nuisance: dust,noise, odor	2	2	n/a	2	0	2	2	2	1	2	2	2	0	2
15) Groundwater protection	5	15	n/a	15	5	15	5	15	5	15	10	15	5	15
16) Surface water diversion	0	2	n/a	2	0	2	0	2	2	2	2	2	0	2
17) Final grading	0	2	n/a	2	0	2	1	2	1	2	0	2	1	2
18) Training program	0	2	n/a	2	0	2	0	2	0	2	1	2	0	2
19) Operational records	0	2	n/a	2	0	2	0	2	0	2	0	2	0	2
20) Recycling	0	2	n/a	2	0	2	0	2	1	2	1	2	0	2
TOTAL SCORE:	15	71	0	71	10	71	19	71	28	71	35	71	10	71

Water Quality Protection. Appropriate landfill design and operation is important to protection of human health and wildlife resources, particularly ground water and surface water. When water comes into contact with garbage, contaminants can be transferred from the refuse to the garbage by a process known as "leaching". "Leachate" is the product of this process, and carries with it extraordinarily high levels of naturally occurring minerals as well as some traces of toxic contaminants. Leachate occurring downstream from a landfill can make ground water unfit to drink, and can harm aquatic wildlife communities if it exists in sufficient concentrations.

To minimize leachate generation, landfills should be located and structured to minimize contact with water. Placement of garbage in or near wetlands should be avoided. Water coming from hillslopes upgradient of the landfill should be diverted. And while snowmelt and precipitation can not be avoided, the landfill site should be graded to minimized potential for accumulation of snow or collection of runoff. From an operational perspective, accumulation of water within the refuse can be minimized by compacting the refuse and covering it with earth to promote runoff. By minimizing the area which is actively being used to deposit waste - the "working face" of the fill - the potential for water contact is further reduced.

Regular compaction and cover have other benefits for site management, as well. Wind is less likely to spread trash around if the refuse is adequately compacted and covered. And, while bears are certainly capable of digging through buried trash to find a meal, covering and compacting trash can help reduce odors and make the landfill less attractive to bears, foxes, and birds.

Burning Trash. One of the most useful means of discouraging animals from garbage dumps is to ensure that any potential food items for the animals are incinerated. Incineration also helps reduce the volume of trash that accumulates in the landfill, thus providing a longer life for that landfill site. Burning trash is common at most village landfills, particularly for cardboard and household garbage. Ouzinkie carefully controls placement of trash at the working face of its trench, and uses waste oil or other materials to light a fire, ensuring thorough combustion of the waste. The bedrock trench walls and continuous attendance during the burning process ensure that the fire does not smolder endlessly and/or escape from the confines of the trench.

Other communities have used commercial incinerators, or makeshift "burn-boxes" to effectively reduce the volume and attractiveness of trash (See Section 6.3 Incinerators). Use of controlled burning techniques such as these are preferred over "open-burning", which the project team witnessed in Port Lions and Old Harbor. While open burning can have the same effect of reducing volume and attractiveness, several less desirable results can occur.

First, there is the potential for fire to spread to other materials in the landfill, or beyond the landfill to forest or vegetation nearby. At Port Lions, we heard reports of waste ammunition being discharged after the spread of a landfill fire begun by open burning.

Second, incomplete combustion can produce foul smoke, polluting the air and increasing the potential for toxic contaminants to be released with landfill leachate.

Controlling Access. Fences delineate the landfill boundary and prevent casual access to the steep slopes, sharp materials, and other hazards of the landfill. They also assist in controlling windblown litter by capturing trash before it blows off the property. However, conventional chain-link fences are not sufficient to prevent access by animals. Bears have been known to crawl under or over fences, and have even burst through fencing when particularly anxious to get to the other side. On Kodiak Island, only Old Harbor and Ouzinkie presently have fencing surrounding the landfill. Gates are typically left open at Old Harbor to provide a non-destructive alternative for bear access. Even so, Old Harbor city staff spend several days each year maintaining the fence.

Site Closure and Establishing New Sites. For the most part, the dump sites have been long established. Karluk, Akhiok, and Port Lions, for example, began dump operations shortly after the original development of the community and have not changed locations since. Each of these communities is seeking to close their existing operation and develop a new site with improved controls. Karluk is closest to opening a new site, with a design complete and funding available for construction by the KIB this year. Ouzinkie and Old Harbor have established new sites within the past five years, taking care to close the old sites by capping the waste with a layer of earth. Larsen Bay has also closed an older site prior to beginning landfill operations at the present location.

When properly designed, the closure cap can minimize infiltration of snowmelt and rainfall which might come into contact with the refuse, causing leachate. Closed sites that remain in Kodiak's remote communities have a neat appearance on the surface, suggesting that cover is generally adequate. However, iron-stained seepage downgradient from the closed landfill may suggest the continued production of leachate within the closed landfill, such as occurs at Ouzinkie. (See Photos titled Landfill). At closure, sites should be graded to ensure that snowmelt and precipitation runoff from the site without infiltrating, and that ground water from sources upgradient of the closed site are appropriately diverted.

Landfills

Provision for cover, controlled burning, fencing, and drainage are characteristics of a planned landfill (Ouzinkie).

Trash dumped on the ground is unappealing and a hazard to public health.

6.2 Recycling

Negligible amounts of materials are currently recycled in the subject villages. In the past, MarkAir offered to backhaul bagged aluminum cans from villages at no cost. Schools or other organizations took advantage of this program in some villages (e.g. Ouzinkie, Port Lions, etc.). These collection programs have been discontinued since MarkAir's bankruptcy, as other airlines have not been willing to offer backhauls on regular flights. Bags of stockpiled cans in Ouzinkie were eventually landfilled due to the lack of a backhaul arrangement. The school in Port Lions has restarted an aluminum collection program, although this community is somewhat unique in that they have regular ferry access, and the ability to market cans directly in Anchorage.

Cardboard, paper, glass, tin cans, plastics, tires and wood are generally burned or landfilled in the villages. No recycling programs currently exist for these materials. Some organics are handled via home composting. This is an informal activity and is not currently supported by the Borough through composter subsidization or education programs.

Some larger waste generators may self-haul quantities of recyclables directly to market. Examples might include contractors at USCG facilities, Larsen Bay cannery, fish processors, and wholesale and grocery operations. The quantities and composition of these materials are unknown.

6.3 Incinerators

As tabulated in Table 6-3, Larsen Bay is the only community with an incinerator. The incinerator, a Therm-tec, is housed in a locked building and consists of a kiln-like combustion chamber and an afterburner. Solid waste is loaded into the chamber by hand, the door is closed and the facility is started up. Combustion is initiated and the afterburner fired with fuel oil (or used oil). Exhaust gases are discharged through the afterburner to the atmosphere. After one batch is complete and cooled, a second batch can be processed. Ash is removed from the kiln by hand periodically and disposed in the dump. (See Photos titled Solid Waste Incinerator).

The facility was purchased used from Bracket Lake and currently has about 13,110 hours on it. Therm-tec, located in Tualatin, Oregon, has designated Proctor Sales, located in Anchorage for maintenance and repairs.

No operational or maintenance problems were reported on the facility, however, unburned wastes were observed at the dump.

6.4 Waste Oil Burners and Household Hazardous Waste Collection

6.4.1 Waste Oil Burners

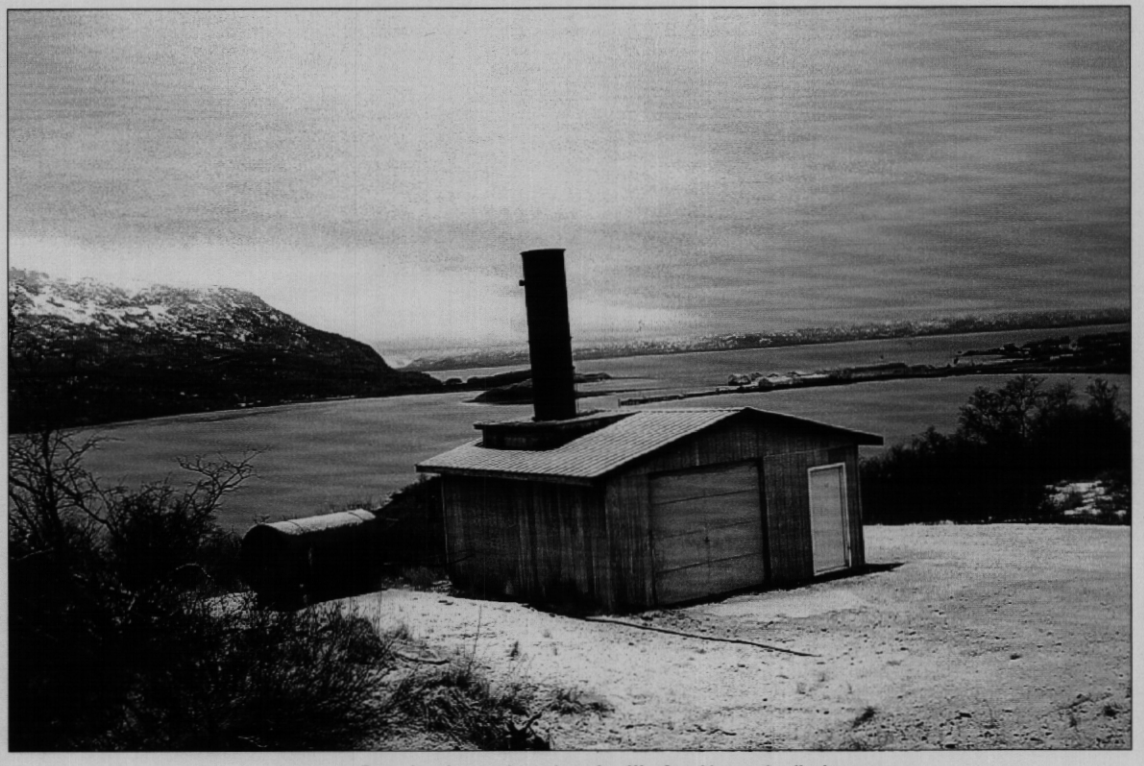
As tabulated and shown on Table 6-3, Port Lions and Larsen Bay both have the facilities to burn used oil. The Akhiok electrical generators burn used oil generated by the electrical generation facility, but not other used oil. Several used oil burners are operational within the city of Kodiak, some of which could potentially accept on-spec used oil generated in the outlying communities. The Department of Public Works has a used oil burner at the landfill, the marina runs two, and the U.S. Coast Guard and fish meal processor each run facilities. The U.S. Coast Guard has indicated that they are willing to accept additional quantities of on-spec used oil.

Table 6-3
Waste Management Facilities

	Non-Hazardous Solid Waste Incinerators/Burners	Used Oil Burners	Household Hazardous Waste Collection	Medical Wastes
Akhiok	None	Village electrical generators designed to continuously bleed a portion of the lubricating oil into the fuel oil and replenish lubricating oil sump.	Vehicle batteries collected through Americorps program and stored indefinitely.	**Sharps** used, collected and stored at health clinic. Transported by air to Kodiak for incineration. **Biohazard** waste from health clinic collected and burned by the
Chiniak	None	None	None	**Sharps** used, collected and stored at health clinic. Transported by air to Kodiak for incineration. **Biohazard** waste from health clinic collected and burned by the
Karluk	None	None	None	**Sharps** used, collected and stored at health clinic. Transported by air to Kodiak for incineration. **Biohazard** waste from health clinic collected and burned by the
Larsen Bay	Therm-tec, no model number, 13,110 hr., Tualatin, Or, Combustion and Control (Anc-562-3073). Also feeds used oil. Batch process, afterburner, manual ash disposal	Same as incinerator	Used generator lube oil collected and stored at generator indefinitely. Batteries accumulating at cannery dock.	**Sharps** used, collected and stored at health clinic. Transported by air to Kodiak for incineration. **Biohazard** waste from health clinic collected and burned at the Larson Bay incinerator by trash collector.
Old Harbor	None	Installed, but not operational	None	**Sharps** used, collected and stored at health clinic. Transported by air to Kodiak for incineration. **Biohazard** waste from health clinic collected and burned by the
Ouzinkie	Solid waste burned in dump.	None	Household hazardous waste and used oil collection and storage facilities	**Sharps** used, collected and stored at health clinic. Transported by air to Kodiak for incineration. **Biohazard** waste from health clinic collected and burned by the
Port Lions	None	Black Gold, Smartburner, Model Sun 2, Nozzle only 30609-5, Serial No. BR2742, 1.4 gal/hr, 160,000 BTU, factory-supplied filter only, manual filling operation	Used oil stored at marina in drums prior to use.	**Sharps** used, collected and stored at health clinic. Transported by air to Kodiak for incineration. **Biohazard** waste from health clinic collected and burned by the
Regional Resources	**Kodiak Landfill Solid Waste Incinerator located at KIB Landfill**	**Kodiak Marina** Two used oil burners 1. Black Gold, model Sun II, Nozzle 30609-5, 1.4 gal/hr., 160,000 BTU, equipped with factory filter and preheater and additional water and particulate 2. Omni 350, OWH 350, 2.4 gal/hr., 350,000 BTU, equipped with pre-heater and extra water and particulate filters **USCG** One used oil burner: Smartash burner One oil filter crusher: **Kodiak Landfill** Reznor used oil burner **Fish Meal Producer** Used oil burner	**Kodiak Landfill Lead Acid battery consolidation Freon recovery**	

Solid Waste Incineration

Controlled incineration of Larsen Bay solid waste decreases it's attraction to bears.However, batch processing is very labor intensive.



Larsen Bay incinerator shed with fuel/used oil storage tank. Afterburner reduces discharge of air pollutants.

Port Lions operates a used oil burner located on the second floor of the Port Lions marina building. The facility consists of a Black Gold, Smartburner model Sun 2 (serial number BR2742) with nozzle number 30609-5 and an oil storage reservoir. The unit is rated at 160,000 BTU and consumes about 1.4 gallons per hour.

Operation of the unit is labor intensive. Used oil is stored outside in drums. The laborer decants the used oil to a bucket from the drum leaving the oily water in the drum. He carries the oil upstairs and transfers it to the burner reservoir. The burner reservoir is equipped with a water trap and filter. The water trap is periodically emptied, and the filter should be changed periodically. No disposal facility has been identified for the oily water.

Heat generated from the used oil burner is used to heat a small portion of the marina building. It is reported to work well, but consumes far less used oil than is generated in the community. Part of the problem is that only a small portion of the burner capacity is required to heat the marina. (See Photos titled Used Oil Burners).

The Larsen Bay incinerator is capable of burning used oil and is described in section 6.3. Currently used oil from the electric generators is stored in drums at the generators and little or no used oil is being burned at the incinerator.

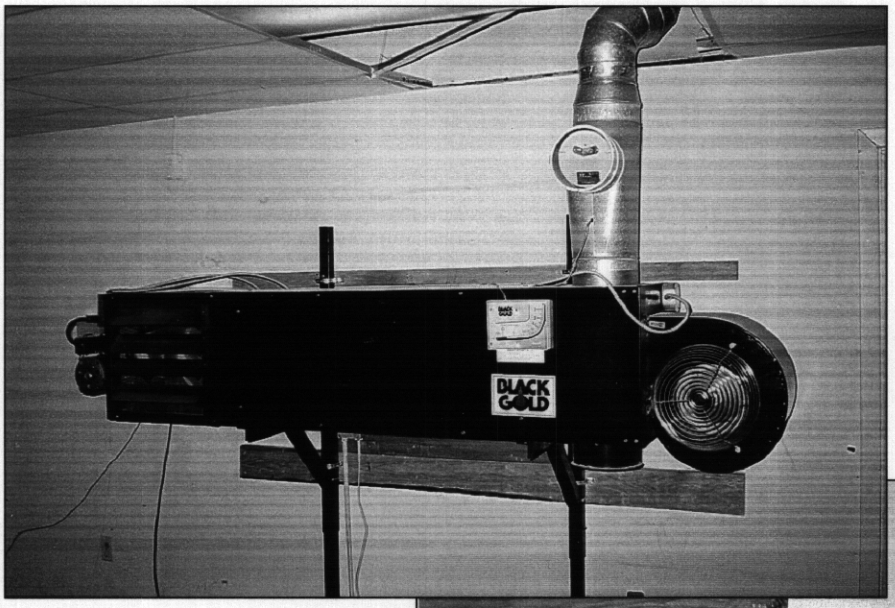
The new Akhiok electric generators at the bulk fuel storage facility burn the used oil generated by the electrical generators. The system reportedly works automatically by dripping a small portion of the lubricating oil into the fuel stream and continuously replenishing the lubricating oil. The system is quite new, but reportedly works well and eliminates the need to periodically change the oil. However, the facility is not equipped to burn used oil from other sources in the community.

In Ouzinkie used oil is collected at the household hazardous waste collection facility, however, no permanent transportation and recycling disposal scheme is defined.

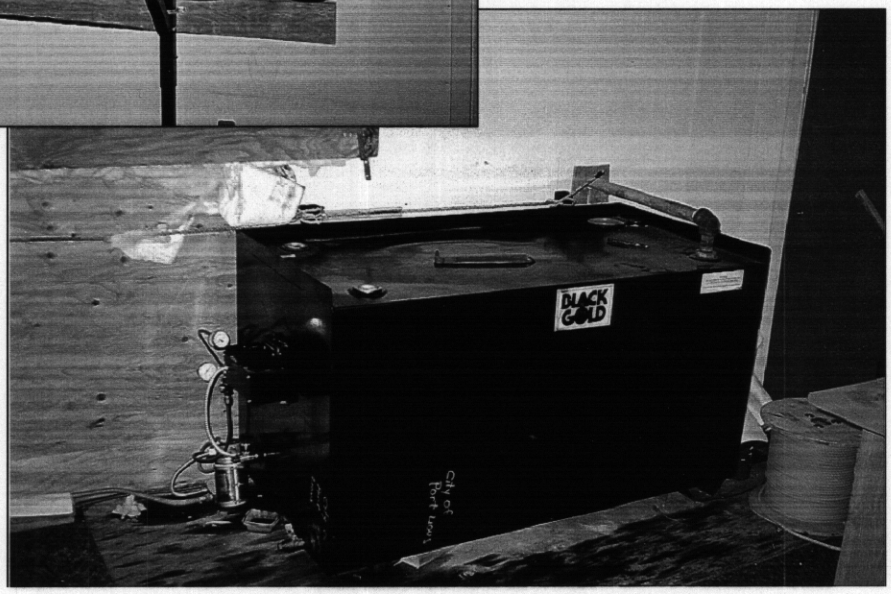
In Karluk and Old Harbor, used oil from the electric generators, is collected and stored at the generator in drums indefinitely. Old Harbor has recently installed an used oil burner, but it is not yet operational. (See photos titled Accumulation of Used Oil).

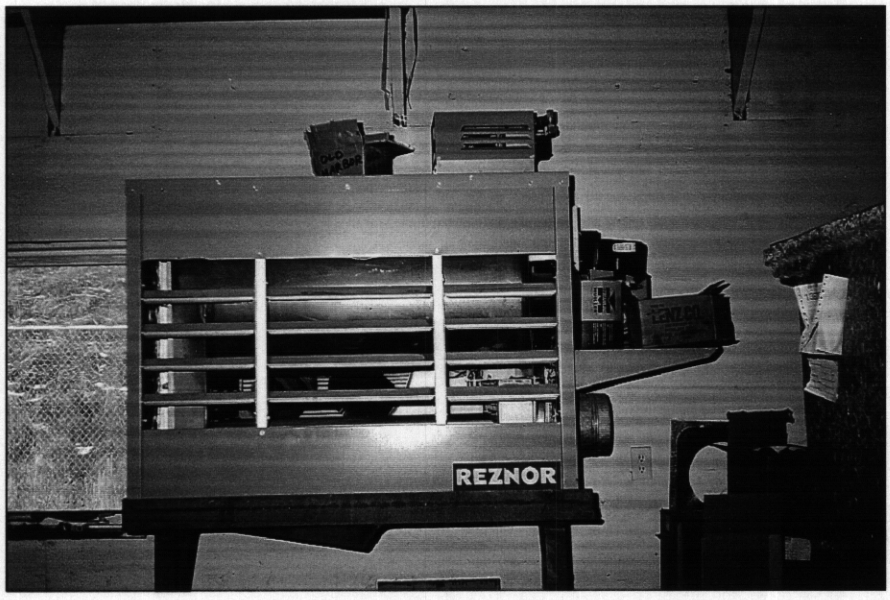
Used oil and other petroleum products have been identified in this report as a high priority waste management issue. However, if collected, existing facilities in all communities are inadequate to collect, store and recycle/dispose of the collected materials. Because there has not been adequate petroleum collection and disposal facilities, none of the communities has been urging residents to bring the petroleum products to a centralized facility for management, so along with capital improvements, an educational program would be needed in each community to change existing habits.

Used Oil Burners



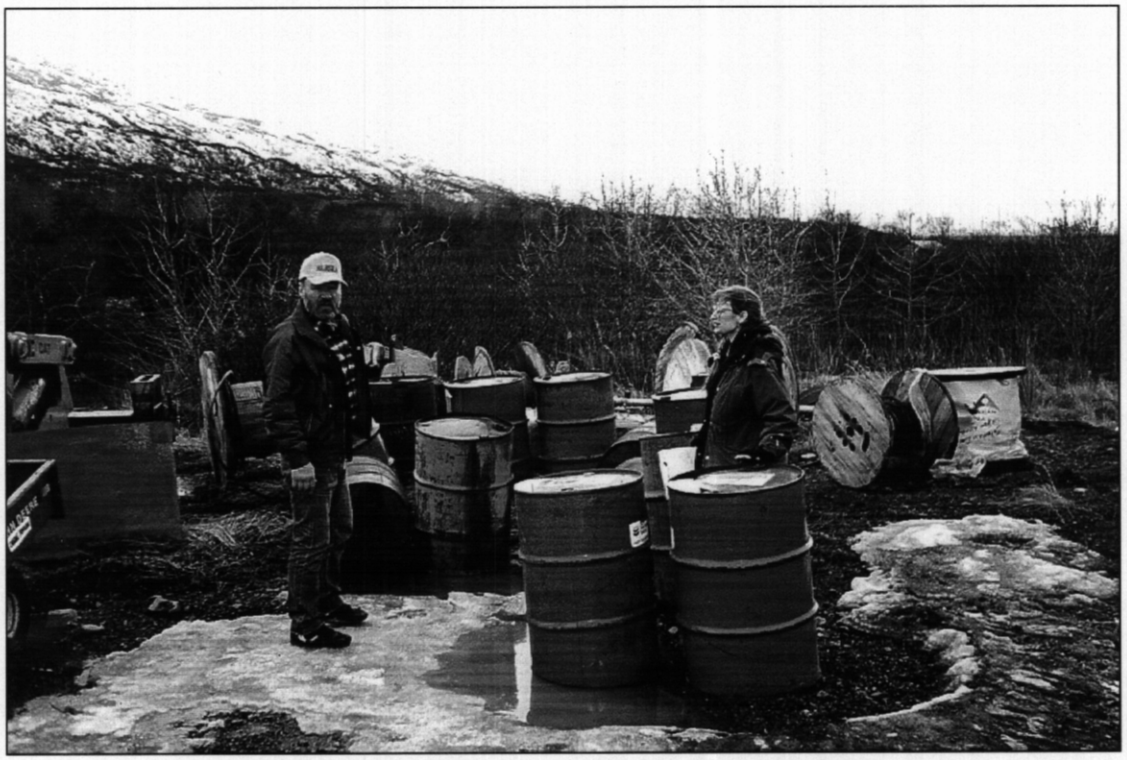
Used oil burner in Port Lions works well, but is labor intensive. More used oil is generated than is burned in the unit.



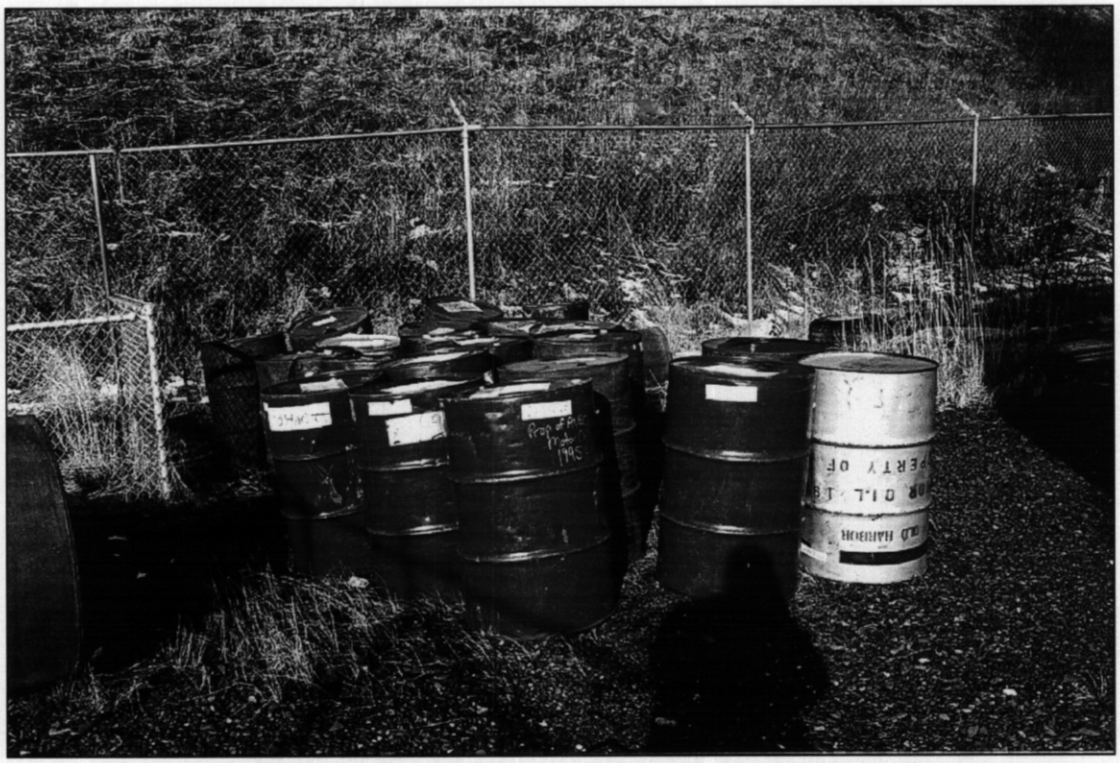


Used oil burner in Old Harbor ready for installation.

Accumulation of Used Oil



Larsen Bay's used oil accumulated in drums indefinitely.



Drums of used oil destined for energy recovery in the new used oil burner in Old Harbor.

6.4.2 Household Hazardous Waste Collection Systems

One community, Ouzinkie, has a household hazardous waste collection facility, a drop-off area located at the dump, for used oil and other household hazardous wastes. The facility consists of an outside dirt staging area and a covered shed constructed under a tight budget using scavenged materials. Both areas are clearly marked and within the fenced dump area. (See photos titled Used Oil and Household Hazardous Waste Collection). Drop-off can be made at any time. The shed floor is lined with an impermeable HDPE liner and a fish tote is staged on the liner to hold lead acid batteries prior to disposal. Welding gases were also stored in the facility. Facility capabilities are disseminated by word of mouth and few wastes were in storage at the time of the site visit. Transportation and disposal of wastes are arranged on a case-by-case basis, which is very labor-intensive. Evaluating transportation and recycling/disposal alternatives and developing standard procedures and contracts would ease the administrative burden of the facility. Facility capacity is limited and would probably require roof repairs and expansion, if a higher volume of community household hazardous wastes were directed to the facility.

Part of the 1995 Americorp program in Akhiok was collection of the lead acid batteries and indefinite storage in a fish tote. Currently, methods for transportation and recycling/disposal of the batteries is undefined.

As shown on Table 6-3, no other communities currently have hazardous waste collection facilities.

Hazardous wastes, especially petroleum products, lead acid batteries, antifreeze and chlorinated solvents, have been identified as high or medium-high priorities for waste management. However, facilities are non-existent or too small to handle the anticipated quantities and would require upgrade prior to instituting a collection program. The Ouzinkie household hazardous waste collection facility is a starting point for facilities in other communities. Similar to used oil, hazardous waste management has an operational as well as facilities component. Members of the community are not used to having centralized facilities for collection and disposal of hazardous wastes, so an educational program will be a key part of the success of any facility. Various alternatives for collection and recycle/disposal will be identified and evaluated in the next report.

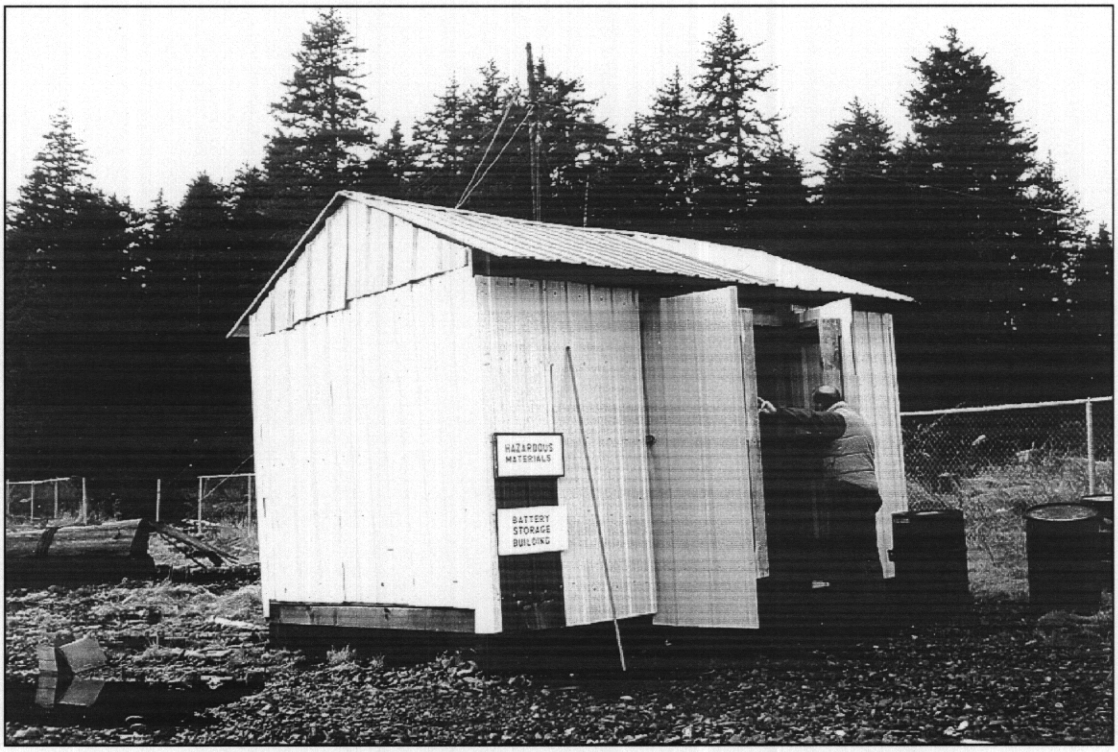
6.5 Wastewater Treatment

In almost every home, wastewater flows by gravity to one or more septic tanks and then flows to an ocean outfall. Table 6-4 summarizes the wastewater treatment by community.

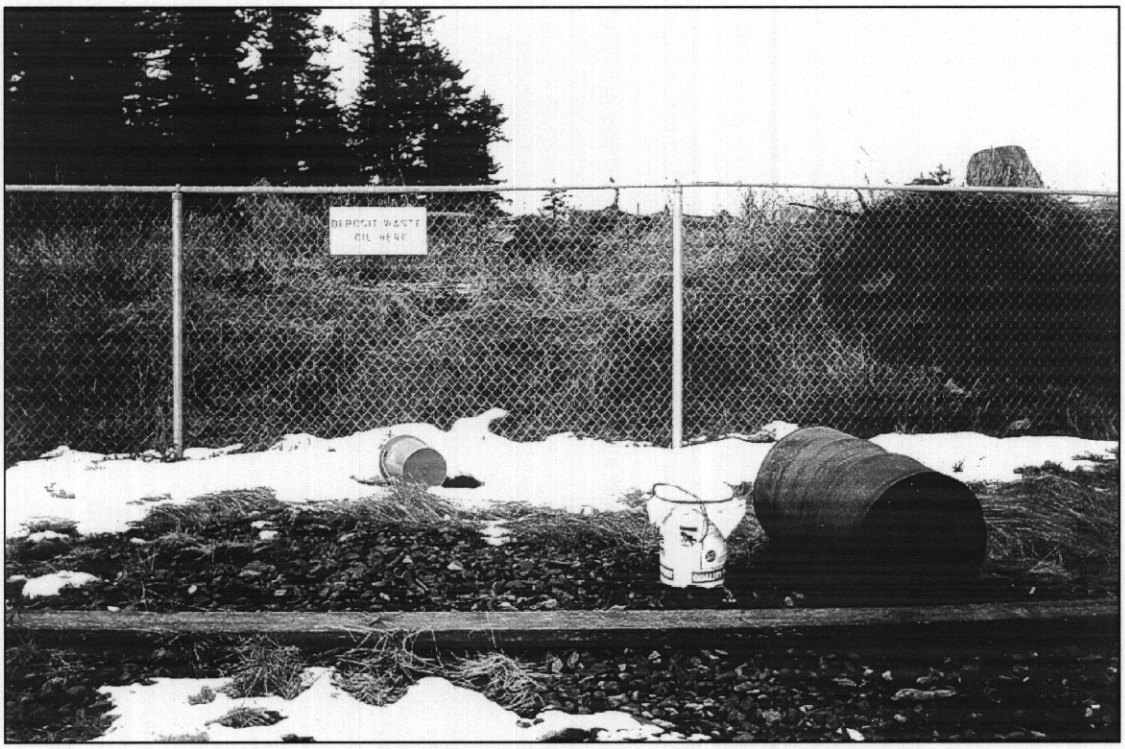
Table 6-4
Wastewater Treatment by Community

	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Collection							
Wastewater Volume (gallons / day) (Based on 100 gallons per person per day)	6,200	9,200	7,000	22,400	27,000	22,700	28,300
Septic tanks							
Number	3	30 ±	2	12 ±	2	25 ±	4
Total Volume (gal)	13,000 ±	3,000 ±	10,000	14,000 ±	14,000	45,000	60,000
Ocean Outfalls							
Number	1	none known	none	2	1	12	1
Length (feet)	2,050			unknown	1,100	varies	2000
Comments							
	Wastewater overflows on ground	Individual septic systems with drainfields	Wastewater overflows on ground; wastewater lagoon unused	Cannery has Wastewater package plant	Also has percolating lagoon	3 outfalls will be re-routed for breakwater	Lift station to force main across Settler Cove, then gravity outfall

Used Oil and Household Hazardous Waste Collection



Household hazardous waste collection shed at Ouzinkie Landfill.



Underutilized waste oil collection area at Ouzinkie Landfill.

Akhiok. The wastewater collection system flows into three separate septic tanks which each empty into 6-inch PVC lines. These lines join in the bay and are connected to a 2050 foot long, 6-inch polyethylene ocean outfall.

Manhole 7 by the middle septic tank was observed overflowing and manhole 9 by the septic tank on the east side of town is reported to overflow periodically, exposing the public to raw sewage. The overflow is located in the center of town and on the beach where residents traditionally clean and split fish. Dogs walk through the wastewater and track it into homes. There is one known hepatitis B carrier in town, which exacerbates the health concerns associated with exposure to raw sewage. Eliminating raw sewage overflow onto the ground is a high priority issue.

Some residents typically leave water flowing to prevent the water pipes from freezing. During the site visit, the flow rate in a single house was observed at 0.6 gallons/minute or 600 gallons per day. Assuming similar flow rates from 10 other residences, this results in an added load on the septic system of 6000 gallons per day, which could contribute to the overflows observed. As discussed in the section on water supply, this practice should be evaluated with a view toward eliminating it. Possibly the water pipe insulation should be improved as a way to reduce the load on the water supply and wastewater systems.

Operation and maintenance support is needed.

Chiniak. Most of the homes in Chiniak have on-site septic systems with a septic tank followed by a drainfield.

The school has a 1,500 gallon septic tank and drainfield of about 1,000 square feet. The system reportedly backed up into the school a couple of years ago. The septic tank was then pumped for the first time in 11 years. In order to maintain the proper functioning of the system it is important to pump the septic tank every other year.

With on-site systems, home owners have to take responsibility for their own systems. Community members should be informed and encouraged to have their septic tanks pumped every other year. This practice will help increase the life of their drainfield.

Karluk. The sewer system consists of a collector that runs from east to west and five branches that run from south to north. The sewer goes to a pair of septic tanks with a combined volume of approximately 10,000 gallons and then to a "dosing" tank that is supposed to serve as a lift station. In about 1989, a pump and 1,700 feet of 4-inch polyethylene pipe were installed and a wastewater lagoon was constructed. Although the pump has been replaced more than once,

the lift station/force main/sewage lagoon disposal system has reportedly never worked for an extended period of time.

Currently the septic tanks and dosing tank are full and the wastewater overflows from manhole MH-1 and runs across the surface of the ground, exposing the public to raw sewage and the health hazards associated with it.

Based on the volume of the septic tanks and the assumed water usage rate of 100 gallons per person per day there is the potential for more than one day of retention time in the septic tanks. This potential, however, will not be realized until the wastewater flows through the septic tanks and the effluent is disposed of in some manner.

It is a high priority that sewage not flow on the ground. Operation and maintenance support, including the identification of a person who will have responsibility for the wastewater system is needed.

Larsen Bay. There are at least two ocean outfalls for septic tank effluent in the community. Outfall #1 handles the wastewater from C Street and the area to the east. There are two septic tanks on the sewer lines served by the outfall. Outfall #2 handles the wastewater from two branches of sewer lines and serves D, F, and G Streets, including the school and community buildings. There are 7 septic tanks on these lines.

The septic tanks are reportedly pumped every other year and the septage is discharged into Larsen Bay from the point of land near First and B Streets.

There was a report of wastewater smell from the beach near First and B Streets on hot summer days. This is the location of outfall #1 but no visible evidence of leakage or overflow was observed. The beach is about 300 feet from the nearest septic tanks so it is unlikely that the odor originated at the tanks. This should be investigated during the summer or whenever the odor is detected.

Although we do not have enough information to make a meaningful evaluation of the effectiveness of wastewater treatment, wastewater collection and disposal appears to function successfully. The organic load of the community wastewater system is probably small relative to the organic load of the cannery when the cannery is operating.

Old Harbor. There are two separate wastewater systems in Old Harbor, one serving the old town area, and one serving midtown and new town. The old town system consists of wastewater collection lines, a pair of septic tanks with a combined volume of approximately 14,000 gallons, and an 1,100 foot ocean outfall made of 6-inch ductile iron.

The volume of the septic tanks is enough to provide more than one day of residence time for the wastewater, assuming water usage of 100 gallons per person per day.

The system serving the midtown and new town areas consists of gravity sewers that empty into a two-cell lagoon. The wastewater seeps into the floor of the first cell of the lagoon and does not build up enough to cover the floor. The second cell is dry. The lagoon was built in 1979 and an apparent problem with the application of the clay lining has resulted in the wastewater continuing to drain into the underlying silty gravel. The lagoon is located about 100 feet from the shore of Sitkalidak Strait with the bottom of the lagoon at about the same elevation as mean high water. No odor was detected along the beach nor in a small hole dug in the beach.

The system appears to be well-maintained. Although the wastewater lagoon does not provide the treatment for which it was designed, it does function like an absorption field. Because the wastewater percolates into the ground, the major maintenance item of a lagoon, the annual discharge of partially treated wastewater, is not needed.

Ouzinkie. There are 12 ocean outfalls and they vary from "sewer system I" which serves a single 500 gallon septic tank to "sewer system K" which serves a series of two 3,000 gallon and two 5,000 gallon tanks. Public Health Service records indicate that all of the outfalls are made of 6-inch polyethylene.

The total volume of septic tanks is about 45,000 gallons. At the assumed wastewater flow rate of 100 gallons per person per day and the assumed population equivalent of 228 persons, the average detention time of the wastewater in the septic tanks is almost two days. This is a very general analysis but it does suggest that that the community has adequate septic tank capacity to provide the one day detention time recommended by standard practice.

The sludge disposal pit, located at the landfill site, is not working the way it was envisioned when designed. When observed in February, rain water from the solid waste disposal trench was flowing into the sludge disposal pit and overflowing at the east corner.

The Army Corps of Engineers is planning a breakwater on the east side of the harbor. As part of the project, planned to be constructed during the summer of 1997, 3 of the ocean outfalls will be intercepted and routed to the outside of the proposed breakwater.

At one house raw sewage is discharged directly to the ground and is accessible to the public. Hooks-ups to the public system are available to the house. Hooking up the system and eliminating the raw sewage is a high priority item.

Port Lions. Wastewater from the main part of the community flows by gravity to two septic tanks with a combined capacity of 50,000 gallons. A lift station pumps the effluent through a 2,700 foot long, 4-inch force main across Settler Cove to a pair of 5,000 gallon septic tanks at Port Wakefield. Wastewater from the homes in Port Wakefield also flows into these tanks. From there, the effluent flows by gravity through the 2,000 foot long, 6-inch polyethylene outfall into Kizhayuk Bay.

There may be one or more individual systems that discharge septic tank effluent into Settler Cove.

Some of the sewer lines in the main part of town were replaced during the summer of 1996.

The total volume of septic tanks in the community system is about 60,000 gallons. At the assumed wastewater flow of 100 gallons per person per day and the assumed population of 278, the average detention time of the wastewater in septic tanks is greater than two days.

This system appeared to be one of the best maintained. Along with continued support for the operation and maintenance effort, the next step for Port Lions should be a site for sludge disposal, possibly at the new landfill.

When a wastewater system is not working it affects everyone in the community, and on Kodiak it also affects the marine environment and its food resources. Although the specific problems vary from system to system, the recommended action is:

- ❑ Identify operators who will be responsible for their systems
- ❑ Train them to do their job
- ❑ Pay them enough to keep them on the job
- ❑ Provide them with tools, dedicated to their operator responsibilities
- ❑ Provide them with equipment and spare parts to operate and maintain their systems
- ❑ Provide technical assistance
- ❑ Educate the community, perhaps through the schools, as to the important role of the system operators.

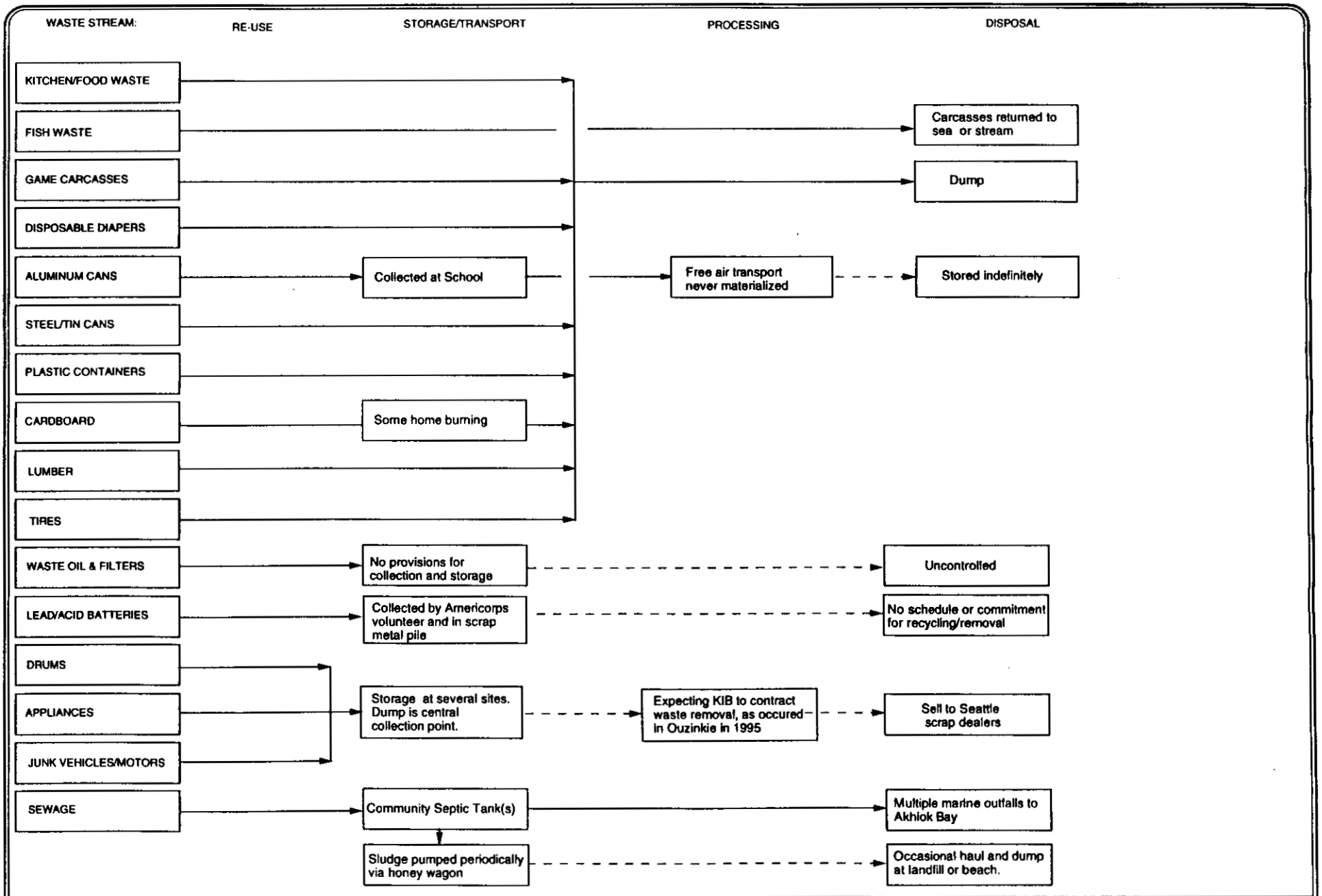
Section 7.0
SYSTEMATIC WASTE MANAGEMENT ISSUES

7. SYSTEMATIC WASTE MANAGEMENT ISSUES

Typically we tend to think of waste as only two types of materials: garbage is solid and sewage is liquid. Actually, the waste that is produced by rural communities is composed of a variety of materials. Each material offers different opportunities for processing and treatment or disposal. By classifying wastes into categories of materials, we can identify ways to segregate or group materials so that costs for processing and disposal are reduced, and that communities can be improved. The charts that follow show how each Kodiak Island community processes each waste. In some cases, the system is incomplete, there is currently no endpoint for disposal and/or re-use of some items. By comparing the charts, it can be seen that the rural communities share some of the same systematic weaknesses. These shared systematic problems can be viewed as opportunities for collaborative efforts among several communities for problem solving.

7.1 Operations and Maintenance

Waste management systems require a considerable amount of attention for consistent system operations. There needs to be a thorough understanding of system functions, with diligence on the part of the community to ensure that the system operates effectively. The community may appoint an individual for some of the technical aspects of systems operations, but the community as a whole must support the operations and maintenance functions. This means that the resources of the community must be dedicated to this purpose.


WASTE STREAM:
RE-USE
STORAGE/TRANSPORT
PROCESSING
DISPOSAL
KITCHEN/FOOD WASTE
FISH WASTE
GAME CARCASSES
DISPOSABLE DIAPERS
ALUMINUM CANS
STEEL/TIN CANS
PLASTIC CONTAINERS
CARDBOARD
LUMBER
TIRES
WASTE OIL & FILTERS
LEAD/ACID BATTERIES
DRUMS
APPLIANCES
JUNK VEHICLES/MOTORS
SEWAGE
Collected at School
Some home burning
No provisions for collection and storage
Collected by Americorps volunteer and in scrap metal pile
Storage at several sites. Dump is central collection point.
Community Septic Tank(s)
Sludge pumped periodically via honey wagon
Free air transport never materialized
Expecting KIB to contract waste removal, as occured in Ouzinkie in 1995
Carcasses returned to sea or stream
Dump
Stored indefinitely
Uncontrolled
No schedule or commitment for recycling/removal
Sell to Seattle scrap dealers
Multiple marine outfalls to Akhiok Bay
Occasional haul and dump at landfill or beach.
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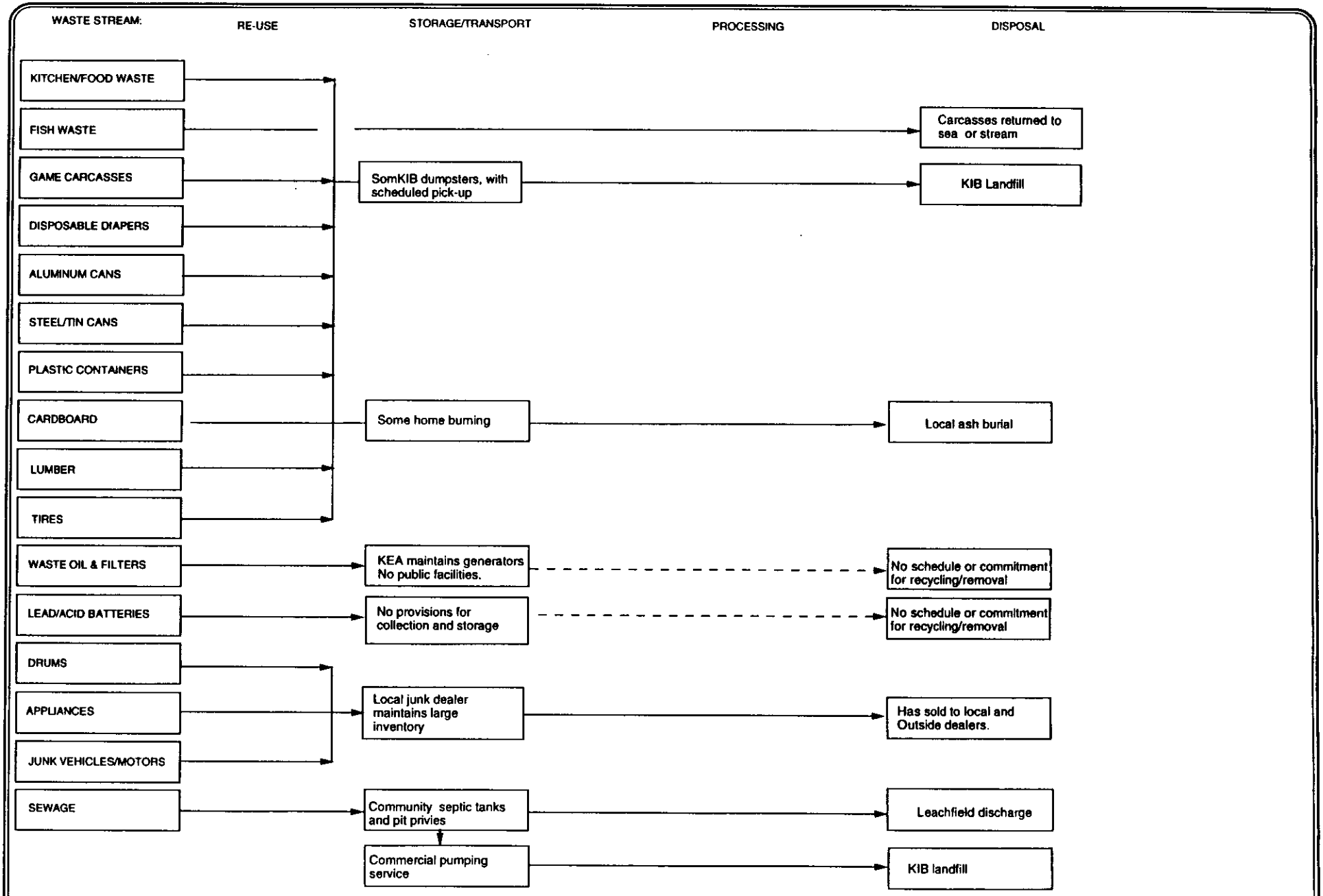
February 1997
Kodiak Island Borough
Master Plan for Waste Management for Rural Coastal Communities
Figure 8:
Existing Waste Management System for
AKHIOK


WASTE STREAM:
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LUMBER
TIRES
WASTE OIL & FILTERS
LEAD/ACID BATTERIES
DRUMS
APPLIANCES
JUNK VEHICLES/MOTORS
SEWAGE
Carcasses returned to sea or stream
SomKIB dumpsters, with scheduled pick-up
KIB Landfill
Some home burning
Local ash burial
KEA maintains generators No public facilities.
No schedule or commitment for recycling/removal
No provisions for collection and storage
No schedule or commitment for recycling/removal
Local junk dealer maintains large inventory
Has sold to local and Outside dealers.
Community septic tanks and pit privies
Leachfield discharge
Commercial pumping service
KIB landfill
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Figure 9:
Existing Waste Management System for
CHINIAK

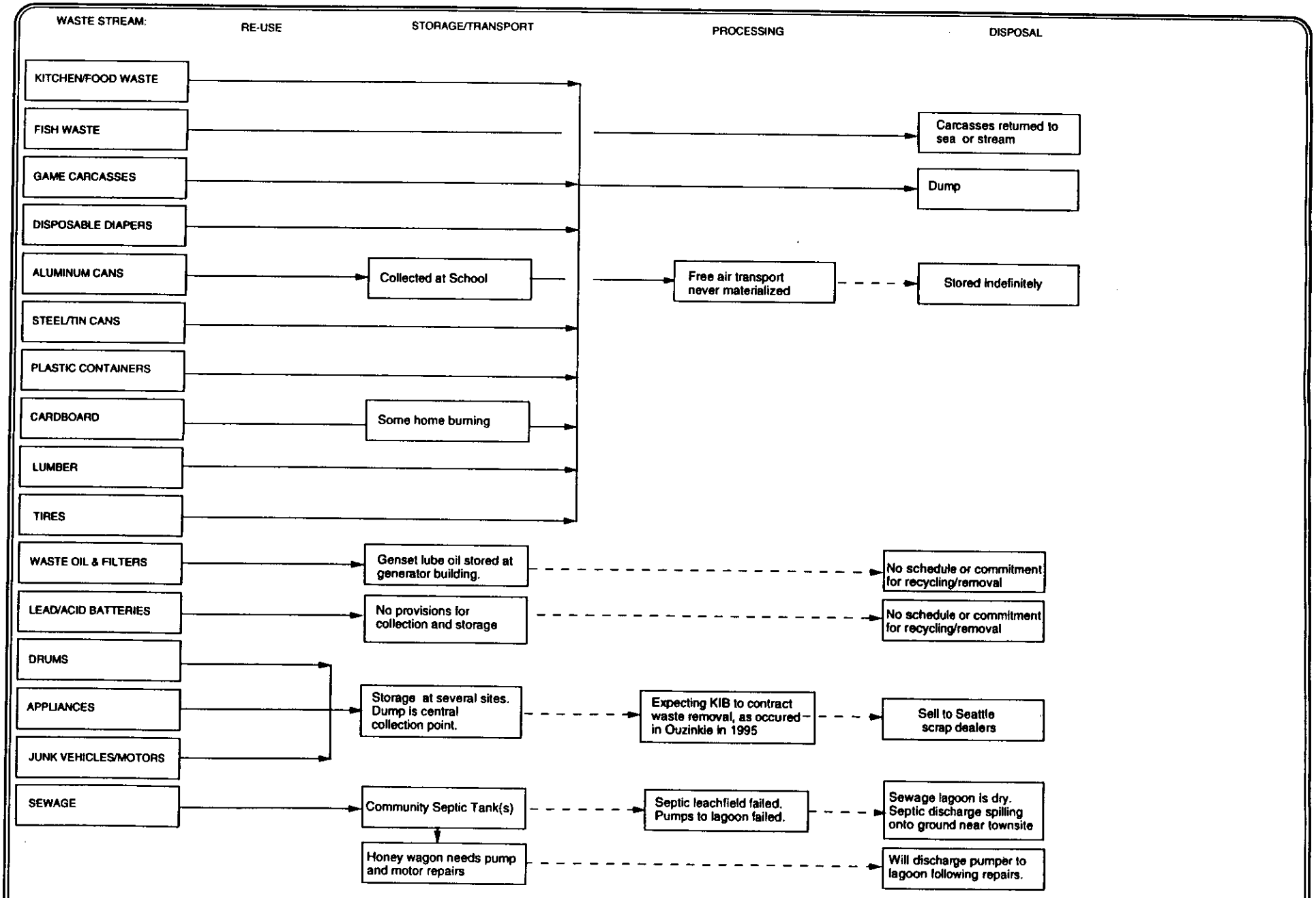

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Figure 10: Existing Waste Management System for KARLUK

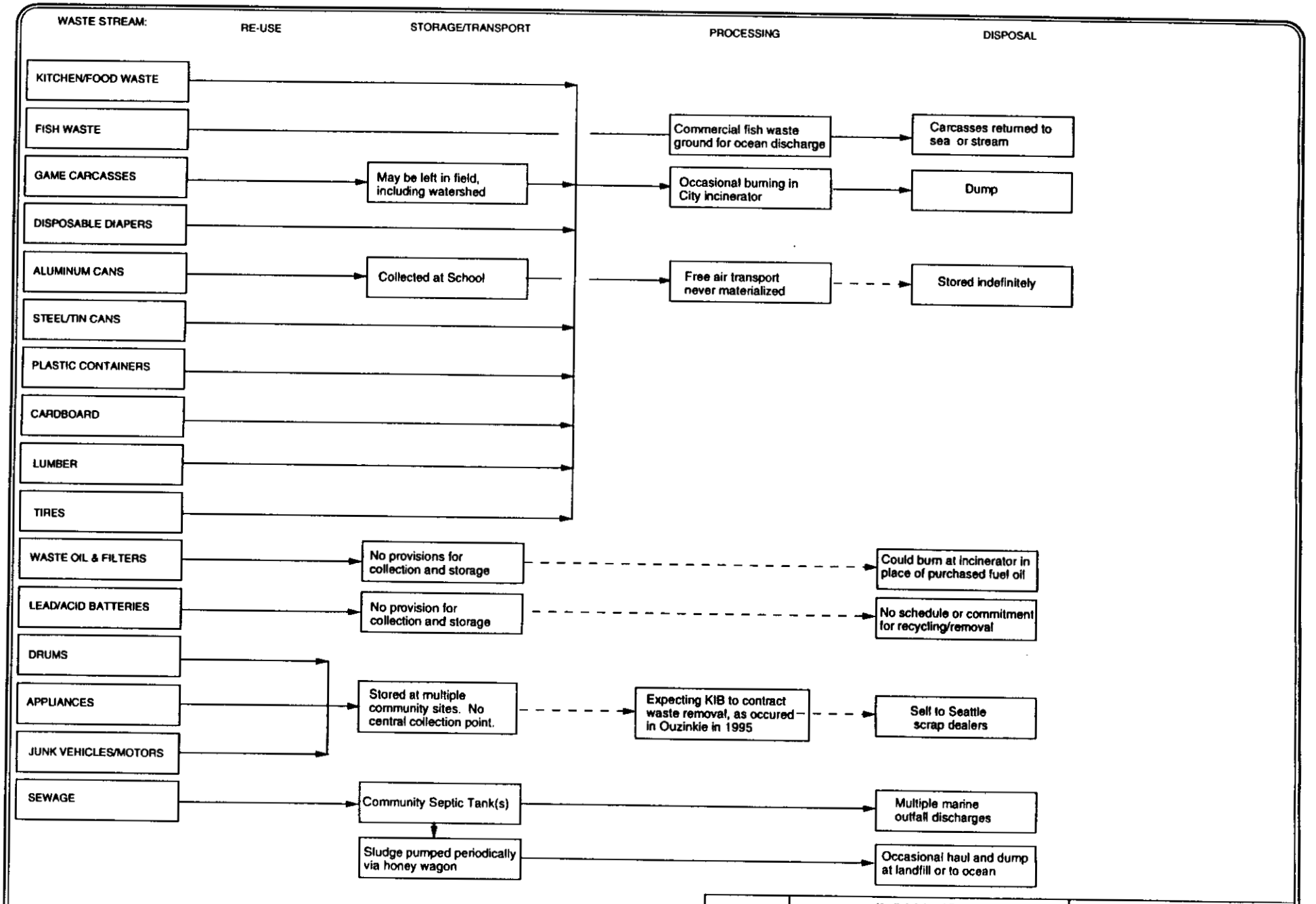

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Figure 11: Existing Waste Management System for LARSEN BAY

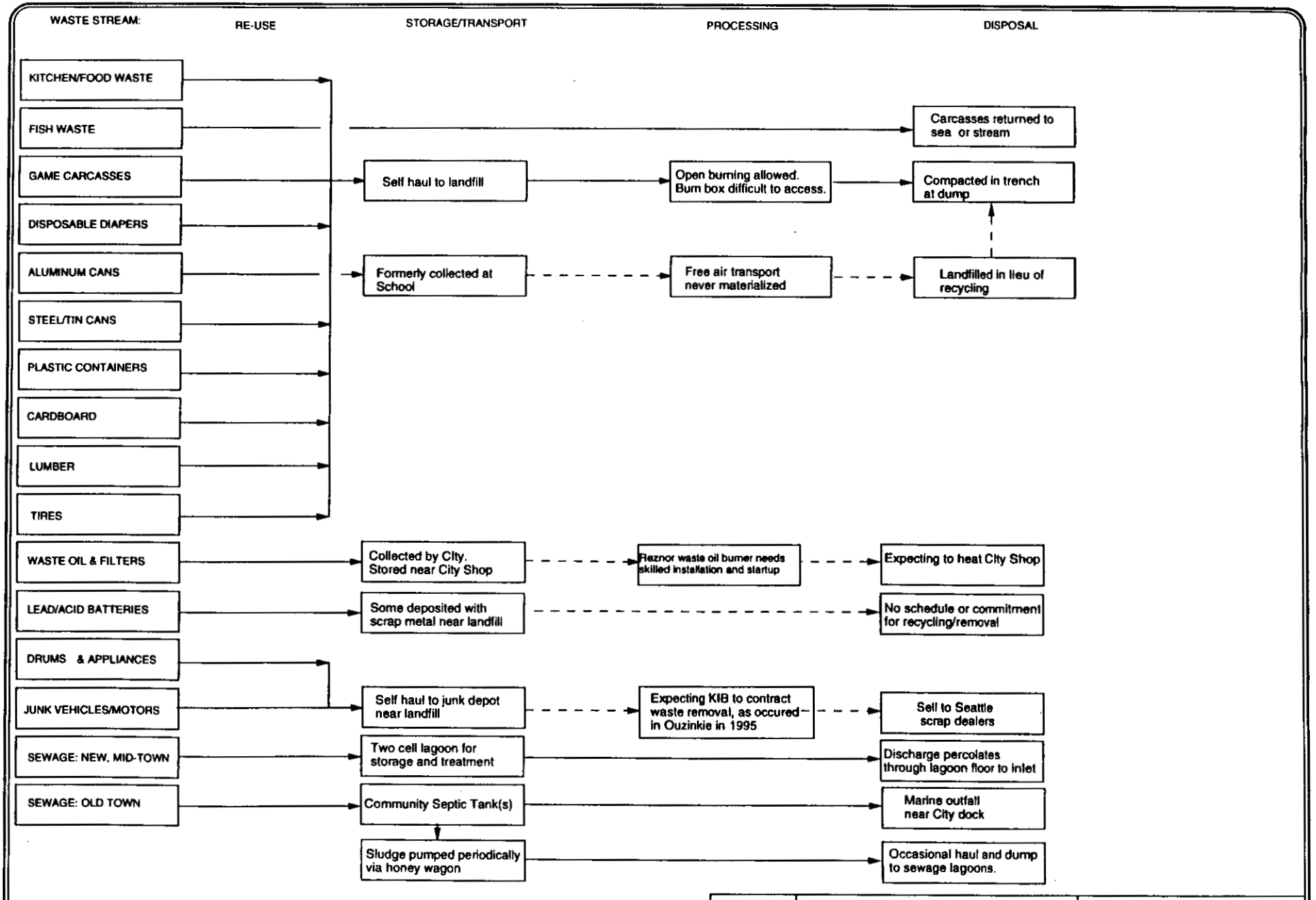

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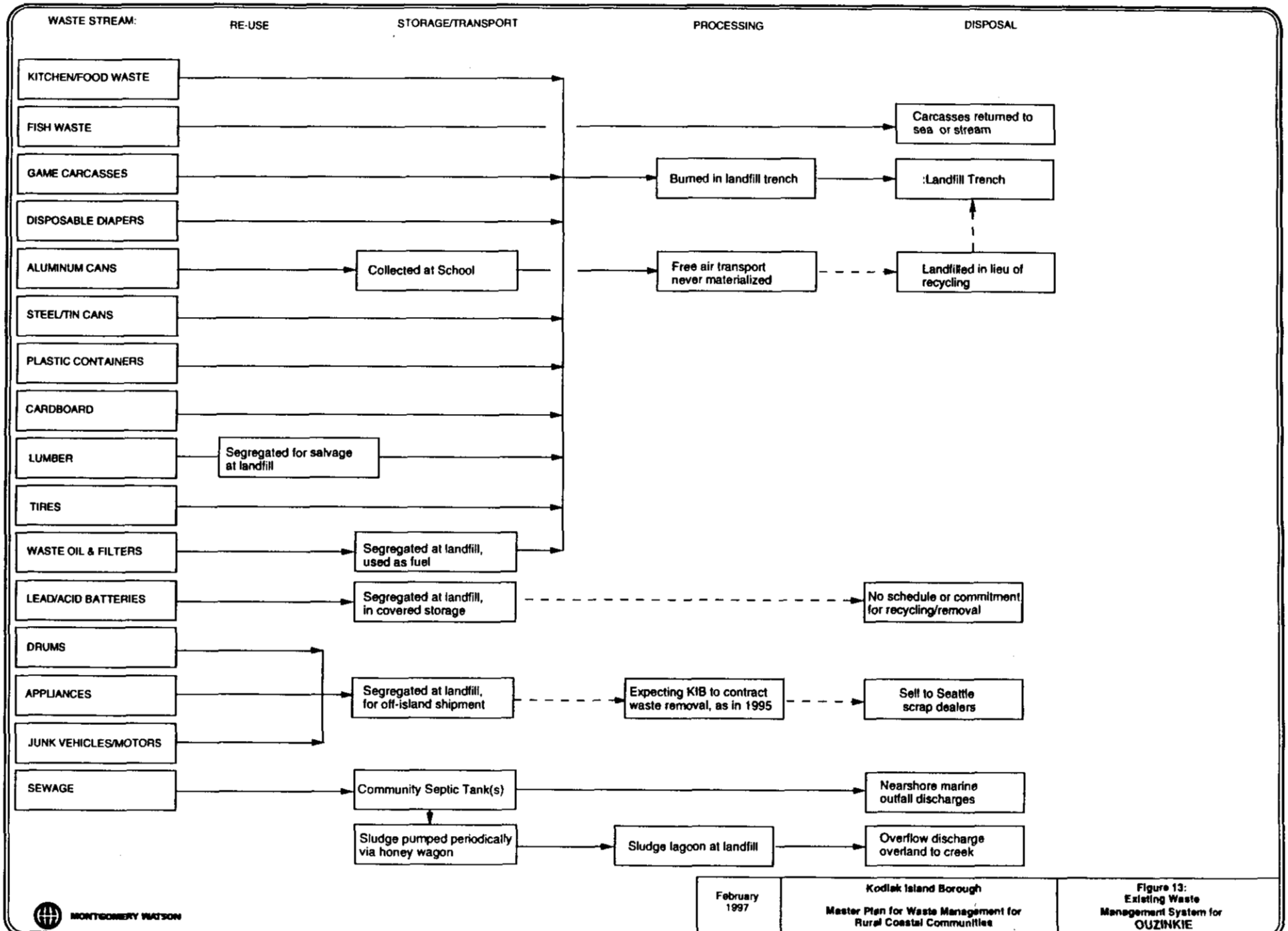
Figure 12: Existing Waste Management System for OLD HARBOR


WASTE STREAM:
RE-USE
STORAGE/TRANSPORT
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KITCHEN/FOOD WASTE
FISH WASTE
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ALUMINUM CANS
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PLASTIC CONTAINERS
CARDBOARD
LUMBER
TIRES
WASTE OIL & FILTERS
LEAD/ACID BATTERIES
DRUMS
APPLIANCES
JUNK VEHICLES/MOTORS
SEWAGE
Collected at School
Segregated for salvage at landfill
Segregated at landfill, used as fuel
Segregated at landfill, in covered storage
Segregated at landfill, for off-island shipment
Community Septic Tank(s)
Sludge pumped periodically via honey wagon
Carcasses returned to sea or stream
Burned in landfill trench
:Landfill Trench
Free air transport never materialized
Landfilled in lieu of recycling
No schedule or commitment for recycling/removal
Expecting KIB to contract waste removal, as in 1995
Sell to Seattle scrap dealers
Nearshore marine outfall discharges
Sludge lagoon at landfill
Overflow discharge overland to creek
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Figure 13:
Existing Waste Management System for
OUZINKIE

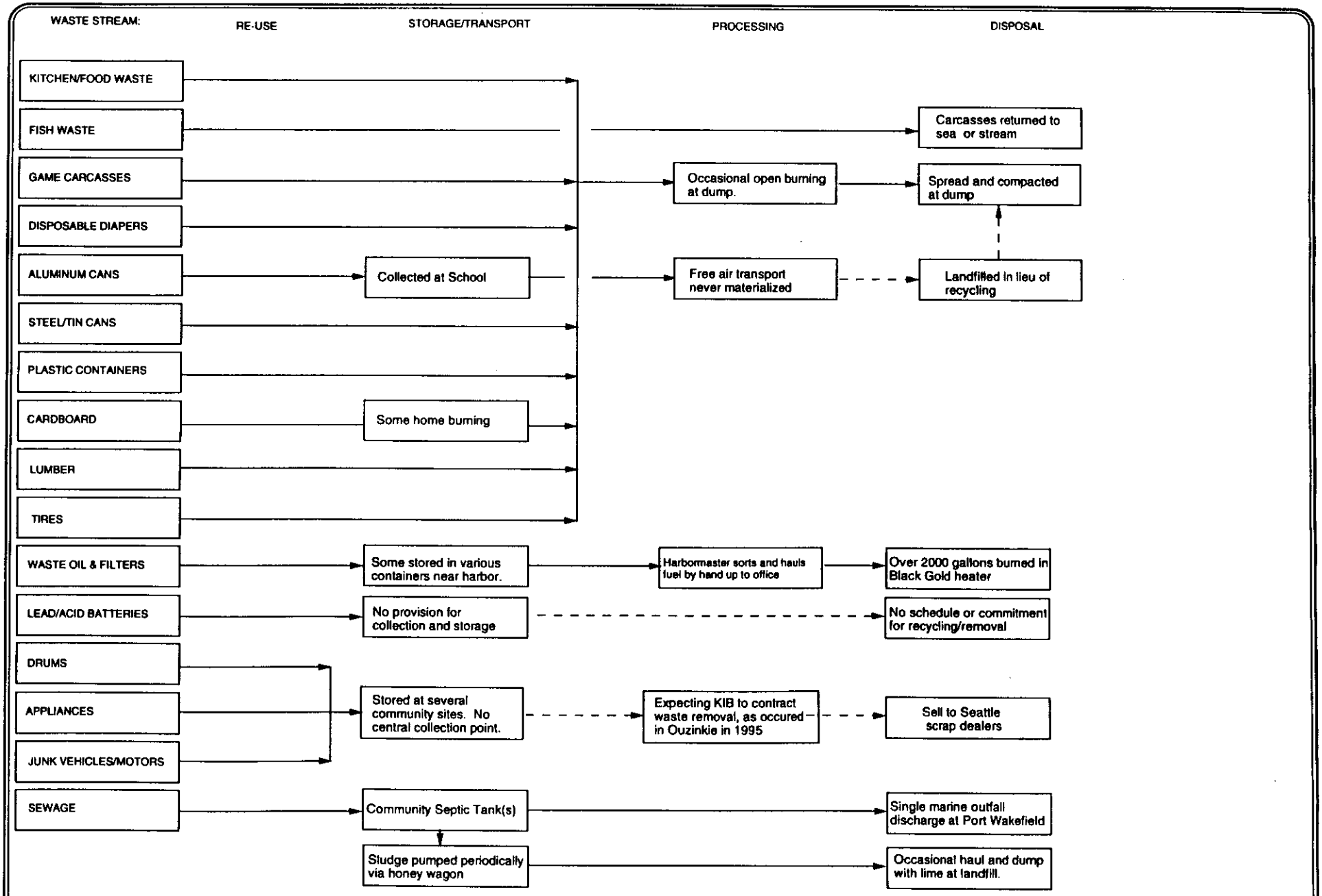

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Figure 14:
Existing Waste Management System for
PORT LIONS

7.1.1 Constraints on Rural Operations and Maintenance.

Presently there are several limitations to adequate operations and maintenance. Frequently systems rely on one individual for expertise in certain operations. Without proper training, that individual may make inappropriate or inconsistent decisions regarding site management. Moreover, when that person becomes unavailable, no one is able to stand in and provide the equivalent service. There should be at least two individuals who are trained appropriately and tasked with the responsibility for site management according to well specified standards. For critical systems, the back-up operator must have practice on a regular basis to keep up his level of understanding and commitment to the system operation. (See Photos titled Operations and Maintenance).

Procedures for operations and maintenance should be fully documented and retained in an accessible place to provide assurance for the primary operator, and to guide the back-up operator when necessary. This is particularly true for procedures that take place infrequently, when there is potential for new people to take over the operation, or the main operator is not practiced. Checklist style directions are very useful, and can be posted close to the operations.

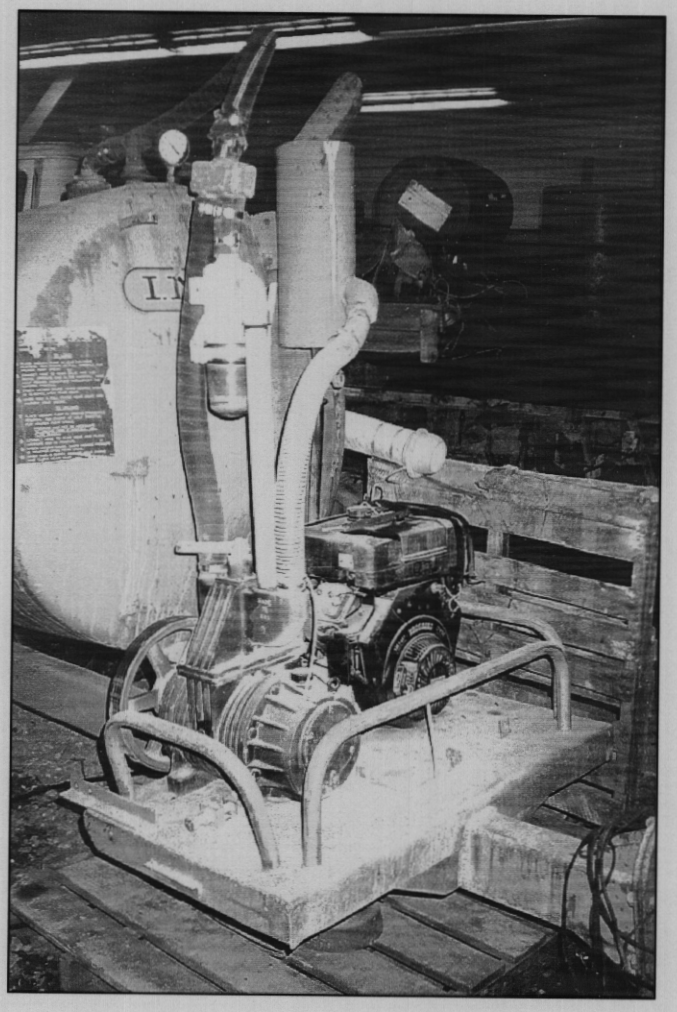
Tools and spare parts are a special concern in the remote communities. Where there is no convenient access to supplies, the simplest repair can take weeks if appropriate equipment and parts are not on hand. Furthermore, training specific to the maintenance of the systems is required. The remote operator must be able to troubleshoot mechanical equipment and make repairs independently. Again, detailed checklist documentation can assist in undertaking these activities.

7.1.2 Basic Maintenance Requirements

The following presents a brief overview of the tasks and responsibilities that are required for basic maintenance of waste management systems.

Solid Waste Collection. Maintain collection vehicle. Insure that solid waste containers are adequate and secure from wind, weather, and animals.

Operation and Maintenance



The septic tank pump equipment in Old Harbor is stored in the City Garage. Many pieces and parts are needed for proper functioning.

Systems require personnel and equipment for operation and maintenance.

Water system operators require training and deserve the support of the community (Akhiok).

Landfill. Keep fence in good condition. Pick-up trash that has blown away from working face. Keep trash contained to one area. Minimize the area of exposed "working face" of the trash. Maintain an adequate stockpile of earthen cover material. Keep the landfill heavy equipment in good operating order: lubricate hydraulics drive train frequently. Compact trash with heavy equipment by making several passes with a track loader or dozer each time that material is added. Cover the trash with 6 inches of earthen material every working day. Prevent impoundment of water anywhere on site. Keep a minimum of 5% slope on the ground surface, directing drainage away from the working face. Understand the operating fill plan and stay with it.

If a burn box is in use at the landfill, provide access to make it easy for people to get garbage into the box. Always remove ash to the landfill working face when the depth of accumulated ash exceeds 6 inches depth, or otherwise impedes the burner operation. Prevent spilling of fuel or waste oil outside of the burn box.

Sewer System. Establish a regular schedule for pumping of septic tanks - don't wait until the system backs up. Annual pumping every spring might be simpler and easier to document than pumping every other year. Insert suction hose to bottom of tank to maximize removal of solids. Be sure to wash down the pumper truck completely upon completion of the operation.

Waste Oil. Keep all the village waste oil together in one designated location. Store in drums or buckets in a safe and weatherproof site. Ensure that bungs on drums and lids on buckets are on tight for storage and/or movement of waste oil. The site for storage and handlings should have an impermeable lining of asphalt, concrete, or heavy duty plastic membrane. Keep a supply of adsorbent pads available near the worksite. Use adsorbent pads in conjunction wherever you undertake operations transferring oil between containers.

Fuel Storage and Delivery. Keep a supply of adsorbent pads available whenever you are transferring fuel or making connections with fuel lines.

7.1.3 Training Opportunities

Training for waste management is available through a variety of sources. KANA has been responsible for a series of workshops for utility operators and managers. Together with the KIB, KANA has provided demonstrations for members of the Kodiak Island Village Environmental Council. The Kodiak Island Village Utility Council was formed in part to provide technical guidance for critical water system maintenance. This entity does not presently have authority for waste management training, however.

Several statewide organizations provide significant opportunities. The Alaska Section of the Solid Waste Association of North America (SWANA) provides workshops on an annual basis to demonstrate all aspects of landfill operations. A certification program is available through SWANA for landfill managers and operators. The Alaska Water and Wastewater Management Association provides training for water and wastewater

operators. Public Health Service provides training programs for water plant operators, with grant funding tied to long term application of the training program for villages.

Few of the waste management staff operating in the villages are trained professionally. Some are not even paid for their service. Short duration training sessions in Kodiak or Anchorage could certainly be useful as well as economical to pursue. The potential for follow-up is limited, however, and there is little supervision or oversight of the trained staff once back in the village.

In addition to the need for trained staff people, there is an unfulfilled need for preparing young people for rural waste management as citizens and as future technical staff for the communities. Few young people understand the relationships between their own actions in the community and the impacts on waste management. For example, while every kid knows how to turn on and off the lights, few recognize that the use of diesel generators not only burns large volumes of fossil fuels, but also creates a steady supply of waste oil which must be processed and disposed of every 250 hours (12 days). Young people need to have mentors in the community who can teach technical waste management skills while developing values that are essential to self-reliance in modern rural Alaska.

7.1.4 Funding Needs

A variety of funding sources exist for capital investments for waste management system enhancements. We intend to identify these sources and pursue capital funding for particular projects as part of the later phases of this master planning effort. However, we are concerned that fulfilling the capital improvement funding needs alone will not be sufficient to ensure effective waste management. Rather, the most important hope for effective waste management lies in developing a commitment to sustainable operations at both the community and regional level.

This means that either existing financial resources available within the communities must be re-distributed to provided for secure waste management funding, or economic development must proceed at a rate of growth that can support waste management operations at an increased level over existing practices.

7.2 Transportation

The existing transportation infrastructure is sufficient to handle essentially all materials requiring removal from remote communities. For stockpiled/accumulated materials, the most efficient removal method will likely be marine-based. Since each community appears to have multiple marine operators providing service, the competitive procurement of marine transportation should not be difficult. Once stockpiles are removed, a broader range of backhaul arrangements should be suitable for materials generated on an on-going basis. For example, when drums of fuel are flown via charter to a remote village, it can be village policy to make sure that the same number of empty drums are returned on the same charter flight. Similar arrangements might be possible

for materials delivered via freighter or barge. The on-going backhaul of certain materials could reduce the need for relatively costly clean-up projects sponsored by the Borough.

For those materials that are not easily handled by regular backhaul (e.g., vehicles, equipment, appliances), periodic bulk transport may be more cost effective. Considering the limited quantities of scrap metal and some other materials, bulk shipments might be relatively infrequent - perhaps once every few years in some villages. Although some communities may prefer to ship materials more frequently, the need to obtain economies of scale may dictate less frequent shipments. The logistics of various options will be discussed in the ensuing report on Alternative Solutions and Funding Sources.

Section 8.0
SUMMARY AND CONCLUSIONS

8. SUMMARY AND CONCLUSIONS

The Montgomery Watson project team completed visits to each of the rural coastal communities on Kodiak Island and made as many contacts in each community as possible to ascertain existing waste management problems and uncover pollution issues potentially affecting marine resources. With assistance from many people, notably the participants in the Kodiak Island Village Environmental Council as well as City and Tribal Council staff, we conclude the following:

1. Raw sewage is being discharged onto the land and into surface waters in several communities. This is a result of poor system design and operation, and is creating an immediate health threat in the affected villages. The affected communities should place a high priority on correction of the conditions leading to the discharges.

2. Used oil from boats, diesel generators, and vehicles is accumulating in the villages with a high potential for improper disposal, including discharge to the marine environment. Use of waste oil for heating fuel and incineration of refuse has been attempted, but technical assistance for installation and operation of these systems is needed.

3. Improved waste management practices are needed for economic development. Clean air, clean water, and tidy solid waste management systems will help promote rural Kodiak as a destination for tourism and sport-fishing, and will assist in maintaining the marketability of commercial seafood.

4. Old fuel tanks present a potential hazard. Several communities have older fuel delivery and storage systems that do not provide for spill containment and response in accordance with modern standards. While there is no evidence that the tank systems are presently polluting soil or water, the proximity of fuel tanks to the water's edge at Old Harbor, for example, in conjunction with their age and upright orientation, suggests that contamination from a major fuel spill may be more likely than from other chronic sources.

5. Septage facilities and methods will have an impact on health and marine resources. Several villages use community septic tanks to remove solids from wastewater before discharging to the coastal waters. These tanks may fill with solids (septage) unless appropriately pumped every couple of years. Presently, septage receiving facilities are inadequate in all of the villages. If left without maintenance, the solids will overfill the septic tank and discharge raw sewage directly into the marine environment. Tidal flushing may carry away some of these wastes, masking the effect of the discharge. Harbor and breakwater construction, such as planned for Ouzinkie, may reduce the flushing effect of the tides, and concentrate contaminants to the extent that toxic effects may occur.

6. Scrap metal removal is recommended to prevent release of associated contaminants and build an environmental ethic. Junk vehicles, appliances, and heavy equipment harbor hydraulic fluid, petroleum hydrocarbons, and other fluids which pose a hazard for aquatic wildlife in the case of spills. Additionally, scrap metal lying uncontrolled on rights-of-way and public property can pose a hazard to children and visitors who might casually encounter the materials.

7. Household hazardous wastes should be kept out of village landfills. Batteries, solvents, paints, and other materials can lead to toxic contamination of surface and ground water. These materials should be collected in a central location and disposed of through a regional cooperative effort.

8. Watershed protection is important. Ouzinkie and Port Lions have established watershed protection zoning to prevent certain activities which could contaminate local water supplies. This process should be extended to other communities.

9. Operation and Maintenance training is needed for local village technical staffs. Few village residents have the technical training necessary to implement appropriate waste management practices. Landfill operations, waste oil management, and sewer system management could be topics for local workshops provided by committed regional experts.

10. Landfill operations planning can improve the function, longevity, and visual quality of disposal sites. Site specific documentation of how a system should be operated would provide a convenient instruction guide for landfill users and city staff. Operations planning could be used to prevent the development of water pollution, minimize the attraction of animals to the site, and encourage appropriate use of the site by residents and visitors.

11. Drainage control at landfills is needed to prevent leachate production. Upstream water sources should be diverted away from the landfill. Snowmelt and precipitation on the landfill should be drained off the site so that water does not come into contact with garbage.

12. The solution to bear encounters includes, but is not limited to, improved landfill operations. Incineration, improved grading, compaction, and cover placement will reduce attraction of bears. However, the long term presence of bears in the area, in addition to other attractions, such as fish processing at Larsen Bay, means that bears will not necessarily disappear solely as a result of changes to solid waste management.

13. Waste management activities need a sustainable source of funding. Short term grant-funded capital projects are not sufficient to provide for meaningful waste

management. Communities should consider means of addressing long term operations and maintenance costs.

14. Local responsibility is needed for successful waste management. Although state and federal regulations mandate certain standards for solid waste management, building and maintaining a successful program comes from the ongoing commitment of the community.

15. Raising Pollution Prevention awareness is key to promoting local responsibility. A tailored education program is needed to help build an environmental ethic for children, focusing on local self-reliance. Further community education can be developed for specific concerns by targeting segments of the population, such as harbor users for waste oil and battery recycling.

16. Recycling of consumer packaging materials to off-island sources is not likely to be financially self-supporting. However, programs such as school collection of aluminum cans for recycling through the statewide "Flying Cans" program does provide for building of an environmental ethic among school children, as well as provide some modest revenue.

Appendix A

STATE OF ALASKA

DEPARTMENT OF COMMUNITY AND REGIONAL AFFAIRS

DIVISION OF ENERGY

TONY KNOWLES, GOVERNOR

333 WEST FOURTH AVE., SUITE 220
ANCHORAGE, ALASKA 99501-2341
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March 22, 1997

Ms. Deborah Luper
Montgomery Watson
4100 Spenard Road
Anchorage AK 99517-2901

Subject: Request For Rural Tank Farm Information

Dear Ms. Luper:

In response to your request of March 11, 1997, for information, I am sending you the enclosed tank farm evaluations, evaluation criteria and list of tank farms removed from the deficiency rankings. The evaluations are for five of the seven communities you mentioned. The database from which these data have been gathered is still in draft form and therefore not ready for public release.

I hope this information is helpful and wish you success in your environmental work on Kodiak Island.

Sincerely,

Percy Frisby
Director

Enclosure as stated

cc: David Lockard, Division of Energy

Karluk

Tank Farm ID	Owner	evaluation date	capacity	Site	Diking	Found	Tanks	Piping	Elec.	Safety	Total
3	Karluk Village Council	11/24/96	50,000	0	0	0	5	0	0	0	5

Larsen Bay

Tank Farm ID	Owner	evaluation date	capacity	Site	Diking	Found	Tanks	Piping	Elec.	Safety	Total
2	City of Larsen Bay	11/24/96	70,500	0	20	5	10	10	10	20	75
3	City of Larsen Bay	11/24/96	4,900	0	30	0	5	10	0	10	55

Old Harbor

Tank Farm ID	Owner	evaluation date	capacity	Site	Diking	Found	Tanks	Piping	Elec.	Safety	Total
3	Alaska Army National Guard	11/13/96	5,300	0	30	10	0	20	0	10	70

Ouzinkie

Tank Farm ID	Owner	evaluation date	capacity	Site	Diking	Found	Tanks	Piping	Elec.	Safety	Total
1	Native Corporation Fuel Facility	11/14/96	71,600	0	10	10	20	10	0	10	60
2	Kodiak Island borough	11/14/96	5,200	0	0	0	0	0	0	10	10
3	City of Ouzinkie	11/14/96	1,400	10	30	10	30	40	0	20	140

Port Lions

Tank Farm ID	Owner	evaluation date	capacity	Site	Diking	Found	Tanks	Piping	Elec.	Safety	Total
1	Kizhuyak Oil Sales	11/13/96	90,600	0	20	0	10	0	10	0	40
2	Kodiak Electric Association	11/13/96	1,100	0	10	0	0	20	0	10	40

DIVISION OF ENERGY

TANK FARM EVALUATION CRITERIA

Site Location	
Site suitable for tank farm	0 points
< 100 feet from a public well	10 points
< 25 feet from an eroding bank or beach, or in a flood plain	10 points
Gasoline tanks < 25 feet from an important building	10 points
	30 points max.
Secondary Containment	
*Liquid-tight, lined dike of proper volume and construction (not plywood, 12" min. freeboard)	0 points
*Liquid-tight, lined dike of *improper* volume or construction (plywood or < 12" freeboard)	10 points
*Fully diked but not liquid-tight (sand bag dike, permeable gravel, torn or missing liner)	20 points
*Partial or no dike	30 points
	30 points max.
Foundations	
*Tanks on acceptable foundations (min. 6" timbers, no cribbing, stable)	0 points
*Tanks directly on gravel pad or light timbers (raised small timbers, on permeable gravel)	5 points
*Tanks directly on tundra or natural soils (no dike or liner, subject to erosion)	10 points
Tanks leaning considerably or unstable foundations (seismic hazard)	10 points
	20 points max.
Tanks	
*Tanks in fair to good condition (no dents, minimum rust, no major repairs needed)	0 points
*Immediate need of cleaning and painting	10 points
*Rusted or dented beyond repair or riveted, bolted or other	30 points
	30 points max.
Piping (choose most likely to leak, i.e., victaulic, threaded or welded, only)	
*Welded piping above grade	0 points
*Welded piping below grade	5 points
*Threaded piping above grade	10 points
*Threaded piping below grade	20 points
*Victaulic piping above grade	30 points
*Victaulic piping below grade	40 points
Rubber hose	20 points
Additional for active leaks	20 points
	80 points max.
Electrical	
Wiring appears appropriate	0 points
Exposed wiring, improper grounding, etc.	10 points
	10 points max.
Life, Health & Safety	
*Code compliant	0 points
*Low risk	10 points
*Medium risk	20 points
*High risk	30 points
*Potential for loss of life	40 points
	40 points max.

*Indicates that only one of the group should be chosen.

Tank Farms Removed From Deficiency Rankings

Community	Owner	Capacity (gal)
Larsen Bay	Kodiak Salmon Packers	128,900
Old Harbor	Old Harbor Fuel Company	76,400
Old Harbor	AVEC	41,200

APPENDIX B

Master Plan for Waste Management
Interim Report #2: Alternatives Analysis and Potential Funding Sources
Kodiak Island Borough

Revised
April 28, 1998

Supported by EVOSTC Grant
Project Number: 97304
Montgomery Watson
Project Number: 1189056.010101

MONTGOMERY WATSON

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LIST OF FIGURES

1. INTRODUCTION

1.1 Authorization

The Kodiak Island Borough has retained Montgomery Watson to develop a Master Plan for Waste Management for the rural communities of Kodiak Island Borough. This Alternatives Analysis and Potential Funding Sources Report is the second deliverable work product developed under the Agreement for Engineering Consulting Services for the Master Waste Management Plan, dated February 7, 1997. The Alternatives Analysis follows the Inventory of Pollution Sources and Problems prepared by Montgomery Watson for the project and dated April 7, 1997.

1.2 Background

This work supports the efforts of a group of leaders from remote coastal villages on Kodiak Island brought together under the auspices of the Kodiak Area Native Association (KANA) and the Kodiak Island Borough (KIB). Known as the Kodiak Island Village Environmental Council (KIVEC), this group has met several times to discuss potential pollution problems and identify waste management concerns that are shared by all of the villages.

Following the distribution of the Inventory of Pollution Sources to members of the KIVEC, a meeting was held in Kodiak Island Borough offices with KIB, KANA, and Montgomery Watson staff to provide feedback on the findings of the Inventory report and discuss potential improvements to waste management systems in use around Kodiak Island. Attendees included:

Jim Nestic	Old Harbor
Eli Squartsoff	Larsen Bay
Virginia Squartsoff	Larsen Bay
David Eluska	Akhiok
Edward Phillip, Sr.	Akhiok
Alicia Lynn Reft	Karluk
Larry Chichenoff	Ouzinkie
Wayne Lukin	Port Lions
Helen Harris	Port Lions
Tom Quick	Ouzinkie
Betty Odell	Chiniak
Ron Riemer	Kodiak Island Borough
Brenda Schwantes	Kodiak Area Native Association
Steve Russell	Kodiak Island Village Utilities Council
Bill Rieth	Alaska Department of Environmental Conservation
Deb Luper	Montgomery Watson
Brett Jokela	Montgomery Watson

In the meeting, Montgomery Watson staff presented their findings. The Montgomery Watson team concluded that successful improvements to Kodiak Island village waste management systems will require work in four distinct areas:

1. Systems planning, including the identification of responsibilities and mechanisms for all parts of the process;

2. Community education, so that the community as a whole understands the value of appropriate waste management;

3. Technical training, to ensure that local paid staff have the tools and the know-how to keep the systems operating; and

4. Community improvements, as necessary to facilitate appropriate operations and maintenance.

This report provides an analysis of alternative waste management systems and proposes a series of initiatives, or projects, which are meant to address fundamental weaknesses in the current systems in place for waste management around the island.

1.3 Approach To Selection Of Alternative Solutions

Three themes provide a basis for all of the recommendations in this report. First, identification of problems and prospective solutions is best done using a systems approach. Second, successful solutions are those that maximize sharing of resources between villages and encouraging collaboration. Finally, solutions will be sought that provide for community self-reliance and self determination. These themes are explained further below.

1.3.1 Systems Approach

It is important to recognize that waste management involves implementation of a system - a complex arrangement of activities and materials. A system works when it provides for the needs of the community effectively. In order to be effective, all the system components and relationships between components provide a useful role in the operations. The system components can be mechanisms of transport, such as pipes or trucks. They can be storage or processing facilities, such as a waste oil burner, or landfill. People have roles in the system, too, as generators of waste and operators of the system. And of course, money is needed in the system, to buy parts and fuel, and to pay for labor to operate and maintain the system. All components are necessary to provide for a successful system.

However, a fault in any one of the components or relationships can cause the system to break down, for example:

- ❑ If the money stops, the system fails;
- ❑ If people don't participate, the system fails;
- ❑ If the spare parts aren't available when the pump breaks, the system fails; etc.

The success of the system requires all of the activities to be coordinated. As most communities can attest, having money to build a landfill is not sufficient to ensure that the solid waste system will function appropriately. Although most systems allow for small variations in the way things work, there are weaknesses in every system that make it vulnerable. More sophisticated systems provide checks and balances and back-ups for critical processes. Village environmental systems tend to be less reliable because there is often no alternative, or back-up if something goes awry. This report will reflect on common weaknesses of present systems based on the first interim report, the Inventory of Pollution Sources and Problems. By focusing resources to bolster the weaknesses of the present system, the reliability of the system as a whole can be improved.

1.3.2 Shared Resources - Collaboration Among All Communities

The remote coastal villages of the Kodiak Island Borough have small populations, no more than a few hundred people in any case. In this rural environment, there are generally few hands available to do the work of operating local government, and little money to accommodate the needs of the communities. Prioritization of the use of community time, money, and energy sometimes means that important and useful tasks get deferred in spite of the best intentions of the community. This has happened with respect to operating and maintaining waste management systems.

One means of overcoming the constraint of having too few resources to work with is to pool the resources that are available to provide a larger base to draw from. This can be done in the villages by sharing equipment and expertise among neighboring villages, or combining in a cooperative sense with all of the other island villages, for mutual problem solving. This process is already started through such initiatives as the Kodiak Island Village Environmental Council, and the Kodiak Island Village Utility Council. We anticipate that "the biggest bang for the buck" can be achieved by developing a network for support of waste management operations composed of all of the villages.

1.3.3 Provide Atmosphere For Self-Reliance And Self-Determination.

As noted by the Alaska Natives Commission (Joint Federal-State Commission on Policies and Programs Affecting Alaska Natives, Final Report, May, 1994), since contact with western culture, Alaska Natives (Koniagmiut/Alutiiq) people have been subject to a continuous series of external influences, some good, some bad. Often, the work of the outsiders has been for the well-intended purpose of improving the lives of local villagers. Outsiders have provided a Christian tradition, an economy based on the use of money, a host of material goods, public housing, a school system, medical care, and a

variety of social services. Many decisions regarding the development of the communities are being made by KANA, KIB, or the School District in Kodiak; or by State and Federal agencies in Anchorage, in Juneau, or in Washington, D.C. As a result, local people learn to depend on the activities and decisions of outsiders.

Only by re-establishing control of community systems locally can those systems be effective. This affects all community systems, including waste management. Therefore, the best approach to complete and strengthen waste management systems will be to stimulate local responsibility and institute local control to the furthest extent. Thereby, communities can build an atmosphere of self-reliance that will extend beyond the grants that are currently sponsoring many community efforts, including the development of this Master Waste Management Plan.

1.4 Format Of Alternatives Summary

Section 2 of this report provides a series of model systems for waste management for Kodiak Island villages, including waste water management, solid waste management, hazardous materials management, scrap metal, waste oil, fuel delivery systems, and resource protection systems. Alternative prospective solutions will be presented in response to correct or complete inadequate systems.

Section 3 of this report identifies four regional projects which are proposed to respond to the weaknesses of the present systems. While intended to be viable candidates for funding, the projects by themselves do not provide complete solutions to the system needs and problems identified in Section 2. Rather they are *initiatives*, that is, a means to begin establishing effective self-reliance and self-determination with respect to waste management in remote coastal communities.

Section 4 of this report provides a discussion of sources of funding recommended to initiate the changes in local waste management that are necessary to protect the environment and encourage viable economic development in the remote coastal communities. Grant funding will not provide for complete and viable systems. Only the commitment of individual communities will allow that to happen. However, grant funding can be used to assist villages in the process of defining appropriate community systems, and in completing the links between system elements.

2. BUILDING FUNCTIONAL WASTE MANAGEMENT SYSTEMS

This section of the Alternatives Analysis Report describes model systems for waste management in KIB villages. System diagrams have been developed for each kind of system. These diagrams are the basis for the discussion of the model system. By comparing existing practices to the model, we identify the weaknesses of the systems that are presently in place around the island. Potential alternative solutions are presented to resolve those weaknesses.

2.1 Domestic Wastewater

2.1.1 *System Description*

Wastewater systems consist of:

- ❑ the sources of sewage,
- ❑ collection,
- ❑ treatment,
- ❑ discharge of liquids, and
- ❑ operations and maintenance: disposal of solids.

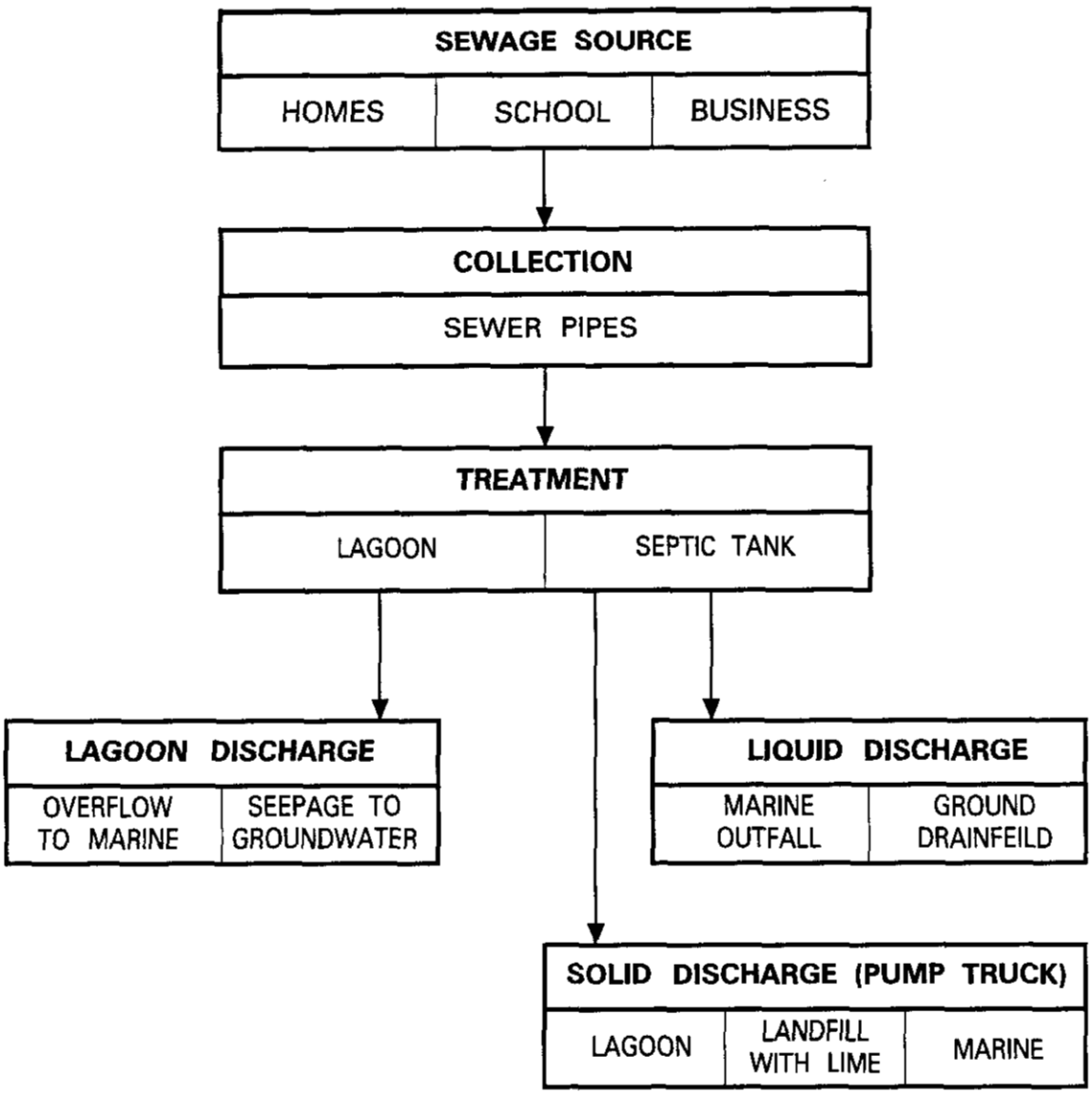
Figure 2-1 describes a model system, showing how the waste flows between system components.

Wastes. Domestic wastewater is sewage from homes, schools, and businesses in villages. Toilet wastes are sometimes referred to as "black water" to be distinguished from "gray water", which is wastewater derived from lavatory sinks, showers, and kitchens. Currently, there is no distinction between black water and gray water disposal systems in Kodiak villages. Once it goes down the drain, it becomes wastewater.

Large industrial operations, such as fish processing, produce large quantities of waste water, as well. These industrial wastewaters are disposed of separately, as regulated by the National Pollutant Discharge Elimination System, of the Federal Environmental Protection Agency.

Collection. Wastewater is plumbed from houses directly into buried sewer pipelines. The sewers are sloped to provide gravity flow from several service connections to a centralized storage and treatment facility. Sewer pipes can become blocked if customers flush anything other than waste down the drain. Also, frozen pipes are a possibility if the sewer does not have enough insulation.

IMPORTANCE:
HUMAN HEALTH, PROTECTION OF SUBSISTENCE RESOURCES



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MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-1
KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

SEWAGE SYSTEM

In order for the collection portion of the system to work by gravity, the next part of the system, storage and treatment, must be located downhill from the homes being served. If distances are large or there are uphill sections, pumps are required as part of the collection system. Pumps, however, need maintenance. If they are not properly maintained they stop working, the collection portion of the system stops working, and the wastewater system stops working.

Where homes are isolated from one another, individual on-site treatment of domestic wastewater has advantages. The collection portion of the system is relatively short, from the home to the septic tank and drainfield. This type of system, however, requires well-drained soils and adequate depth to bedrock.

Storage and treatment. Domestic wastewater is treated to reduce disease-causing organisms and solids that can suffocate aquatic wildlife. Generally two kinds of systems are appropriate for KIB villages: Septic tanks and lagoons.

Septic tanks are used when there are a small number of homes to serve. The tanks provide primary treatment by collecting solids from the sewage and allowing them to decompose in a "septic" environment, that is, where little or no oxygen exists. The size of the tank is dependent on the number of people served. Baffles in the tank enhance the separation of solids from liquids. As the tank is full all of the time, liquid wastewater moving through the tank is discharged after treatment to the soil or to a water body. The solids are partially digested in the tank, but eventually build up as "septage" and must be removed for disposal elsewhere.

A sewage lagoon is a large shallow pond engineered to store and treat wastewater from numerous households, including an entire village. Lagoons in KIB villages are used for treatment of raw wastewater as well as for septage from septic tanks. Lagoons have advantages over septic tanks in that they have a larger capacity and longer retention time, so that septage has a chance to be digested by biological processes in the lagoon. The disadvantages of a lagoon system are the potential hazard of public access, the extensive land requirement, and potential for unpleasant odors. Also, unless the lagoon is located downhill from the community, the collection system will have to include one or more pumps which require additional operation and maintenance effort.

Discharge of liquids. Where soil conditions permit, a septic tank should discharge into the ground through a drainfield composed of a perforated pipe lying in a trench or trenches lined with free draining coarse gravel. The discharge into the soil allows for completion of the biological digestion of the sewage by bacteria in the soil.

As an alternative to soil discharge, most communities on Kodiak discharge septic tank effluent directly into the sea via outfall pipelines. This approach does not provide the extra treatment that would occur in the soil following a conventional septic tank discharge to a drainfield, but it does allow for mixing and flushing of the sewage with

the marine waters. When the marine outfall is sited well and is in good condition, the marine discharge is quickly assimilated, and the treated sewage discharge does not pose a hazard to marine resources.

However, a marine outfall can have bad effects if:

- ❑ the septic system is poorly maintained and solids are allowed to escape into the outfall,
- ❑ offshore mixing is inhibited by structures or poor natural circulation patterns, or
- ❑ the outfall pipe is damaged or obstructed.

A properly sized lagoon should maintain a certain water level, discharging to a controlled overflow spillway only intermittently during break-up or following rain events. Alternatively, the lagoon can be designed to hold a year's supply of wastewater. Once a year the liquid in the lagoon is pumped out in an annual "discharge event" that is allowed by the State of Alaska Wastewater General Permit No. 9440-DB004. The planned discharge usually involves moving a large portable pump into place, pumping down the liquid level for several days, and putting the pump back into storage.

Some water losses from the lagoon are anticipated due to evaporation but rainfall is expected to exceed evaporation on Kodiak. Continual overflow is usually a sign of undersizing of the lagoon, or of too much water being diverted into the lagoon. On the other hand, if the lagoon drops below its design volume due to leaks in the lagoon floor or containment berms, the level of treatment is reduced, and raw wastewater can leak into receiving water with very little treatment.

Operations and maintenance: disposal of solids. It is of paramount importance that solids from a septic tank are removed and disposed of on a regular basis.

A tank full of solids means that there is no further ability to collect solids, and that raw sewage passes straight through the system to the outfall without treatment. For septic systems discharging to the ground, solids discharge can plug the soils around the drainfield and cause the entire system to fail. This kind of septic system failure requires replacement of the entire drain system, if it can be done at all. For discharges to marine outfalls, solids spilling over from the septic tank can cause obstructions in the line and build-up of deposits of organic muck on the sea floor near the outfall. This muck build-up can suffocate animals that live on the sea floor.

Every community needs to have a regular program of septic system solids removal and disposal. This means there must be a procedure or maintenance plan, the equipment to carry out the plan, and a location to properly dispose of the solids.

Each septic tank should be cleaned out annually. Equipment required is:

- ❑ proper equipment to gain access to the septic tank clean-out manhole,
- ❑ a pump system to draw solids out of the septic tank,
- ❑ and a mobile tank or tank truck to transfer those solids to the septage disposal lagoon or landfill pit.

Generally, a trailer-mounted pump and tank system has been used for the last two items.

The pump and tank should have adequate capacity to withdraw the entire volume of retained solids in one cycle. That is, if a tank is design to be pumped when 1000 gallons of septage has accumulated, then the pump and tank haul system should have a capacity of 1000 gallons. It is also very important to insert the intake hose of the pump to the bottom of the tank in order to withdraw the solids that have settled to the bottom of the tank.

2.1.2 Present Weaknesses

Figure 2-2 compares aspects of the model system described above, with existing conditions in each KIB community.

Most people assume that their sewer system is working fine until there is a problem with their toilet backing up. In truth, the system may be failing even if there is no evidence at the residences upstream. It is easy to forget about maintenance of the sewer system until the health of the community is in danger, or the marine environment is being damaged.

KIB villages rarely pump septic systems on a regular schedule. This leads to filling of the septic tank with solids and ultimately failure of the disposal system. Excessive solids in the septic tanks is at least partially responsible for ongoing raw sewage discharge in Akhiok and Karluk, and is suspected of causing septic system failure at Chiniak School. Other communities do not have a program of septic tank pumping that is adhered to rigorously. This may be causing raw sewage discharge into marine waters in Old Harbor and Ouzinkie.

Community wastewater systems also do not have adequate septage disposal. Port Lions discharges septage at the landfill, but the landfill has little control. Larsen Bay discharges septage into the bay, reducing the effectiveness of the initial separation of the solids from the wastewater flow. At Ouzinkie, the sludge lagoon sometimes overflows with local stormwater runoff, affecting its capacity for sludge storage.

Several communities do not have a functional pump and tank system for hauling sludge. Although each community was supplied with a system by PHS when the

Sewage

System Component	Adequacy of Existing System						
	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Collection							
All residences connected	✔	✖	✔	✔	✔	✖	✔
Capacity ok	✖	✖	✖	✔	✔	✔	✔
Septic tank storage							
Tank capacity ok	✔	✖	✔	✖	✔	✔	✔
Pumped annually	✖	✔	✖	✖	✖	✖	✔
Pumper truck works	✖	✔	✖	✔	✔	✔	✔
Lift station & force main works			✖		✔		✔
Trained operators	✖	✔	✖	✔	✔	✔	✔
Documented procedures	✖	✖	✖	✖	✖	✖	✖
Disposal							
Outfall capacity ok	✖			✔	✔	✔	✔
Well mixed receiving waters	✖			✔	✖	✖	✔
Groundwater discharge works		✔	✖	✔	✔		
Septage lagoon works	✖		✖		✔	✖	
Septage buried & limed	✖		✔	✖			✔

Key		
	✔	System is adequate (green)
	✖	System is inadequate (red)
		This system component not applicable for this community

Figure 2-2

systems were constructed, they have fallen into disrepair due to lack of expertise and spare parts to keep the pump, pump motor, and fittings operable. Some tank trailers were underdesigned, calling for many repeat trips and significant labor to ensure that the septage would be appropriately removed.

2.1.3 Prospective Solutions

Systems/Community Planning. The following list of issues shows areas that can be addressed by an overall planning process.

- ❑ Each community should have a wastewater system operations plan that details the parts of the system, the maintenance schedule, and the procedures to be followed during maintenance.

- ❑ Each community should have a landfill operations plan that identifies a specific sludge disposal area and procedures for sludge disposal there. Drainage should be diverted from any septage or sludge disposal area.

- ❑ Each community should charge water users to allow for a wastewater management system budget, to include the expense of pumping and disposing of septage annually.

- ❑ Communities should share resources for operation and maintenance of community septic systems. As septic pump and tank haul systems are replaced, equipment from the same manufacturer should be used so that spare parts and expertise can be shared between communities.

- ❑ Each community should establish ordinances to:
  1. Prohibit discharge of hazardous materials, including oil, paint, or solvents, into the sewer system.

  2. Require use of the sewer system for disposal of domestic wastewater when available,

  3. Support collaborative efforts with other communities for operations and maintenance.

Technical Training. There needs to be a higher degree of skill developed for wastewater management in each village. The operators have a very large responsibility to maintain expensive systems and to safeguard the health of the community.

- ❑ Operators of the septage pumping equipment should be trained in pump and motor operation, maintenance, and repair.

- ❑ Basic system hydraulics and principles of operation of wastewater treatment should be taught to each village operator.

- ❑ A certification program, perhaps through a group such as the Alaska Water Management Association, or ADEC's Remote Maintenance Worker program could provide the necessary training and allow for enhanced recognition for village operators.

The community as a whole does not need to understand the technical details identified in this section. The technical training can be limited to the few residents staffing the facility.

Community Education. The elements of a community education program necessary to improve domestic wastewater systems include:

- ❑ Educate residents on materials to be kept out of the sewer system.
- ❑ Mark positions of outfalls on a map and mount signage to indicate outfall locations.
- ❑ Build an environmental ethic through the curriculum of the KIB School District.
- ❑ Educate residents on the hazards of contact with raw sewage.

Community Projects. Several communities have system problems that may require capital investment, but are also related to operations and maintenance of former capital improvements. We recommend improvement of operations and maintenance practices, in conjunction with a improved systems operation planning, prior to suggesting expenditure of further capital funds.

Some purchases that would assist this effort would be:

- ❑ A dedicated set of tools for wastewater system operations and maintenance.
- ❑ Spare parts to maintain pumps and other equipment.
- ❑ Joint purchase of a septage pump and tank hauling system that could be shared by communities, provided that transportation between villages could be made available for the equipment.

2.1.4 Prospective Systems Operations Costs

The following list provides planning level cost estimates for labor and equipment on an annualized basis. Each community should provide for system operations and maintenance from its own resources.

- ❑ Septage hauling pumper trailer and tank (includes spare parts and maintenance). $1,000

- ❑ Annual septic tank clean out (depends on community septic tank capacity) — $500 - $2,000/year
- ❑ Ongoing operator training (assume 2 days in Kodiak with RMW) — $500/year

2.2 Solid Waste Management

2.2.1 System Description

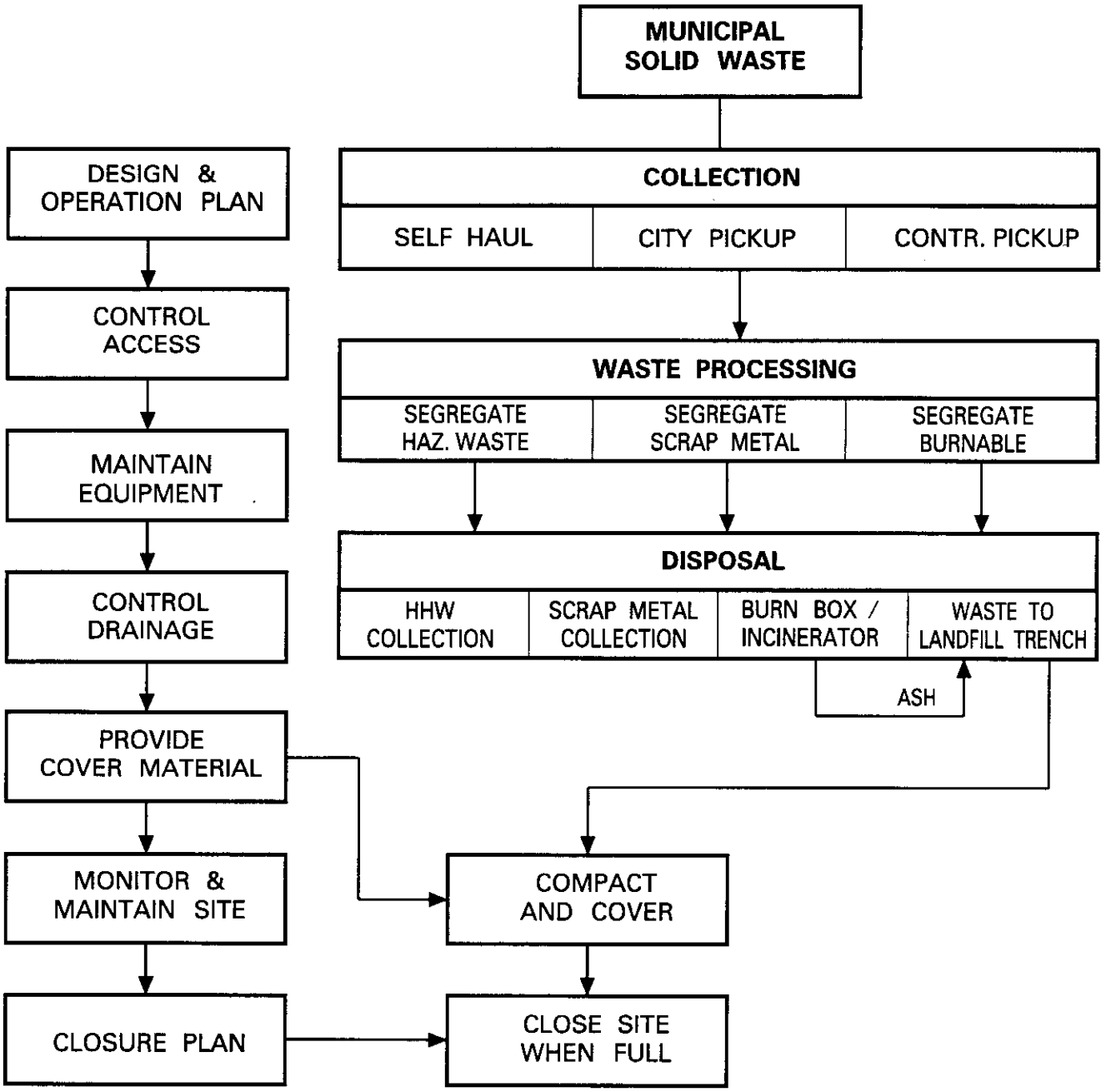
Community solid waste management is more than just a garbage can or a fence around a community dump. Solid waste comes about by bringing goods into the village from outside, including everything from old oil heaters to pop cans, disposable diapers, and the packaging that the goods come in. What follows is a description of an ideal solid waste disposal system, including alternatives for various parts of the system. The basic parts of the system are illustrated in the schematic drawing of Figure 2-3. These include collection operations, waste processing operations, and disposal operations.

The elements of the solid waste disposal system for each community should be spelled out in writing. This written description of the way things work becomes an operations plan. The operations plan becomes a ready reference for both the community and the Alaska Department of Environmental Conservation, which regulates solid waste disposal. ADEC regulations allow for permitting of Kodiak Island village landfills as Class III landfills, requiring only the most basic management.

Collection Operations.

Getting garbage from homes and businesses to the disposal site can be done in a variety of ways. Many residents of Kodiak Island Borough communities haul their own garbage to the landfill. While this can work effectively in small communities, there are several reasons to consider having community collection service. First, some residents are not able to travel to the landfill in all weather. Ice and snow limit the ability of many people to get to the landfill, especially if there is a steep road. Not everyone has a vehicle or four-wheeler to haul garbage.

A collection service operated by the community, or an enterprising individual, can provide a greater degree of control in how the landfill site is managed. When each individual is responsible for his own disposal, sometimes wastes are put in the wrong place at the landfill. Individuals may not want to spend the time necessary to segregate waste and make sure that the burnable garbage is burned safely and completely. Hazardous wastes can get mixed up with other garbage. A community sponsored employee or contractor can be trained to take care of the site each time he brings in a load of garbage.



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MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-3

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

LANDFILL SYSTEM

Collection techniques do not need to be elaborate and expensive for rural communities. Typically, a pick-up truck is used to collect bags of trash from businesses and homes. In some communities, four-wheelers with trailers are used. A tilt-bed pick-up allows the trash to be unloaded efficiently at the burn box, or directly into a landfill cell. Getting in and out of the truck for each house is very time consuming if one person is doing all the work. A second person can walk or ride along the bed of the truck and load trash while the driver concentrates on steering and stopping for trash pick-ups.

It is important that the materials to be picked up by the collection service are contained so they can reasonable be handled. Rules may be formulated by the collection service to make sure they can economically handle the waste. Examples of rules are:

- ❑ Animal carcasses must be double bagged in strong plastic trash bags or game bags.
- ❑ No leaky batteries or hazardous waste is allowed.
- ❑ Maximum size container for pick--up is a ten gallon plastic bag.
- ❑ Each bag must be cinched tight and sealed.
- ❑ Materials for pick-up must be at (name the location) by (name the time) on the day of collection.

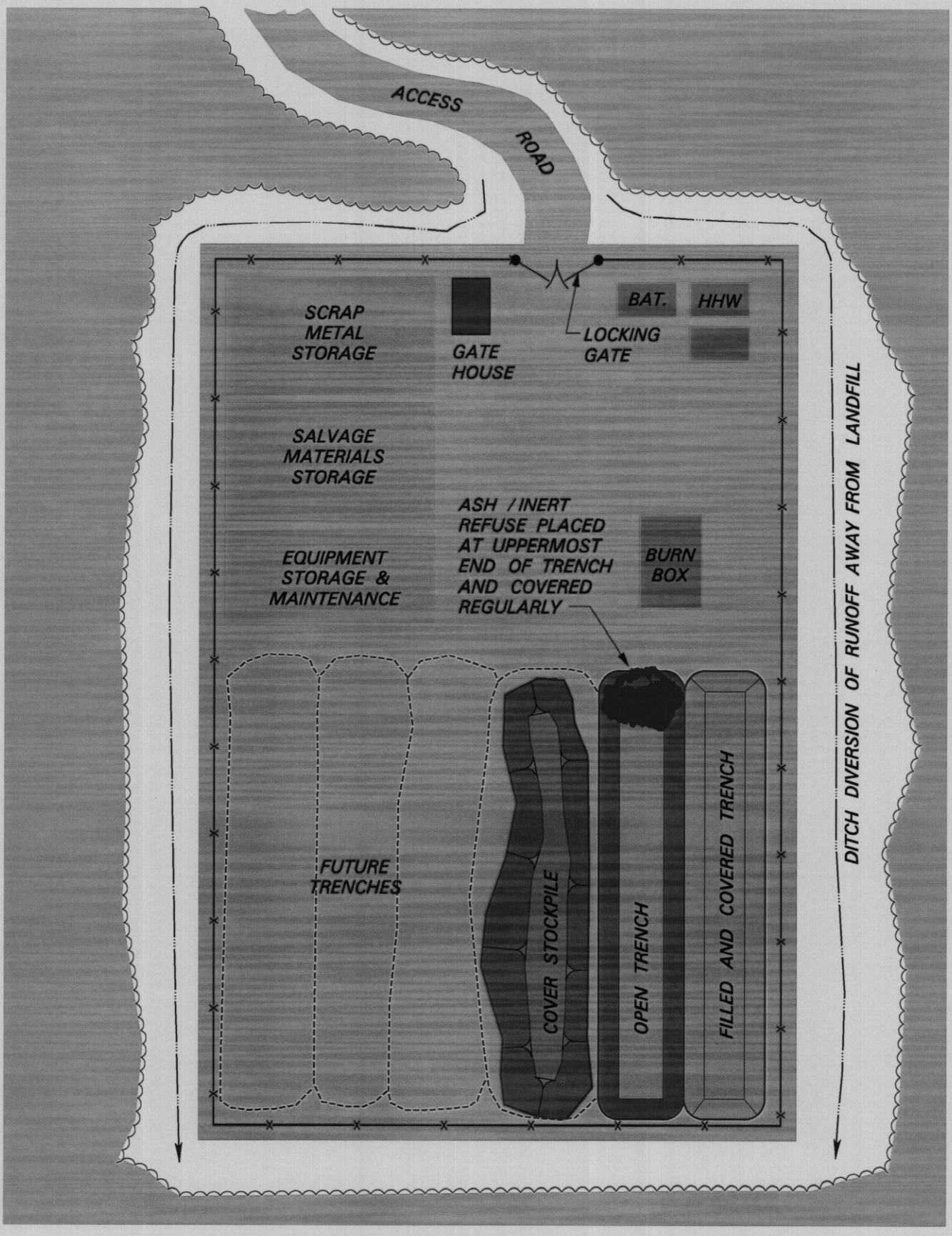
Waste Processing Operations

Waste processing can take place at several levels. To a certain extent, everyone processes waste in the home by choosing to retain or discard items. In some homes, materials are retained for re-use or recycling that would be discarded by others.

Other waste processing is typically applied at the landfill, as indicated by each community's operations plan. Figure 2-4 shows a typical site layout at the landfill, which provides for waste processing in addition to disposal at the landfill. Note that specific areas are identified for storage of wastes that should not be buried in the trench, and a burn box for incinerating burnable trash.

Waste Segregation. Each community should have a specific area designated for collection and storage of materials that should not go into the landfill. Dedicating space at the landfill site is an obvious choice for maintaining the area, since discarded materials can be added to the recycled materials storage or disposed of in the landfill at the same time. The landfill attendant can direct users of the landfill to separate out aluminum cans, batteries, scrap metal and lumber from waste materials to be burned or buried. Bins for storage of materials can be set up with signs to identify what material goes where.

There may be other places in the community that are individually more suitable for storage of materials than at the landfill. For example, often there is warehouse space



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MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2–4

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

TYPICAL VILLAGE LANDFILL SITE PLAN

near the airstrip, or space in a hangar that can be set aside for aluminum can storage prior to being shipped out by air. Waste oil or batteries can be collected at a covered and controlled village shop, or near the waterfront. Each community should decide where the best place is for storage of these materials and make sure that everyone in the community knows where to put the recyclable goods to conserve buried landfill space. The storage space would be covered and must be accessible to people bringing materials as well as for bulk shipment of materials out of the community.

Recyclable materials can also be collected at drop off boxes around the community. The drop off boxes for recyclable goods could be located with community dumpsters for gathering and storage by a community collection service.

Incineration. Many landfill problems are solved by incinerating all burnable garbage before placing it in the landfill. Attractiveness to animals, volume, odors, and potential for groundwater contamination are minimized when garbage is burned down to a clean ash. For most villages this entails the use of a burn box or incineration vessel located near the disposal area, but away from the disposal trench itself. Ouzinkie does a remarkable job of reducing all of its solid waste to ash through controlled burns in the trench. Ouzinkie also has the advantage of a landfill trench cut into bedrock, so the potential for the fire spreading is minimized. By carefully segregating the hazardous materials and scrap from the refuse delivered to the landfill, and then burning the remainder, Ouzinkie typically achieves greater than 80% reduction of the waste volume that would otherwise fill up the landfill trench.

Alternatively, Larsen Bay has a community incinerator that is located outside of the landfill facility boundary. When the incinerator is properly maintained, the ash, after cooling, is removed from the firebox with a shovel, and transported to the landfill. As long as no hazardous wastes, including explosives, are placed in the incinerator, the ash residue is essentially inert. Old Harbor established a burn box, but it was located too close to the disposal area and has become difficult to access, load, and clean, so it is not regularly used. As a result, many residents have resorted to open burning, lighting their own trash on fire on a level place near the landfill entrance. This practice may or may not be attended, and ash from the burning is left in place, preventing future access.

Port Lions residents also use open burning at the landfill to reduce the trash volume. This burning, too, is rarely coordinated with fill placement, and often ends up as an unattended smoldering mass. Open burning can lead to spreading of the fires to the buried landfill mass, where the fire can spread underground, or beyond the landfill boundary to adjacent forest or tundra.

Incineration should take place in a controlled vessel that provides efficient combustion, is easy to clean, and contains the fire so that only the target waste is burned.

Disposal Operations

Compaction and Cover. The most important practice for containing disposed refuse at the landfill site is compaction and cover. It is not enough to dump garbage into the trench until it is full and then cover it up. To insure that animals are not attracted to the waste, to insure that the waste is not soaked by rain and snowmelt, to prevent the wind from blowing waste all over the countryside, and to reduce odors of decaying garbage, the refuse should be compacted and covered at the end of every operating day.

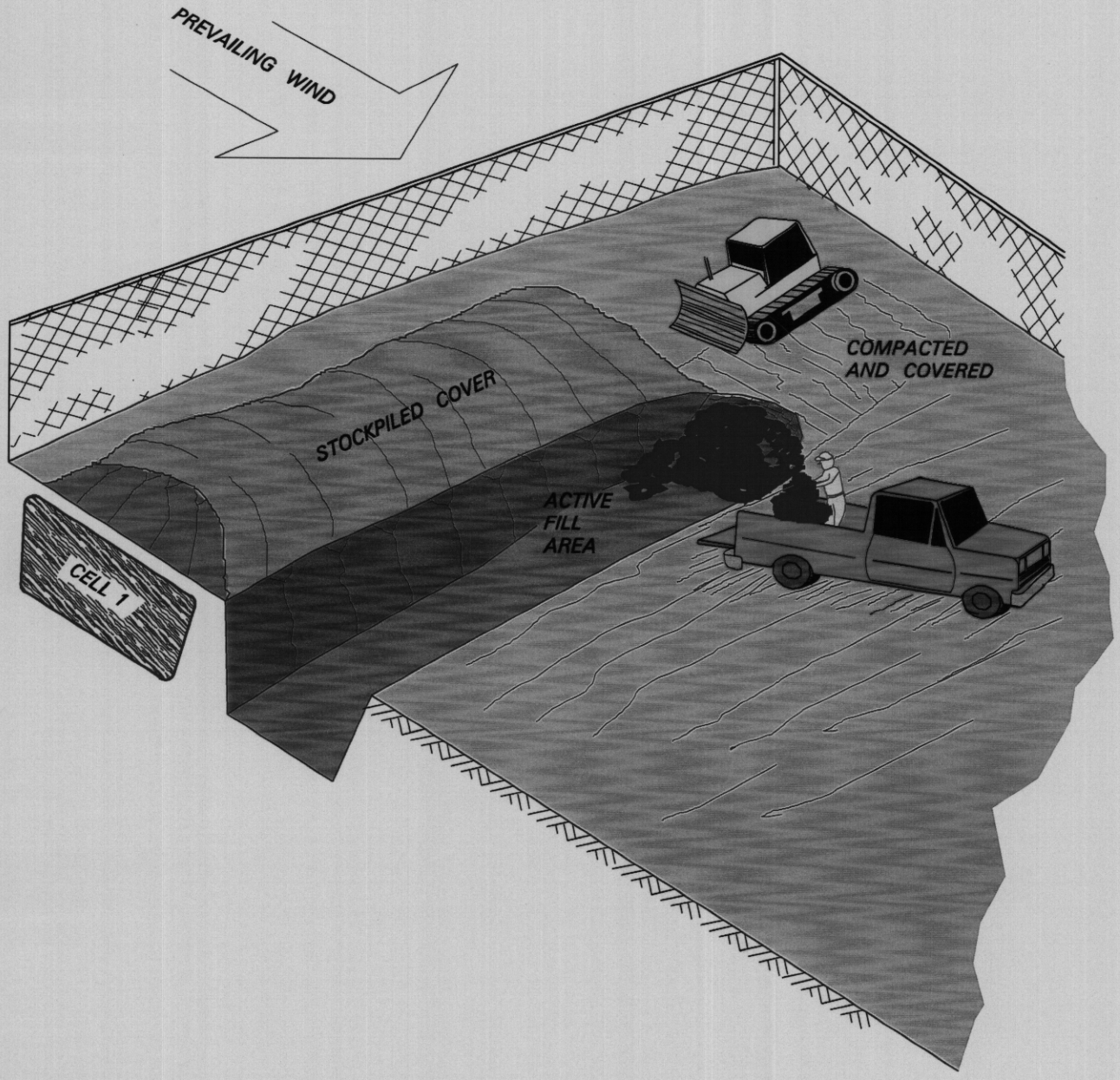
The life of the landfill can be extended to twice its capacity if material is adequately compacted. Refuse should be piled up no more than two feet high in any area of the working cell without working over the fill with heavy earthmoving equipment. Specially manufactured machinery for this purpose has large wheels instead of tracks, and has steel compression points mounted on the wheels to increase the machinery's capacity to shear the deposited refuse and apply greater pressure for compaction. While it may be difficult to justify this kind of dozer for exclusive use of the community's landfill, every community in the Kodiak Island Borough has a bulldozer or loader that could be used for compaction.

Most villages have a small loader or dozer for use with water system maintenance, school projects, electric cooperatives, industrial operations, or construction. These pieces are already employed on an irregular basis for excavating new landfill trenches or regrading the site. To maximize the use of the site, however, the equipment should be driven over the refuse at least 6 passes, insuring that the whole weight of the equipment is placed over each square foot of exposed garbage. This should be done every day that the landfill is in operation.

The second part of the operation is equally important. Not only should the refuse be smashed down with a dozer every day that the landfill is in operation, but the compacted refuse should be covered with about six inches of soil. The source of this cover material might be a borrow area on the landfill site or even off-site. Often, the most economical approach is to extend the cell slightly by excavating cover material from the edge of the cell. A trench operator, for example, can extend the trench while using the excavated material immediately in covering the recently placed garbage.

An example of a trench operation with daily cover is shown in Figure 2-5.

Leachate Control. Leachate is the contaminated water that escapes from saturated garbage. When saturated with water, decaying garbage release chemicals such as nutrients, salts, metals, and organic compounds in a process called "leaching". The chemicals exist in leachate at much higher concentrations than normally found in ground water. When the concentrations get too high, the chemicals pose a hazard to people whose water supplies are affected. Also pollution of surface water can occur when leachate seeps out of the ground water into a bog, a stream, or a lake or lagoon.



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MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-5

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

TYPICAL VILLAGE LANDFILL TRENCH OPERATIONS

Leachate production can be minimized by carefully planning and operating the landfill so as to limit the amount of wet garbage in the fill and to minimize the chances for the refuse to contact water on the site, whether in the ground, falling as rain, or collecting or flowing on the site from floods or snowmelt.

Animal Controls. Garbage placed in a landfill invites bears, gulls, ravens, rodents, and other critters to the site to scavenge for food. If there is no garbage or animal waste (carcasses, guts, and so on) in the landfill, most problems are avoided. Home composting can be used to make the refuse less attractive. Composting involves putting all food waste into a pile in a backyard, turning and mixing the pile every couple of days to ensure that the composting waste remains well aerated. Those who feed food scraps to chickens or pigs are less likely to have animals attracted to their compost bins.

Another useful way to avoid animal problems is to incinerate all the food waste, disposable diapers, and other burnable material completely before putting it into the fill.

Once garbage is placed into the fill, however, it should be compacted and covered immediately to limit its attractiveness to animals.

Monitoring. When a landfill is being operated, it is useful to keep good records of what happens at the site, who is in attendance, where wastes are placed, and how developments occur. The records can be used to defend your community against claims that the landfill operation damaged an adjacent property or water resource.

It is particularly useful to document drainage control at the site and maintain records of water quality near the site to ensure that ground water is not being affected by the operation.

Closure. Every landfill has a finite life. After some time, the site will be fully used up. In some cases this means the entire area is covered with refuse. More and more, the landfill operating plans are calling for multiple cells constructed on top of each other to save space. In any case, the landfill must be appropriately closed when it meets the end of its useful life. This doesn't mean necessarily that the fill will be useless. Many communities have effectively covered and regraded their sites so that the old landfill might be useful as a recreation facility, such as a ball field or sled hill.

The landfill operating plan should consider the final configuration of the landfill at closure. A final cover should be designed to provide at least two feet of relatively impermeable soil on top of all of the compacted refuse. The design should ensure that no rainwater or snowmelt is allowed to agglomerate on the site or seep into the ground where it could come into contact with garbage. Leachate can continue to be generated

after the landfill is closed. Special attention should be made to nearby water resources, and considerations should be made concerning water quality monitoring after closure.

As the refuse degenerates, microbes produce methane gas inside the landfill. At large installations, this mass of methane can accumulate and pose a fire hazard. The landfill cap should be designed to allow any methane generated to escape, by providing gravel seams in the cap and/or providing vent pipes intruding down into the refuse.

2.2.2 Present Weaknesses

Figure 2-6 compares the adequacy of existing village solid waste systems to the model system presented above.

None of the KIB villages have established a clear operating plan to guide the development, use, and closure of their landfills. Attempts to segregate waste have had various success, with Old Harbor and Ouzinkie being very successful in keeping scrap metal and other durable goods away from the landfill working face.

Access control is poor in most cases. Few directions are provided for landfill users and operators. As a result, the landfill operation is inconsistent, wasting landfill space and cover material, and allowing spreading of trash by wind and animals.

2.2.3 Prospective Solutions

2.2.3.1 Systems/Community Planning

Locating a new landfill. A public waste disposal site should be close enough so that it is convenient for people to use, yet far enough away from everyday village activity that the waste disposal does not pose a hazard or a nuisance to village life. Typically, the site should be owned by the community either deeded to an incorporated City or held in trust by the State for unincorporated villages. Alternative ownership is possible; some landfills are privately owned and operated. A community non-profit corporation, or local village corporation may develop a landfill.

Principal rules to keep in mind in siting a new landfill include:

- ❑ The site should be on well-drained mineral soil. Avoid wetlands and peaty organic soil, or areas exposed to flooding from snowmelt or tides. Make sure that if a landfill trench is dug, no water would seep into it or be trapped in the bottom.
- ❑ Sandy loamy soils are best suited for landfills. Too much gravel and course grained soil allows for water to infiltrate and contact the garbage. The landfill should be located above bedrock to avoid drainage problems. Silty or clay soils tend to collect and hold water, causing continual contact with the garbage. Also,

Landfill

System Component	Adequacy of Existing System						
	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Collection							
Self-Haul	✖	✔	✖	✔	✔	✔	✔
City Pickup at residences	✔	✖	✖	✖	✖		✔
City Dumpsters		✔					
Community Clean-up	✖	✔	✔	✖	✔	✔	✔
Storage							
Transfer Box at Landfill	✖	✖	✖	✖	✖	✖	✖
Segregate Haz Waste	✖	✖	✖	✖	✖	✔	✖
Segregate Scrap Metal	✔	✔	✖	✖	✔	✔	✔
Segregate Burnable	✖	✖	✖	✔	✔	✔	✖
Processing							
Incinerator off-site				✔			
Burn Box at Disposal area	✖		✖		✔	✔	✖
Operations Plan	✖		✖	✖	✖	✖	✖
Disposal							
Access Control	✖	✖	✖	✖	✖	✔	✖
Equip. maintained	✖		✖	✖	✔	✔	✔
Drainage Controlled	✖		✖	✔	✖	✖	✖
Compact and Cover	✖		✖	✖	✖	✔	✖
Closure Plan	✖	✖	✖	✖	✖	✖	✖

Key		
	✔	System is adequate (green)
	✖	System is inadequate (red)
		This system component not applicable for this community

saturated soils can cause mechanical equipment like bulldozers, trucks and loaders to get stuck.

- ❑ The site should be at least 5000 feet from an airstrip, or 10,000 feet from a strip that can accommodate jet aircraft. This minimizes the potential that birds near the landfill might pose a hazard to aircraft approaching or departing from the runway.
- ❑ The terrain should be flat to gently sloping. It should be stable, with minimal potential for landslides or seismic activity. Geologic faults should be avoided.
- ❑ Access must be provided. Consider how garbage will get to the landfill: by four-wheeler; by pick-up truck; or by dump truck. Each of these kinds of vehicles has different requirements for road construction. Larger capacities of bigger trucks also need wider roads and improved roadbeds and drainage.
- ❑ The landfill should be located away from any residential water wells, subsistence resource areas, or public facilities that might be subject to noise, smoke, or odor from the landfill operations.
- ❑ Your landfill should last many, many years if sized and operated correctly. Even so, be prepared to think about how that land will be used after the landfill is closed, and what steps and costs need to be factored in for future closure.

It will be useful to get technical assistance from an experienced engineer to assist in siting and developing cost estimates for landfill construction and operations.

Developing an Operations Plan. Through the guidance of a professional solid waste engineer, a plan can be tailored to individual Kodiak Island village communities, as part of a workshop training exercise for landfill operators. The operations plan should include the following as a minimum, as required by State law:

1. Procedures for site access control,
2. waste acceptance policies,
3. waste placement and compaction practices,
4. litter control and clean-up,
5. animal control
6. traffic control,
7. dust, noise, and odor control.

2.2.3.2 Technical Training

The Operator's Job. Being the operator of a community landfill is an important position, and should not be taken lightly. There are a number of responsibilities which the operator should understand plainly and be qualified for. Operator responsibilities should include:

- ❑ Controlling access to the landfill; maintaining locks and keys and opening and closing the facility at the appointed hours.
- ❑ Controlling site safety; the operator must understand safety procedures specific to the landfill, including fire protection and control, equipment operations, and potential contact with hazardous materials. He should know some basic first aide and know how to contact the community health aide and Kodiak Island Hospital in case of accident
- ❑ Directing the segregation of wastes. Whether this is done personally by the operator or by a landfill user under his direction, the operator must be able to differentiate burnable from non-burnable waste and must identify hazards such as batteries, solvents, and waste oil. He must maintain the storage areas for wastes that are not to be landfilled and be able to communicate the rules of operation on the site to landfill users.
- ❑ Loading and burning wastes in the incinerator or burn box; the operator must attend the fire, and clean out and dispose of ash after burning. He is responsible for fire safety during the burn.
- ❑ Understanding and communicating the landfill operating plan; the operator must know what parts of the fill are completed and what areas are next to be utilized.
- ❑ Heavy equipment operations and maintenance; the operator must be competent in operating all equipment used on-site: trucks, dozers, loaders, pump trucks. He must keep them in good operating condition and provide regular maintenance: grease, oil, fuel. He must know where to turn for more advanced procedures if he is not qualified as a mechanic.

It may not be possible to find a new employee with all the skills necessary to serve as the community's landfill operator. Training could be done through participation in workshops sponsored by the Kodiak Island Borough, the Kodiak Island Village Environmental Council, or the Kodiak Island Village Utility Council. The workshops may be two or three day meetings, or longer term "apprenticeship" visits to other communities to work alongside experienced operators. Alternatively, the training could come through more formal channels, such as landfill training and certification programs sponsored by the Solid Waste Association of North America (SWANA).

2.2.3.3 Community Education

Landfill signs. Posting signs at the landfill can be very helpful in directing the appropriate disposal of waste without the oversight of a full time attendant.
Signs should list:

- ❑ hours of operation
- ❑ prohibition of hazardous waste
- ❑ instructions for burn box use

- ❑ where to put batteries, oil, metals, other special wastes
- ❑ who to call for help

2.2.3.4 Community Projects

The following project ideas are efforts that can engage local people in productive activity, while serving the community as a whole.

- ❑ **Sign Project: Produce signs for each village landfill.**

  Creating signs for the landfill can be a useful and inexpensive community service project for implementation by the Tribal Council, Lions Club, School, or other local organization. Signs should be large enough to be posted on fence posts or self-supporting structure, and easily read from the landfill entrance. Letters should be 2.5 inches tall in order to be legible, and should stand out from the background by using contrasting colors. A variety of materials are available. Commercially made signs of galvanized steel or aluminum can be ordered from Anchorage, Seattle, or Kodiak. Stencil kits can be used to paint large letters over plywood that has been primed and painted a light background color. A router and jig available from most hardware or department stores can be used to etch lettering into hardwood or dimensional lumber. Signs should provide the information suggested under section 2.2.3.3 above.

- ❑ **Burn boxes: Build burn boxes for use in each village.**

  Every community seems to have old boilers or scrap metal bins that can be converted with some clever welding into a burn box, without significant expense to the community.

  The examples of Dot Lake, or Ivanoff Bay, closer to home, demonstrate that effective designs can be scrounged and put together at low cost. The burn box should have a sufficient firebox capacity to burn the garbage delivery from a single family delivery, up to a full pick-up load. The firebox should have a grate to allow ash to fall out. Typically, ash is shoveled by hand out of the ash hopper below the grate, although some communities have built in arrangements such as hinged grates or openings to facilitate ash removal. There should be a chimney sufficient to provide a draft, with a spark arrestor of mesh at the top of the chimney to prevent fires from spreading. Fires can be started with paper tinder or petroleum based starting fluid. Instructions for use should be posted on signs near the burn box, or better yet, burning could be supervised by a paid attendant.

  Note: Make sure that no explosive or hazardous materials, including batteries, ammunition, spray cans, or propane cylinders, are placed in the burn box. Segregate waste for safety and to maximize effectiveness!

- **Access facilities: Build fences, gates, and storage facilities for each village.**

  Several communities have reported problems with residents unclear about where to dump materials taken to the landfill. This can be handled by developing a drop off box/dumpster arrangement at the landfill entrance that provides a definitive place to deposit wastes. More simply, a retaining wall/grade break can be used on sloping ground to limit the areas than can be traversed by vehicular traffic carrying waste. The City's landfill operator would be responsible for moving the material from the drop off point, or dumpster to the burn box or appropriate trench location for ultimate disposal. Gates provide a clear signal that access is limited, allowing for better control of disposal practices, as well. Welded pipe gates hinged to flanges on vertical pipe posts are common. These can be put together at nominal expense with scrounged or surplus pipe materials.

Port Lions, Akhiok, and Karluk are in need of new landfills or substantial improvements to existing landfills.

2.2.4 Prospective Solid Waste Operations Costs

Communities should plan on funding solid waste operations costs from their own resources. The following list provides a rough planning level estimate of costs.

❑ Weekly residential garbage pickup	$3,000 - $12,000
❑ Collection equipment maintenance	$1,000 - $5,000
❑ Waste segregation/burn box operations (by paid attendant 10 hrs/week)	$8,000
❑ Landfilling, compaction, and cover (4 hrs/week, inc. equipment costs)	$5,000
❑ Training (2 days in Kodiak)	$500

2.3 Used Oil And Hazardous Waste Management

2.3.1 System Description

Any used oil and hazardous waste management system consists of the following elements:

- ❑ Collection
- ❑ Storage
- ❑ In Town Processing
- ❑ Transportation
- ❑ Disposal

As shown in Figures 2-7 and 2-8, various options are technically feasible. The options and how they relate to the KIB communities is discussed below. As background, the wastes included in this section are identified prior to the discussion.

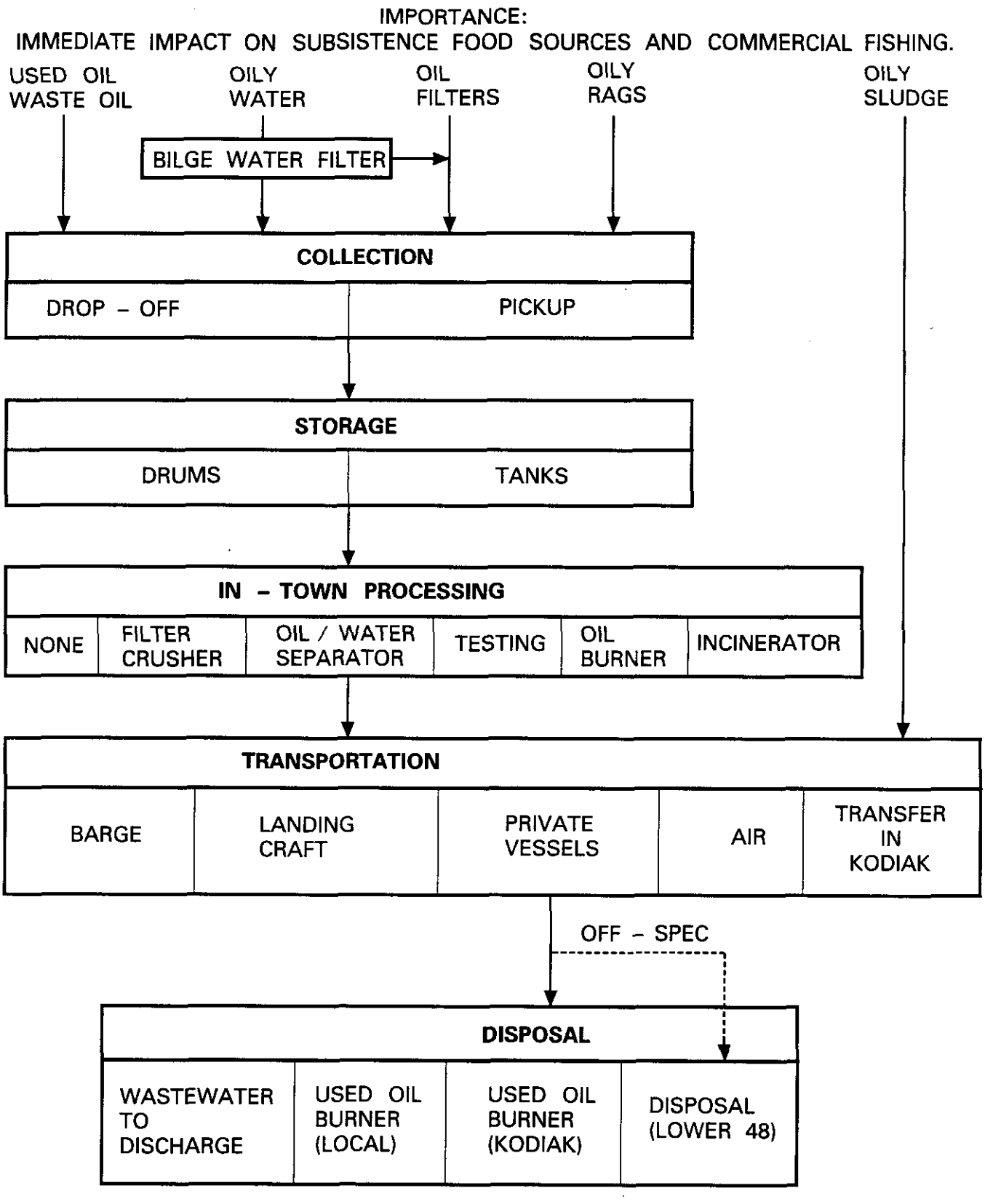
Wastes. Used oil, waste oil, oily water, used oil filters, oily rags, oily sludges, lead acid batteries, solvents, refrigerants, and aerosol cans.

Collection. Throughout the U.S., the two standard practices for waste collection are that either the wastes are dropped off by the residents at a central location or that the wastes are segregated and picked up by a waste management employee. In all of the KIB communities, the existing practice is to place responsibility in the hands of the resident to drop-off the used oil or hazardous waste. In all cases, the residents play a key role in identifying which wastes should be managed separately and storing them separately.

Storage. Part of an existing facility can be used for storage or a new facility can be constructed specifically for management of the materials. Both methods are used in KIB. Akhiok is temporarily storing the lead acid batteries at the school, while Ouzinkie has built a household hazardous waste storage shed at the landfill.

In-town Processing. Some processing can be performed in the community. Options include:

- ❑ Materials exchange (reuse)
- ❑ Used oil/waste oil burner
- ❑ Incinerator
- ❑ Oil filter crusher
- ❑ Oil/water separator
- ❑ Testing
- ❑ Packing and labeling



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MONTGOMERY WATSON

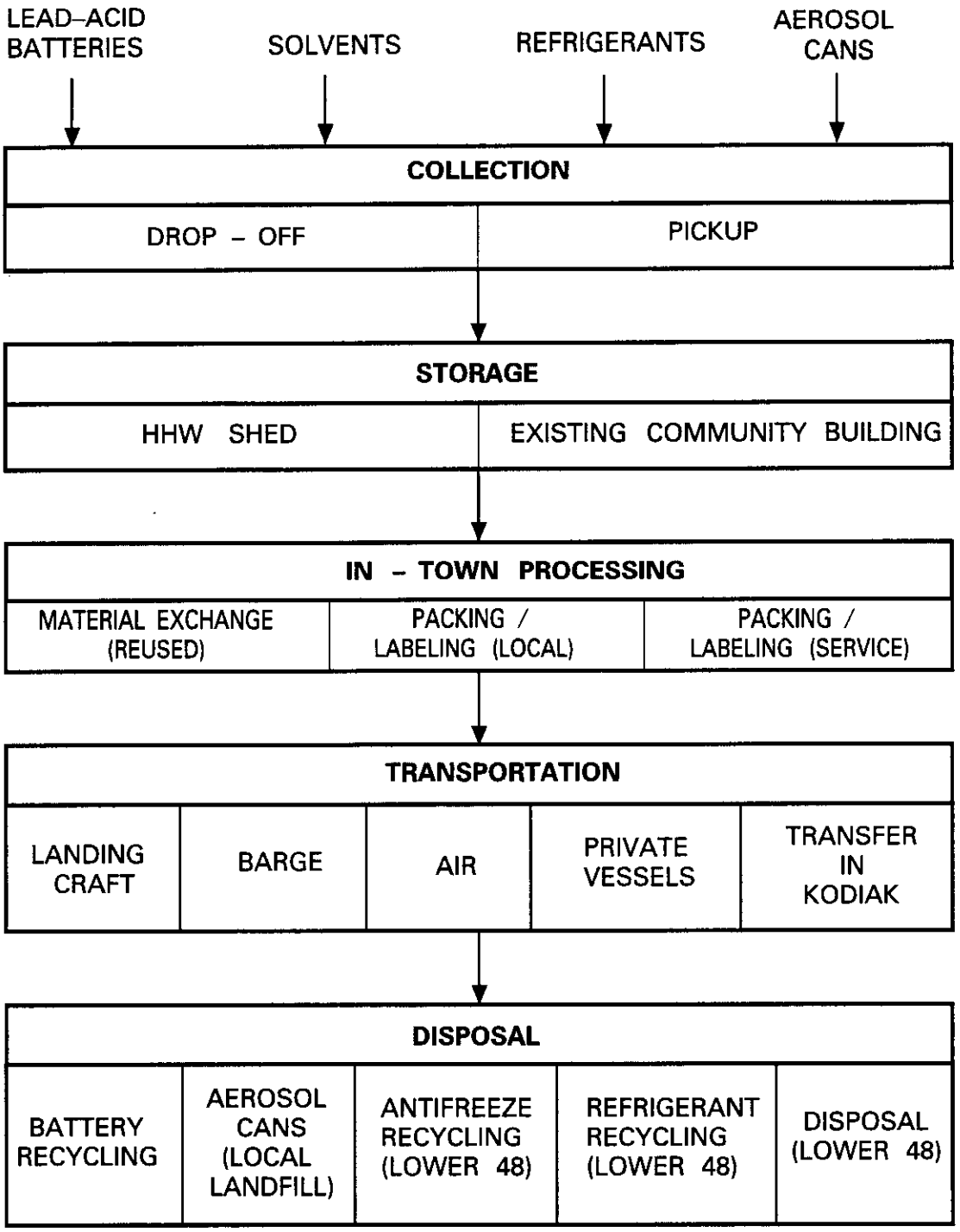
Anchorage, Alaska

FIGURE 2-7

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

USED OIL SYSTEM

IMPORTANCE:
IMMEDIATE IMPACT ON SUBSISTENCE FOOD SOURCES COMMERCIAL FISHING.



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MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2–8
KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN
HOUSEHOLD HAZARDOUS WASTE (HHW) SYSTEM

The benefit of installing these systems in town is that it minimizes transportation and disposal costs. However, each system requires constant attention to operate and maintain it. Either residents must maintain it on a volunteer basis or allocate part of the community's operating budget to maintaining these facilities (i.e., labor, spare parts).

Used oil/waste oil burners are particularly attractive, since they cut virgin fuel consumption and have the potential to manage one of the largest and highest priority waste streams. The three used oil burners currently in use in various locations around Kodiak Island are: Reznor, Black Gold, and Omni 350. Existing experience suggests that the Black Gold equipment operates the most reliably, is capable of burning the widest variety of materials, and operates with the minimum amount of upkeep. It's efficiency is slightly less than the Reznor and Omni 350, but the reliability factors seem to outweigh efficiency. Installations planned for villages should include, at the minimum, water and particulate filters, and a feed preheat.

Reznor can be made to work in village conditions, but it reportedly requires the pretreatment of the waste oil (additional filtering and preheating). This has been the experience of the KIB landfill staff in Kodiak. Maintenance is high and equipment is often finicky and does not operate.

Transportation. Transportation costs have repeatedly plagued KIB projects. Transportation options include:

- ❑ Landing craft
- ❑ Barge
- ❑ Air
- ❑ Private vessels
- ❑ Transfer in Kodiak

As a public relations effort, many of the transportation companies offer free backhaul of some recyclable materials, notably aluminum cans. It would seem that economical transportation of the small quantities of most wastes could be negotiated as backhaul in conjunction with the hauling of school lunches.

Economical transportation options will involve transporting the hazardous wastes in conjunction with other materials, because the quantities are very small.

Disposal. Disposal options include:

- ❑ Energy recovery (in the local community or in Kodiak)
- ❑ Recycling in the lower 48 (e.g., for lead-acid batteries, refrigerants, antifreeze)
- ❑ Disposal in the lower 48
- ❑ Discharge (of treated wastewater)

The small quantities of these materials generated in KIB suggest that costs for recycling or offsite disposal will be quite high, on a unit price basis.

2.3.2 Present Weaknesses

Figures 2-9 and 2-10 present a comparison of model systems with existing KIB village practices.

Managing used oil and hazardous wastes requires a low level of capital investment, but a high level of community attention and participation. Specific technical knowledge is necessary for appropriate implementation of storage and transportation components of the waste management system. Typically, even large communities look to contractors to handle the disposal of household hazardous wastes.

It appears that the few existing systems are not capturing most of the used oil or hazardous wastes. Additionally, the existing systems could all use some additional operations and maintenance attention (e.g., minimizing leaking containers and spills). Part of the problem is that all elements of the system depend on each other. Communities do not push residents to segregate the hazardous wastes, because transportation and disposal options have not been identified and funded. Residents are not pushing community leaders to improve the used oil and hazardous waste management systems, because they may not be aware of the impact on public health and fishing.

In any small-sized community, numerous important issues vie for the attention and energy of residents. Hazardous waste management must compete with pressing issues such as children's education, economic development, housing and social problems. Community leaders do not have the resources to establish and administer systems for a problem that does not present the urgency of other community needs.

Used Oil

System Component	Adequacy of Existing System						
	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Collection							
Drop Off	✖	✖	✖	✖	✔	✖	✔
City Pickup	✖	✖	✖	✖	✔	✖	✖
Community Clean-up	✖	✖	✖	✖	✖	✖	✖
Storage							
12 month volume capacity	✖	✖	✖	✖	✖	✖	✖
Double-walled or diked tank	✖	✖	✖	✖	✖	✖	✖
Easy access - funnel & screen	✖	✖	✖	✖	✖	✖	✖
Signage	✖	✖	✖	✖	✖	✔	✖
No solvents or antifreeze	✖	✖	✖	✖	✖	✖	✖
Processing							
Lab testing	✖	✖	✖	✖	✖	✖	✖
O/W separator	✖	✖	✖	✖	✖	✖	✔
Filter system	✖	✖	✖	✖	✖	✖	✖
Plumbing	✖	✖	✖	✖	✖	✖	✖
Disposal							
Fuel for Incinerator				✔			
Landfill use	✖		✖			✔	✖
Used oil heater	✖	✖	✖	✖	✖	✖	✔
Transport out	✖	✖	✖	✖	✖	✖	✖
Drip to generator fuel system	✔	✖	✖	✖	✖	✖	✖

Key		
	✔	System is adequate (green)
	✖	System is inadequate (red)
		This system component not applicable for this community

Household Hazardous Waste

	Adequacy of Existing System						
	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Collection							
Drop off	✖	✖	✖	✖	✖	✔	✖
City Pick-up	✖	✖	✖	✖	✖	✖	✖
Community Clean-up	✖	✖	✖	✖	✖	✖	✖
Storage							
HHW Shed	✖	✖	✖	✖	✖	✔	✖
Existing Community Building	✖	✖	✖	✖	✖	✖	✖
Processing							
Exchange	✖	✖	✖	✖	✖	✖	✖
Packing/Labelling	✖	✖	✖	✖	✖	✖	✖
Disposal							
Landfill	✖	✖	✖	✖	✖	✖	✖
Batteries	✖	✖	✖	✖	✖	✖	✖
Fluids (Antifreeze/ Refrigerent)	✖	✖	✖	✖	✖	✖	✖
Transport	✖	✖	✖	✖	✖	✖	✖

Key		
	✔	System is adequate (green)
	✖	System is inadequate (red)
		This system component not applicable for this community

2.3.3 Description of Solutions

2.3.3.1 Systems/Community Planning

The following list of issues shows areas that can be addressed by an overall planning process.

- ❑ Review subsistence food sources and economically-important resources that could be impacted by used oil and hazardous waste management.
- ❑ Present hazardous waste management as an important community issue.
- ❑ Establish a location for collection of wastes (e.g., at the landfill, city shop, harbor, or other location agreed to by the community).
- ❑ Identify operations and maintenance responsibilities and staffing.
- ❑ Develop and implement agreements with contractor to handle collected wastes.
- ❑ Motivate residents to participate in the program on an on-going basis.
- ❑ Incorporate hazardous waste management costs in utility billings to assure continued funding.
- ❑ Oversee environmental aspects of government projects in the community (i.e., their fuel management and waste disposal practices).
- ❑ Review past practices that may be causing current problems (i.e., were batteries typically dumped near shore? Have the practices changed?

2.3.3.2 Technical Training

The specific technical aspects for the staff starting and running a used oil and hazardous waste collection facility are:

- ❑ Learn requirements for spill prevention and containment.
- ❑ Learn techniques for plumbing, filtration, and cleaning of used oil collection and burning equipment.
- ❑ Learn the regulatory requirements affecting which materials can be accepted and which can't.
- ❑ Learn how to minimize disposal costs by segregating materials from each other (e.g., antifreeze and used oil).
- ❑ Develop standard operating procedures that address safety and environmental issues (i.e., worker protection, minimizing leaks and spills, deny public access, segregation of incompatible materials).
- ❑ Learn strict EPA and DOT packaging, marking, labeling, placarding transportation and disposal requirements.

The community as a whole does not need to understand the technical details identified in this section. The technical training can be limited to the few residents staffing the facility.

2.3.3.3 *Community Education*

The elements of a community education program necessary to starting a successful used oil and hazardous waste management program include:

- ❑ Educate residents on what materials are considered dangerous to public health and the environment and what to do with them.
- ❑ Communicate the importance of collecting and disposing of used oil and household hazardous waste appropriately with pamphlets or educational programs at bingo.
- ❑ Motivate residents to make used oil and hazardous waste management a priority in their lives.
- ❑ Teach an environmental ethic in school.
- ❑ Teach children the impact of waste management on the community.

2.3.3.4 *Community Projects*

An interested community can start a used oil and hazardous waste program with minimal or no capital investment. Most of the items necessary can be scavenged and include:

- ❑ Containers (i.e., drums, tanks) for storing collected materials.
- ❑ Secondary containment (e.g., plastic sheeting, fish totes).
- ❑ Collection and storage areas (e.g., landfills, stores, garages) that protect materials from the weather.

2.3.4 Prospective Costs for Used Oil and Household Hazardous Waste Management

Local communities need to retain responsibility for funding of ongoing operations. The following list provides rough planning level estimates for elements of system operations. Capital expenses, such as the purchase and installation of a burner system, are not included.

❑ Used oil/HHW collection site maintenance (2 hrs/week, paid staff + expenses)	$2,000
❑ Staff training (2 days in Kodiak)	$500
❑ Used oil burner maintenance (40 hrs/burner)	$800
❑ Transportation from used oil collection to burner	varies
❑ Fuel saved by burning used oil (500 gal/year x $2/gal)	($1,000)

2.4 Scrap Metal Management

2.4.1 System Description

Figure 2-11 presents a visual depiction of a successful scrap metal system.

Scrap metal is one of the most visible types of solid waste that is generated in villages. When appliances, motor vehicles, drums, and tanks have come to the end of their useful life, they become scrap. The metal still has some value if it can be recycled but many of the scrap items have hazardous materials that must be removed before the metal can be recycled. It is the removal of the hazardous material and putting it into the hazardous waste system (described in section 2.3) that protects the environment.

A system to manage scrap metal must have the basic elements of collection, processing, storage, and transportation off-site. The details of these elements will be different from village to village but it is important that the system be written down. The written system becomes part of the solid waste operations plan.

Collection. In most communities the person (or business) who discards the scrap metal is responsible to get it to the scrap metal pile. Communities that have collection services for household trash may not be able to handle bulky scrap metal items in their normal pick-up. Some villages, however, do have a large vehicle that could be used to move large or heavy items.

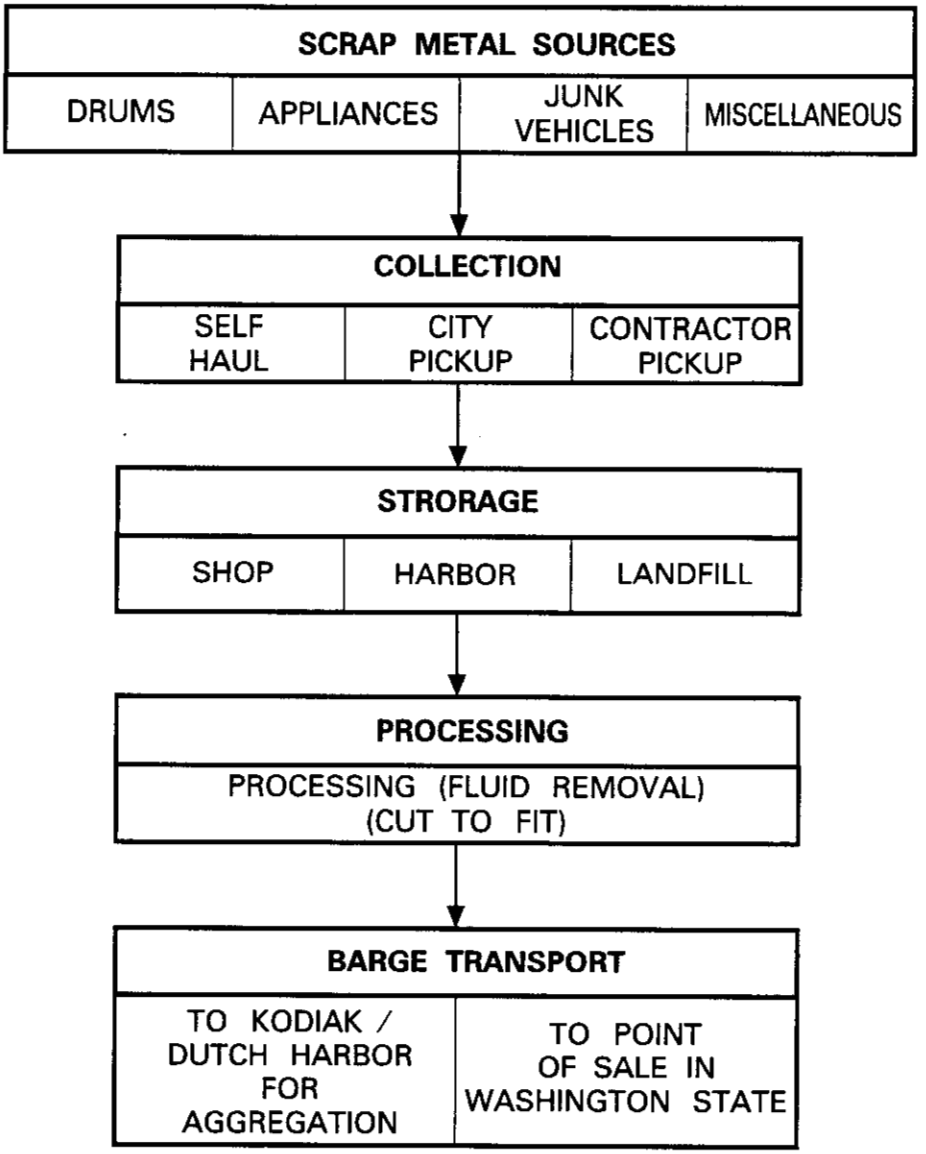
The community should decide how scrap metal will get from the home or business to the storage area. Whether it is the responsibility of the individual, the solid waste utility, or a contractor, or if the responsibility is shared, the system should encourage people to get scrap metal to the designated area.

Processing. As mentioned above, scrap metal sometimes has hazardous material that must be removed. Scrap vehicles and equipment should be drained of fuel, motor oil, gear oil, hydraulic fluid, and antifreeze. Batteries should be removed. Small tanks and fuel drums should be completely drained. Recovered fluids and batteries will need to be handled as hazardous waste as described in section 2.3.

Old refrigerators and freezers are a special case because of the requirements of handling the refrigerant. Freon® removal requires specialized equipment and knowledge of refrigeration systems. This is a task that may have to be handled by a specialist from outside of the village.

Written procedures for the processing of scrap metal should be developed. In addition to removing fluids and batteries, the procedures should describe how spills will be prevented and what needs to be done in response to a spill.

IMPORTANCE:
COMMUNITY AESTHETICS; ECONOMIC DEVELOPMENT, PROTECTION OF RESOURCES



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MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2–11
KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

SCRAP METAL SYSTEM

Storage. In each village an area should be designated for scrap metal handling. The area would be used for processing, segregating, and storage. Processing, the removal of hazardous materials, was described above. Segregation is dividing the scrap by type, such as autos, appliances, light scrap, and drums. The area needs to be large enough to store the scrap until it is removed.

In most villages the storage site will be at or near the landfill. This will allow the fluids and batteries that are removed during processing to be stored at the hazardous materials storage facility. Storage at the landfill also keeps the solid waste of the community in one place.

An alternative location for scrap metal storage is closer to barge or landing craft loading sites. This would make transport out of the community easier. The advantage of easier transport would have to be compared with the advantages of storage at the landfill site.

Transportation. The removal of the scrap metal from the village is the only capital intensive, that is, expensive part of the system. Material could be shipped out of the villages on a barge or landing craft that is making the trip for the special purpose of removing scrap metal. A vessel such as the Island Provider could load from docks and take a lightering craft to transport scrap from those villages without docks. Because of the high cost of keeping a vessel at a village during loading, it is important that the effort be coordinated and the scrap be staged close to the point of loading.

Other steps can be taken to remove scrap metal from villages. It could be a policy that when full drums are delivered to a village that empty drums be hauled away. This would reduce the accumulation of drums that is taking place. When construction projects are being planned, the village could require that scrap metal generated during the project be removed.

The focus of scrap metal management in Chiniak is different, since residents have road access and the ability to properly dispose of metals at Borough facilities in Kodiak. In Chiniak, educational and enforcement measures are more appropriate to ensure that residents use the existing systems available to manage these materials.

2.4.2 Present Weaknesses

Figure 2-12 compares the elements of successful scrap metal management against existing KIB village practices.

The current system does not allow for the safe containment and recovery of hazardous fluids and gases or the effective off-site recycling of metals. Disposal practices such as abandoning vehicles in coastal marshlands not only have visual impacts, but potentially serious freshwater and marine environmental impacts from ruptured gas tanks and leaking oils and fluids. Abandoned fuel drums and large fuel storage tanks are present in all villages. Both drums and large tanks can contain oily residues that may be

Scrap Metal

System Component	Adequacy of Existing System						
	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Collection							
Self haul	✔	✔	✖	✖	✔	✔	✖
City pick-up	✖	✖	✖	✖	✖	✖	✖
Community clean-up	✖	✖	✔	✖	✖	✖	✖
Storage							
Landfill	✔	✖	✖	✖	✔	✔	✖
Harbor	✖	✖	✖	✖	✖	✖	✖
Other	✖	✖	✖	✖	✖	✖	✔
Processing							
Fluid removal	✖	✖	✖	✖	✖	✖	✖
Fluff removal	✖	✖	✖	✖	✖	✖	✖
Compact	✖	✖	✖	✖	✖	✖	✖
Cut to fit	✖	✖	✖	✖	✖	✖	✖
Disposal							
Local burial	✖	✖	✖	✖	✖	✖	✖
Transport	✖	✖	✖	✖	✖	✖	✖

Key		
	✔	System is adequate (green)
	✖	System is inadequate (red)
		This system component not applicable for this community

released as the containers disintegrate. No immediate plans for tank removal and remediation were noted during site visits.

Abandoned appliances were also present in varying quantities in villages. In some cases, no appliances were noted, which implies that refrigerators and freezers are generally landfilled as-is. In other cases, these appliances were piled with other scrap without special handling for Freon® and compressor oil removal. Lead acid batteries were also present throughout the villages. Given the low volumes of stockpiled batteries, it is likely that many have been landfilled or otherwise dumped.

Two of the communities, Akhiok and Karluk, do not have docks for the loading of scrap metal for transportation out of the village.

2.4.3 Prospective Solutions

2.4.3.1 *Systems/Community Planning*

As villages plan for improved solid waste handling, areas should be dedicated for scrap metal handling. These areas could be used to segregate metals by type (e.g., autos, refrigerators, light scrap, etc.) in stockpiles. The areas should be large enough to stockpile materials for efficient periodic removal, which might occur relatively infrequently. While the metal stockpile area for each village might be at each village's disposal site, alternative areas closer to barge or landing craft loading sites would be more appropriate for some villages.

A coordinated system of removing scrap metal from the communities should be developed. Annually, or on a scheduled basis, a barge or other vessel could stop at each village to load the accumulation of scrap metal that has been processed and staged for removal.

Some on-site technical training might be necessary to stabilize scrap materials for stockpile storage. Scrap vehicles and equipment should be immediately drained of fuel, engine, gear, and hydraulic oils. Small tanks and fuel drums should also be completely drained. Recovered fluids will need to be managed, with oils burned for heat recovery (as appropriate) and gasoline used as fuel or safely stored for removal as hazardous waste.

While these tasks are not necessarily technical in nature, they will need to be performed with regulatory compliance in mind. A responsible person in each village must manage stockpiles and ensure that this preparation occurs in a timely and safe manner. This person will require some training to understand the regulatory environment, safe handling of scrap, and containment procedures for the initial handling of scrap items. Written procedures for initial processing, as well as spill response and containment, should be developed for each village.

Village staff should be able to perform essentially all initial handling of scrap with the exception of Freon® removal. Freon® removal requires specialized knowledge of refrigeration systems as well as specialized equipment. For this function, an annual coordinated recovery program could be the most cost-effective. A specialized contractor could be flown to each village to drain refrigerators, freezers and any scrapped cars with air conditioning accumulated during the previous year.

2.4.3.2 Community Education

Community education will be important for residents to understand the need to segregate metals at disposal or stockpile sites. Residents will also need to be informed about the importance of containing hazardous fluids. For example, scrap refrigerators should be handled carefully to ensure that both compressor oils and refrigerant are not carelessly released into the environment.

Long term environmental education is enhanced through environmental stewardship curriculum (see Section 3.3) directed at school children. However, many of the educational issues related to the safe handling of scrap are fairly specific and will need to be targeted directly to waste generators. The most appropriate community education formats for scrap metals management include direct one-on-one contact, community meetings (e.g., a meeting to describe the village's new waste management system), and to a lesser degree, written materials.

2.4.3.3 Community Projects

No capital improvements should be necessary to upgrade village scrap handling. However, a continuation of the KIB scrap metal removal program is recommended to reduce health hazards in the villages resulting from contact with uncontrolled disposal of scrap metals around the villages, or degradation of subsistence resources from hazardous materials associated with uncontrolled scrap disposal This is envisioned as a recurring regional project involving contractor assistance for a community wide collection process and contractor transport from each village.

2.4.4 Prospective Costs for Scrap Metals Management Operations

Local communities need to provide for operations funding through their own resources. The following list provides rough estimates of funding requirements.

- ❑ Community scrap inventory (8 hrs) — $120
- ❑ Local material segregation and processing (12-24 hrs) — $2,000 - $5,000
- ❑ Transport coordination/contract administration (2-20 hrs/year) — $50 - $500
- ❑ Technical training for local processing (2 days in Kodiak) — $500

2.5 Fuel Delivery Systems

2.5.1 System Description

As depicted in Figure 2-13, proper design, construction and operation of fuel systems typically include the following elements:

- ❑ Siting
- ❑ Appropriate hardware
- ❑ Fuel delivery
- ❑ Spill prevention plans and equipment
- ❑ Operations
- ❑ Maintenance
- ❑ Use
- ❑ Waste management
- ❑ Decommissioning and cleanup

Fuel systems usually represent the largest single source of potential environmental pollution in a rural Alaskan community, because it is a large quantity of petroleum is typically stored near precious marine resources. The tank system itself is often substandard (i.e., does not have the required safety devices) and typical operating procedures present a significant opportunity for catastrophic spills (i.e., unloading fuel from barges and tankers). If a release does take place, the cleanup costs alone could be devastating to the community, not to mention the loss of subsistence food sources and economically-important resources.

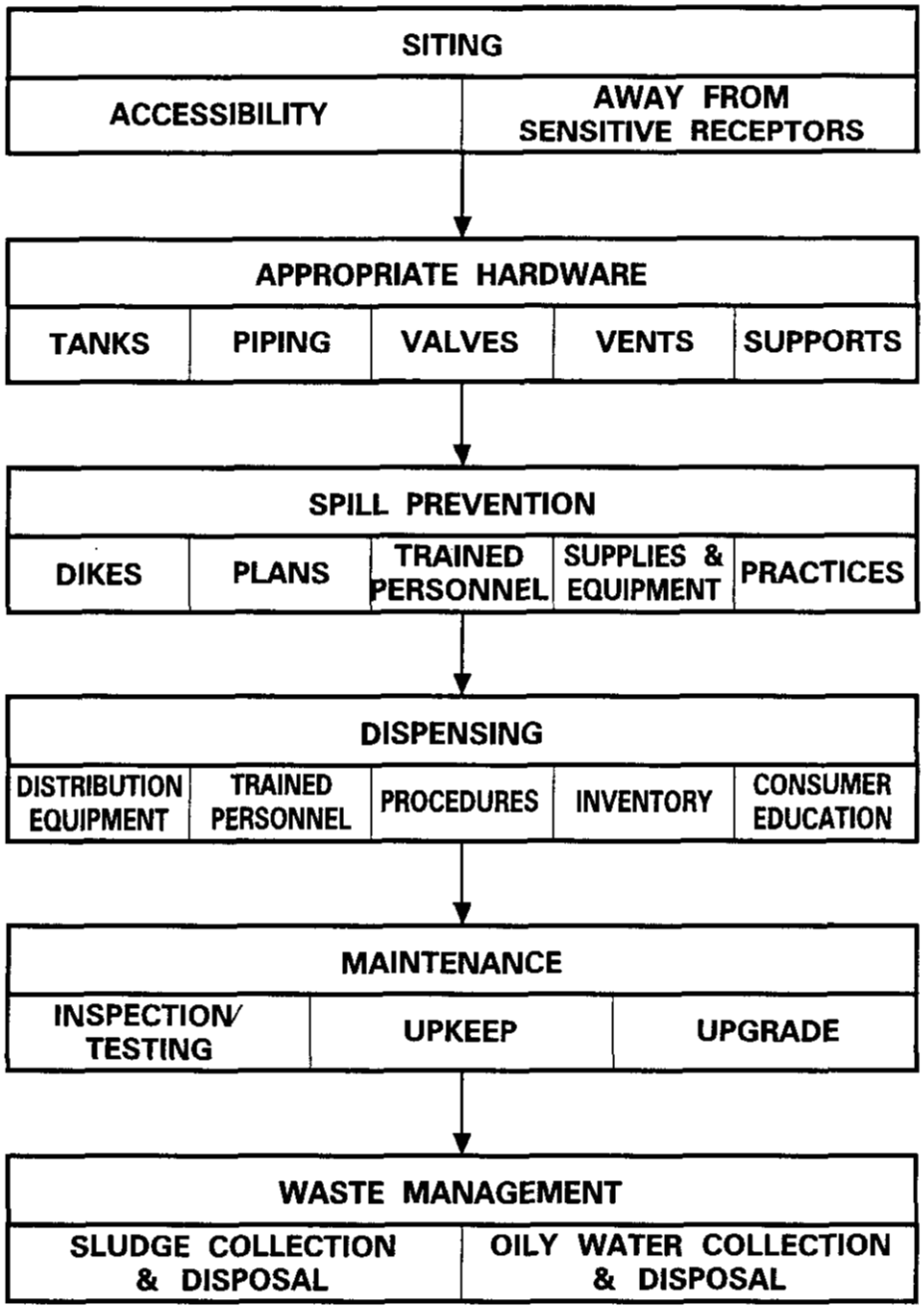
Fuel for the KIB schools is typically stored in underground storage tanks (USTs). Leaks on underground tanks can't be observed visually and therefore can go undetected forever. Fuel added to the tanks promptly leaks out and more fuel is added, causing an ongoing, ever-growing problem. Although no evidence was observed that suggests the KIB USTs leak, the problem is the potential for the leak and the potential for it to go undetected for a long time which could result in costly cleanup requirements.

Additionally, fuel storage facilities generate numerous ancillary waste streams, such as off-spec fuel, oily water, oily rags, petroleum contaminated soil and sludges that require special management.

2.5.2 Present Weakness

Weaknesses in the fuel storage systems in Kodiak Island villages were inventoried and reported in the 1996 audit by the Alaska Department of Community and Regional Affairs. The concerns included the integrity and design of the fuel systems, operations and maintenance.

IMPORTANCE:
IMMEDIATE POTENTIAL FOR LARGE
CATASTROPHIC RELEASE TO LAND OR WATER



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MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-13

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

FUEL TANKS SYSTEM

Most of the issues involve the absence of features that reduce the likelihood or severity of a fuel release, such as secondary containment, and leak detection systems. Community preparedness is equally important in many cases. If a leak or spill is detected early, its impact can be minimized by rapid, coordinated action by properly-equipped on-the-scene responders.

2.5.3 Prospective Solutions

2.5.3.1 Systems/Community Planning

From a strategic standpoint, the following issues were identified that would significantly reduce the vulnerability of the KIB communities to the impact of fuel storage and use. They include:

- ❑ Identify and train an emergency response team that could immediately respond to a fuel spill.
- ❑ Store spill response materials in each community.
- ❑ Prepare a list of outside resources to call in the case of a sizable spill. Put any necessary agreements or contracts in place ahead of time.
- ❑ Actively participate in the oversight of fuel storage facilities in the community, including those owned and operated by private entities (e.g., Kodiak Salmon packers in Larsen Bay) and government programs (e.g., schools). Make sure these entities are in compliance with existing federal and state requirements.
- ❑ Establish a program of routine, periodic inspections of all tank systems by a knowledgeable resident that is independent of all fuel system owners and operators.

2.5.3.2 Technical Training

The following training items were identified for fuel delivery staff in the KIB communities:

- ❑ train fuel delivery staff in fuel transfer procedures that reduce the likelihood of spills
- ❑ train fuel delivery staff to notice and repair fuel leaks in household systems
- ❑ establish waste management procedures for wastes associated with the fuel systems, such as inadvertently-contaminated soil, oily water and sludges, off-spec fuel, and oily rags

Figure 2-14 presents a comparison of existing systems to model fuel delivery management.

Fuel Delivery

System Component	Adequacy of Existing System						
	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions
Siting							
Accessible by fuel barge	✔		✔		✔	✔	✔
Away from sensive environment	✔		✖		✖	✖	✔
Hardware							
Tanks							
Piping							
Valves							
Vents							
Supports							
Filling							
Documented procedures							
Execution							
Inventory							
Spill Prevention							
Diking in place	✔		✔	✖	✖	✔	✔
Diking well maintained	✖		✖	✖	✖	✖	✖
Supplies and equipment	✖		✖	✖	✖	✔	✔
SPCC plan	✖		✖	✖	✖	✖	✖
Dispensing							
Trained personnel			✔		✔	✔	✔
Consumer education	✖		✖	✖	✖	✖	✖
Waste Management							
Sludge collection and disposal	✖		✖	✖	✖	✖	✖
Oily water collection and disposal	✖		✖	✖	✖	✖	✖
Contaminated soil clean-up	✖		✖	✖	✖	✖	✖
Key	✔	System is adequate (green)					
	✖	System is inadequate (red)					
		This system component not applicable for this community					

Montgomery Watson

Figure 2-14

2.5.3.3 *Community Education*

Management of the fuel tank systems does not require participation of the community residents as a whole. If residents transport and transfer their own fuel oil, then broader education throughout the community is desirable. No other areas for community education were identified.

2.5.3.4 *Capital Equipment*

Extensive upgrades are warranted on many, if not all, rural Alaskan fuel tank systems. The cost of the required or recommended upgrades is generally quite high and unaffordable by most communities. The Alaska Department of Community and Regional Affairs currently has a program to inventory and upgrade fuel systems in rural Alaska, but available funding is only a fraction of what is needed. ADEC, ADCRA and local communities are in the throws of determining how and when rural fuel systems can be upgraded and the issue is unresolved.

2.5.4 Prospective Costs for Fuel Systems Operations

In addition to the cost of the bulk fuel and delivery (usually by a private enterprise), the community would be well served by the following ongoing investments to ensure resource protection.

- ❑ Tank site maintenance/spill control equipment inventory $500
- ❑ SPCC review and update $500

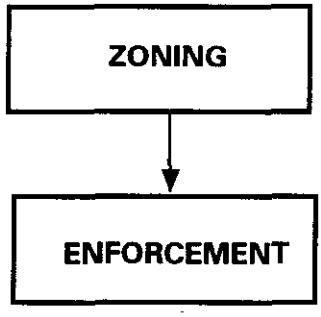
2.6 Resource Protection (Drinking Water And Subsistence Foods)

Resource protection is an attitude that permeates all waste management systems and planning. As shown in Figure 2-15, it does not require its own infrastructure, but rather is a factor taken into account when designing other waste management system upgrades.

Implementation requires community education and planning. An inventory of community resources, such as drinking water, subsistence food sources, economically-important resources (e.g., to commercial fishing and/or tourism) and recreational resources (e.g., swimming and picnic areas), must be compiled so there is consensus on what must be protected and why. These resources must be placed on a map of each village so that they can be communicated to outside agencies and organizations that design and implement projects in the villages. Montgomery Watson's first report, Inventory of Pollution Sources and Problems, presents a first-attempt at this effort and can be used as a basis for discussions.

IMPORTANCE:

DIRECT IMPACT ON HUMAN HEALTH OF WHOLE COMMUNITY THROUGH DRINKING WATER.



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MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-15

KODIAK ISLAND BOROUGH
MASTER WASTE MANAGEMENT PLAN

WATERSHED PROTECTION SYSTEM

For KIB communities, some of the first topics for discussion at a community meeting should be:

- ❑ watershed protection through zoning and/or ordinances
- ❑ oversight procedures for projects implemented in and around the community

3. IMPLEMENTATION AND FUNDING

This section identifies and discusses four projects for improvements to KIB waste management. They include:

1. Borough-wide Utility Council: Establishing a Resource for Collaborative Problem-Solving
2. Systems Development: Fixing and Improving on What is There
3. Community and Environmental Curriculum Development: Building an Environmental Consciousness
4. Local Waste Management Implementation: Community-level Planning and Organization

Each project was selected because of its ability to enhance protection of the marine environment while improving human and environmental health in KIB communities. The projects Montgomery Watson recommends focus on enhancing the KIB village-based technical capabilities and community self-determination and involvement in order to take control and responsibility of community-based waste management systems away from outside agencies.

3.1 Borough-wide Utility Council

3.1.1 Background and Rationale

Historically, the six remote communities of Kodiak Island have lacked a forum to meet and discuss waste management problems, exchange information, and develop regional solutions. For this Waste Management Master Plan project, KANA convened the Kodiak Island Village Environmental Council (KIVEC) to discuss issues and priorities for waste management system problems at a regional level. The KIVEC has been effective in getting communities together and getting significant issues onto the table for discussion.

People from the KIB villages have also established the Kodiak Island Village Utility Council (KIVUC) to provide technical support for a variety of utilities concerns. In the past the KIVUC has obtained funding and hired a remote maintenance worker, arranged for installation of Powerstat devices for Akhiok and Karluk, and undertaken other projects as funding allows. Currently, it operates as a non-profit, volunteer agency that is dormant without specific project funding.

The borough-wide utilities council will be a combination evolving from the two existing councils.

3.1.2 Objectives

The purpose of the utility council is to provide:

- A permanent resource for coordination between KIB communities and between communities and outside agencies
- A forum for collaboration to solve problems
- An administrative center to manage the business aspects of utility operations
- A resource for technical and utility expertise

3.1.3 Description of Solution

The council will evolve from the KIVEC and KIVUC and expand to provide more time and resources for information sharing and exchange, as well as provide a recognized administrative structure, with formal membership and support from both tribal and city governments. Utility system improvements will be coordinated through the council on an area-wide basis.

As envisioned, the borough-wide utility council will be the next step to strengthen and formalize the work of the existing utility council. With a director and a legal structure, the council will be positioned to empower the communities, support community projects, and provide ongoing project administration. The utility council will provide the structure to allow communities to tackle their waste management system problems at the local level.

The council will be the key to the implementation of the remaining three initiatives.

3.1.4 Key Elements for Success

The following key elements have been identified for the success of the Borough-wide utility council:

- An administrator dedicated to the improvement of waste management systems and the operations of utilities in the KIB communities
- A legal structure that serves as an entity for the administration of funding and utility system support
- Formal membership that represents the KIB communities
- Support of tribal and city governments
- Borough-wide focus

3.2 Systems Development: Fixing and Improving on What is There

Regional Training And Oversight For Operations And Maintenance Of Waste Management Systems

3.2.1 Background And Rationale

During our site visits, Montgomery Watson observed that each village has existing infrastructure to manage waste and provide utilities (e.g., drinking water treatment and distribution, landfill, septic systems). The systems are intended to serve the needs of the community, but often don't because most of these systems are partially broken. For instance, sometimes, septic systems are overflowing, drinking water sources periodically become contaminated, unsightly landfills have uncovered garbage and are frequented by bears.

Many of the most severe problems can be fixed immediately without waiting for new facilities. In fact, based on past experience, the new facilities will not be any better than the old ones, because the problem is not with the facility, but with the operation and maintenance. No facility will continue to work, unless it is given the continuous attention at an appropriate level.

One example is the discharge of overflowing septic systems or sewers near subsistence food sources. The systems appear to be correctly sized for the communities, but many of the communities have ongoing problems with them. They plug and overflow.

Part of the breakdown is because these systems were designed and built by outside agencies and experts who don't use them. Therefore, when part of the system breaks, it is only a problem and priority to the local community, not the outside agency.

Although each village has a talented maintenance worker who works on the broken systems, he often lacks the detailed knowledge of the system designer; was only trained in part, if any, of the maintenance activities; lacks tools and equipment; or has conflicting priorities (e.g., lack of time). The maintenance worker, working with the available resources and time, is able to temporarily Band-Aid the system so it limps along for a short time, rather than get to the root problem and permanently fix it. Soon the problem crops up again and the cycle repeats, the problem never really goes away, and frustration builds within the community.

Many of the systems require not only training, but experience. A person cannot be expected to have the skills to fix difficult, complex problems, unless they have troubleshot numerous problems with numerous similar systems. In larger communities, the operations and maintenance workers are usually specialists expected to know only one system (e.g., water treatment). In small communities, like the Kodiak Island villages, a single person is often expected to have this level knowledge on all of the village facilities.

To further illustrate the point, the attractiveness of the landfills to bears can be reduced by covering the garbage immediately or burning it. Each community has the equipment to move garbage (e.g., front end loader) and cover material, people to run it, and a spot to pile and burn garbage, but it is not routinely happening in any of the communities, except Ouzinkie.

In the 1995 EPA report titled, "Federal Field Work Group Report to Congress on Rural Sanitation," EPA states that: "...it will not be possible to attain a satisfactory level of sanitation service in a significant number of rural Alaskan communities unless the O&M issue is addressed effectively."

In summary, the major reason why the KIB waste management systems don't work well is because they don't get fixed. The KIB waste management systems will not work better until each village takes even more responsibility of the system operations and maintenance. To do this, each village needs village-based people who have the training, experience, tools, time and motivation to keep the many complex technical systems from breaking and these maintenance workers need to be compensated for their work.

3.2.2 Objectives

The objectives of this initiative are:

- To establish a network of operations and maintenance specialists within each KIB village that has the knowledge, tools, equipment, budget, and motivation to make the KIB waste management systems perform reliably and well always.
- To retain the necessary skills and experience in the villages and continually improve them.

3.2.3 Description Of Solution

This section describes a vision for a comprehensive operations and maintenance training program for maintenance workers selected from each village. The program focuses on hands-on training and will involve the training group fixing the malfunctioning waste management systems in each village.

As envisioned, each village would select several residents from the community that are to receive the in-depth training as operations and maintenance workers. There would be three groups of trainees, paired as follows:

- Ouzinkie and Port Lions
- Larsen Bay and Karluk
- Akhiok and Old Harbor

Each group of trainees would be provided with an experienced specialist, who would lead them through troubleshooting and fixing the broken systems in the their communities. During the 8-month program, trainees would spend half of their time in their own community and the other half in the partner community.

Selection would be made by the community members and based on a competitive selection process. Communities may want to consider selecting a mix of experienced personnel and new high school graduates in order to maximize the long-term benefit to the community.

Trainees would be provided a stipend during the training program. Trainees found to be unsuited to the program or unwilling to commit the time would be released from service immediately and replaced, so the community would not suffer.

The KIB program would be greatly enhanced by incorporating existing resources, such as ADEC's Remote Maintenance Workers (RMW). The RMW's focus is education and training of rural maintenance workers. Currently, one RMW, funded through the Rural Economic and Development Association, is assigned to serve the six Kodiak Island villages.

The curriculum would consist of, at a minimum, achieving a thorough grasp of the following aspects of operations and maintenance:

- ❑ Read and understand existing drawings
- ❑ Troubleshoot problems in facilities and equipment
- ❑ Identify and order spare parts
- ❑ Compile and be responsible for complete tool kit
- ❑ Cleaning and maintaining of tools and parts
- ❑ Have, read and understand maintenance manuals or checklists
- ❑ Have, read and understand operations manuals or checklists
- ❑ Develop a preventative maintenance program
- ❑ Identify and plan for routine maintenance requirements
- ❑ Inventory planning and control
- ❑ Budgeting and prioritization
- ❑ Keep maintenance logs and budgets
- ❑ Routine systems inspections
- ❑ Identify suppliers and vendors for unmet needs for parts and services
- ❑ Develop a work ethic that is responsive to the needs of the community
- ❑ Work alongside peers from other KIB villages
- ❑ Meet and talk with system designers, experts and other resources from outside the community

- ❑ Identify, evaluate and contract outside experts, when needed
- ❑ Provide feedback to the community on waste management issues
- ❑ Develop standard safety and environmental practices

A short list of preliminary activities for each of the waste management systems is shown below to provide a flavor of the training program and show the value that will be provided by the program to each community.

Waste water treatment

1. Repair sludge pumping trucks
2. Identify/construct a septic sludge disposal pit
3. Develop a preventative maintenance schedule for pumping and disposing of septic tank sludges, changing oil on pumper trucks, etc.
4. Routinely pump and dispose of septic tank solids into the pit
5. Inspect tanks and piping for plugs or restrictions
6. Remove any blockages
7. Identify and fix any systemic problems (such as the excess use of water)
8. Community education (e.g., provide feedback on any community practices that may break the septic system -- such as disposal of plastic bags through the septic system)

Landfills

1. Develop an operations plan
2. Perform all tasks associated with the plan (e.g., collection, hazardous waste segregation, temporary storage, put solid waste into cell, burn, compact and cover)
3. Community education

Used oil burners

1. Develop a streamlined operations plan
2. Develop a preventative maintenance checklist to routinely change oil and filters, etc.
3. Practice all items on the operations and preventative maintenance plan
4. Install any new, uninstalled systems
5. Identify appropriate disposal for oily rags, filters, oily water, etc.
6. Formalize used oil storage area and transfer procedures
7. Rig piping and pumps to streamline transfers

As evident from the list of subjects, many of the most urgent waste management problems will be fixed by the trainees during the training program. For example, when in Akhiok, the training group will troubleshoot the overflowing septic system, when in Port Lions, it can develop an operations plan for the landfill and start a routine of daily cover.

This approach fixes frustrating, reoccurring waste management problems in each village using local labor. It builds a network of trained experts in each village and encourages ongoing collaboration between KIB villages, so that when a system breaks, the local experts can bring in additional manpower from other Kodiak Island villages, rather than Seattle or Anchorage.

3.2.4 Key Elements For Success

Montgomery Watson has identified the following key elements for success of the training program.

1. **Selection of trainees.** The skill and motivation of the trainees are the single most important factor in the long-term success of the training program. The community is investing time and money in the trainees in the expectation that they will master the necessary skills, apply them to the benefit of the village, and remain in the village to use them. Therefore, Montgomery Watson recommends a competitive selection, based on applications, with final selection decided by the community. Interest, aptitude, reliability and motivation should be given more weight than experience. The position is not an entitlement or political appointment. The community retains the ability to rapidly hire and fire personnel for non-attendance, poor performance, etc.
2. **Nurture and retain expertise.** Retain trained personnel in the village once they have the skills by: (1) training more than one person per village, (2) encouraging networking and sharing of resources within the region, (3) provide ongoing training, (4) provide adequate compensation for the time and skill.
3. **Selection of trainer.** More important than specific technical degrees or skills, the trainer should be someone who has a track record of success in working with rural Alaskans and operating and maintaining rural Alaskan facilities. The successful Alaskan maintenance worker is a jack-of-all-trades, whose skill lies in the ability to figure out solutions to problems s/he has never encountered, rather than someone who knows how to fix a specific problem because they have been taught a routine. Besides the necessary experience with the systems, the trainer must have the ability to transfer the skill of ingenuity, rather than rote learning.
4. **Accountability.** Both trainer and trainees must be held accountable for the community's investment in them. A successful program will include a mechanism to measure performance and compensate based on results.

3.2.5 Other Alternatives Considered

Three potential alternatives for in-depth training of village resources were identified and are discussed below:

Established trade school or university programs. Maintenance trainees from the KIB communities could be enrolled in an established training program for the mechanical or electrical trades or wastewater treatment operators. This option was considered inferior because personnel would receive training only in the chosen field, rather than the broad range of skills necessary in the KIB communities. Furthermore, this alternative provides no hands-on experience with the systems currently in use and leaves the villages without maintenance workers for an extended period of time.

Off-site group training. This option involves training the selected personnel, as a group, in an off-site location, such as Kodiak or Anchorage. Off-site training of the maintenance workers as a group has the advantage of bringing the trainees together and strengthening ties between the communities. It also would allow a fast-paced learning environment. Classes could be targeted to the systems in use in the KIB villages, however, hands-on training would be minimal. This option was considered inferior because of the minimal amount of hands-on training with existing KIB village systems and because all of the maintenance workers would be gone from the villages for an extended period of time. During the time the maintenance workers were gone, the existing waste management systems would fall into disrepair.

Round-robin training in KIB villages. This option involves the group of trainees from all villages traveling to each village to troubleshoot problems and fix the existing systems. The two main advantages of this option are: the broken equipment in the villages gets fixed and the maintenance workers receive hands-on training on the very systems they will be expected to fix next time. The disadvantage is the extended period of time personnel will be away from their own community, the lack of facilities to house and feed a group of this size, and large class size.

3.2.6 Benefits Of This Solution Over Alternatives.

Montgomery Watson is recommending this solution over other approaches for the following reasons:

- ❑ It is most likely to provide KIB villages with a permanent solution (i.e., working waste management systems) rather than a temporary fix.
- ❑ Control and decision-making regarding village systems is at the village level.
- ❑ Provides job training and valuable skills to residents.
- ❑ Money allocated to waste management is returned to the villages in the form of operations and maintenance salaries rather than expended with an outside consultant.

3.3 Community And Environment Curriculum Development

3.3.1 Background and Rationale

This project would involve the development and implementation of a unique approach to teaching young people in rural Kodiak Island village schools about how their community works and how their own behavior affects both the local economy and environment. Developed in conjunction with local tribal councils and the KIB School District, KIVEC would implement this curriculum as an intensive, but short duration unit affecting a large number of students in each school.

3.3.2 Objectives

The principal purpose of the special curriculum project would be to introduce or emphasize an ethic of environmental stewardship among the children of each individual village. Closely related would be the development and encouragement of citizenship among village children, providing insight into the way that their community functions. A side benefit from the curriculum development process would be a closer association between the school district and village tribal council leaders. In the long run, the community and environment curriculum could assist in identifying prospective utilities system operators and managers, leading to mentorships as discussed in Section 3.2.

3.3.3 Description of Solution

Since local teachers are fully committed to existing duties, a teacher (or teachers) with specialized expertise would venture from village to village, on a one- to two-week rotation. The roving teacher would implement the community environmental systems curriculum, working with the local teaching staff to optimize the interaction with students in each village. The close and extended contact with students in each school allows the student and teacher to build trust and develop a level of communication that is impossible for day visitors and substitute teachers.

The curriculum would focus on issues germane to local village life: the hydrologic cycle; use of water and the production and disposal of wastewater; health hazards from exposure to pollutants; protection of subsistence resources; generation, collection, and disposal of garbage; definition and handling of hazardous materials; energy use and conservation; duties and responsibilities of citizens and government; and (for older children) costs and cost recovery mechanisms for waste management systems.

Based on a pilot program to be developed in the 1998-'99 school year with grant funds, the School District may elect to incorporate some of the information in the standard school curriculum, or alternatively, devote funding to a continued or expanded program in future years.

Steps and recommended timeframe involved in implementation of this curriculum are as follows:

1. Develop agreement(s) between tribal and village councils and school district outlining approach and commitment. (Summer, 1998)
2. Grant funding requested and obtained. (Fall, 1998)
3. Develop requests for proposals for curriculum development. (February, 1999)
4. Award contract for curriculum development. (April, 1999)
5. Contractor meets with tribal and village councils and teachers in each village. (May, 1999)
6. Contractor submits draft report with implementation plan to school district. (September, 1999)
7. School district and tribal and village council representatives meet in Kodiak to discuss plan with contractor. (October, 1999)
8. Final implementation schedule established. (November, 1999)
9. Pilot implementation in each village. (March through May, 2000)
10. Evaluate program and make recommendations for follow-up. (June, 2000)

3.3.4 Key Elements for Success

Montgomery Watson has identified the following key elements for a successful program:

- ❑ The environmental curriculum must be tailored to and specific to the KIB communities (e.g., impact of waste petroleum on subsistence food resources), rather than a superficial treatment of global issues that are not readily felt in the Kodiak Island communities (e.g., global warming).

- ❑ Including tours of local waste management facilities, interviews with environmental professionals in the village (e.g., waste management maintenance workers) would underscore the relevance of the curriculum to students

- ❑ The educational program should take place after improved waste management practices are ready for implementation. In the past, the sense of accomplishment with student projects was mediocre, because it was not possible to complete the projects. For example, no transportation or recycling facilities were identified for collected aluminum cans and batteries, so they remain stored in the communities indefinitely. This leads to frustration and sends the message that environmental projects are not successful. These detrimental messages must be avoided.

- ❑ The curriculum should include a list of immediate actions the students and their families can take to improve waste management in their community. The list should contain all information necessary to successfully make a positive impact

on the environment and should not require the student to figure out technical or logistical questions that are beyond their grasp.

3.3.5 Other Alternatives Considered.

Using materials already developed. A host of curriculum materials for "environmental studies" have been prepared by agencies and educators around the nation, including materials developed specifically for Native American Communities. The Northwest Renewable Resources Center has even published a teachers guide entitled "Changing Waste in Changing Times: Solid Waste and Natural Resource Issues in Rural Alaska", written by Shirley Moses. This book is full of ideas and methods to focus school kids thinking about personal responsibility in the environment. By assembling many of these materials, and making them available to the rural Kodiak teachers, the teachers could be better prepared to bring these issues to the forefront in their classrooms. This could be done at minimal expense, although it takes considerable work on the part of each teacher to tailor the methods to his or her individual classroom. Additionally, as Ms. Moses points out in her book, the curriculum will still need to be adapted for the specific geography and culture of the school's region.

Provide teacher training. Through a special in-service or summer program, the rural teachers could be introduced to an environment and community curriculum which is more specifically tailored to the KIB environment. As many new rural teachers are visitors from Outside Alaska, with little teaching experience, this workshop environment could help orient teachers into the unique community structures in rural coastal KIB villages. Emphasis would be placed on the operations of community systems and utilities, which are taken for granted in larger communities, but rely heavily on individual commitment in rural Alaska. The workshop would be convened in Kodiak, perhaps as part of an orientation session or special summer program. Contributors could be drawn from city and tribal organizations to discuss utility and community systems.

Develop community education as a tribal council activity. Through collaboration among village tribal councils, develop a curriculum to augment existing activities that take place in the schools. Using similar techniques and approaches as described for the development of the school curriculum, the participating village councils may use external consultants, or perhaps more appropriately, local community elders, to present information concerning the environment and history of the development of each community. This could be a regularly scheduled activity through the winter months, taking 3 to 8 hours on evenings or Saturdays in addition to school. Provided that the school and local village council develop an agreement on approach, it is possible that the school district may allow incorporation of this effort as part of the school day.

3.3.6 Benefits of this Solution over Alternatives

The benefits of this approach to the KIB communities include:

- This activity can be combined with other community planning or educational activities to the benefit of both programs. For example, it can be used as a means to rapidly communicate practices that would have an immediate beneficial impact on the functioning of community waste management systems. For example, students can learn why it is important to dispose of plastic bags and garbage in the landfill rather than through the septic system, where they currently cause plugged pipes.

- The curriculum can provide students the rare opportunity to be exposed to career opportunities outside the community. The curriculum can discuss environmental careers within and outside the community.

- Lessons can draw on the traditional cultural value placed on the environment to reinforce their importance.

3.4 On-going Village Waste Management Implementation Initiative

3.4.1 Background and Rationale

Rural Alaskan communities face an increasingly large and complex set of not only environmental concerns, but social, cultural, educational, physical, and economic concerns as well, all of which are so interrelated that it is practically impossible to consider one without considering the other. Long-term waste management planning and implementation by the villages of Chiniak, Ouzinkie, Port Lions, Old Harbor, Akhiok, Karluk, and Larsen Bay must consider environmental concerns in a holistic context.

Any attempt to implement technical solutions to the problems identified in our earlier report, "Kodiak Island Borough Inventory of Pollution Sources and Problems," must be done with the active concurrence and participation of individuals, families and organizations throughout each village community.

Because important community development of this kind is something the villages can only do for themselves, it is critical that community members take ownership of the on-going waste management process. Significant community development takes place only when local community members are committed to investing themselves and their resources in the effort, and in order for a technical solution to be sustainable, it requires the "buy in" of the majority of a community.

The implementation of the "Kodiak Island Borough Master Waste Management Plan" is a necessary first step in the development of solutions for the coastal villages of Kodiak Island. It has examined and identified pollution sources and problems and is developing some suggested next steps for remedy. This process is taking place primarily with assistance from the Kodiak Island Village Environment Council and

representatives from the Kodiak Island Borough and the Kodiak Area Native Association. Additionally, this process provides for public participation during two half-day meetings within each community to share the thinking and suggestions of our consultants and regional representatives.

Once the "Kodiak Island Borough Master Waste Management Plan" is completed the next step is for each community to gather its residents and determine how, when and why suggestions from the "KIB Master Waste Management Plan" can and will be further internalized and implemented within each community. This process will require "grass roots" participation by residents throughout the community to ensure a strong sense of ownership in the solutions implemented within each village. Additionally, this process must address how environmental concerns will be prioritized against other village issues and concerns; how technical solutions will be maintained and supported by village residents; and how on-going education will be prioritized and supported by village residents.

This is not to say that outside resources are not important, but it is increasingly futile for communities to wait for and depend on help to arrive from outside the community. The villages should fully utilize all available resources by "tapping" them, but not relying on them for sole support. Outside resources should only complement the existing local resources and assets of the village. It is increasingly difficult for villages to rely on outside resources, and it is only going to get more difficult in the future. It is not likely, in light of continuing budget constraints, that there will be significant new pools of federal money.

3.4.2 Objective

To establish and implement an ongoing community-based waste management system within each KIB village that results in a broad-based, collaborative process for addressing critical on-going waste management issues, as well as to develop a long-term waste management action plan for each village that can and will be self-sustainable.

3.4.3 Description of Solution

Participation. Unlike public participation processes in government based planning, community initiatives require full-scale participation from all village residents. Public participation in government processes involves providing the opportunity for public comment and input. On the other hand, the process required to engage village residents actively in sustaining on-going effective waste management requires broad-based, widespread resident participation, with the first step being to engage community members. This process will allow the village members themselves, not outside agencies, and not only village leaders, but all members of the village to have a role in the process and be a part of the village goals.

Approach. In order to accomplish the objective of establishing and implementing ongoing community-based waste management systems, a necessary starting point will be to engage the villages in the process and provide an action plan for development.

The following activities will be included in the initial community process:

Village residents will prioritize environmental concerns against other village issues and opportunities, both short and long-term. This allows the village to prioritize waste management goals that fit the village needs and to choose methods of achieving those waste management goals that are compatible with their level of commitment and their vision of the village's future.

Village resources will be identified and allocated to environmental concerns and other waste management issues as village members feel is most appropriate.
Village residents will identify regional activities and on-going initiatives for further local implementation, and/or identify additional local waste management priorities and activities.

A written action plan will be developed for each village.

Possible Topics for Discussion. Possible topics for community discussion include the following issues:

- ❑ Technical Issues
- ❑ Watershed protection (e.g., zoning, ordinances)
- ❑ Ranking of waste management against other community priorities
- ❑ Determination of waste management priorities
- ❑ Allocation of community funding for waste management
- ❑ Environmental oversight for projects implemented in and around the community
- ❑ Community Issues.
- ❑ What are the community's waste management priorities and how do their fit into overall community priorities?
- ❑ What resources will the community commit to ongoing management and implementation of waste management systems?
- ❑ What community factors, including business environment, capital, infrastructure, education, quality of life, natural resources, must be considered in the waste management planning process?
- ❑ What community problems, needs and assets must be considered in the waste management planning process?
- ❑ How does the community sustain resident support for the ideas and projects outlined during the community waste management planning process?

3.4.4 Other Alternatives Considered

Other alternatives for implementation of the waste management plan include:

External implementation. In the past, a community implementation plan is put together by personnel external to the community. Using external consultants minimizes the volunteer effort required from the community. However, implementation plans prepared by external resources often lack insight into what is necessary to make a project a success in a particular community. Additionally, without community buy-in, even the best programs are often not understood, valued or used.

Fragmented implementation. Several initiatives are planned for each KIB village. Each time a new phase of waste management is initiated, KIVEC members and project planners could arrange a separate meeting with the community to explain the new program, seek community support and buy-in. The disadvantage of this approach is the lack of continuity and coordination among the programs.

APPENDIX C

Master Plan for Waste Management
Detailed Cost Estimates
Kodiak Island Borough

April 28, 1998

Supported by EVOSTC Grant
Project Number: 97304
Montgomery Watson
Project Number: 1189056.010101

MONTGOMERY WATSON

DETAILED COST ESTIMATE

The estimated cost of the Master Plan for Waste Management is described in this section. The four components, or initiatives, of the plan; a Borough-wide utility council, systems development, community and environment curriculum development, and local waste management implementation, are costed-out in the following pages.

First, a brief summary of the initiatives, along with their potential funding sources, can be found in the table on the following page.

After the summary, there is a one-page budget overview followed by the detailed breakdown of costs for the systems development initiative.

In addition to the funding sources, the communities will continue to actively participate in the implementation and to provide in-kind support including:

Personnel
- Community planning and organizational meetings
- Borough-Wide Council Meetings
- Supplemental Salaries
- Volunteer Labor

Facilities
- Land for siting facilities
- Use of heavy equipment
- Space for community planning and organizational meetings

Administration
- Workspace, communications, support services
- On-going operation and maintenance of existing and new facilities

SUMMARY OF PROJECT INITIATIVES and FUNDING SOURCES

Phase I Recommendations	Purpose	Start Date	Cost	Funding
1. A Borough-Wide Utility Council: *Establishing A Resource for Collaborative Problem-solving*	To establish a permanent administrative entity to coordinate shared resources and management of system improvements in the coastal villages	August 1998	$269,000	• Funding will be received from the communities • Funding has been requested from the Administration for Native Americas (ANA)
2. Systems Development: *Fixing What Is There*	To provide capital improvements to existing waste management systems and promote local responsibility	September 1998	$2,222,000	• $1.8 million has been requested from Exxon Valdez Oil Spill Trustees • Balance to be determined
3. Community and Environment Curriculum Development: *Building an Environmental Consciousness*	To introduce and emphasize an ethic of environmental stewardship in the community	January 1998	$180,000	• $145,000 will be received from the Kodiak Area Native Association (KANA) and the Environmental Protection Agency (EPA) • $35,000 will be requested by KANA from ANA
4. Local Waste Management Implementation: *Community-Level Planning and Organization*	To establish and implement procedures for ongoing community-based waste management systems within each village	August 1998	$168,000	• Funding will be received from the communities. • Funding has been requested from ANA

Kodiak Island Borough
Master Plan for Waste Management
Budget Overview

Systems Development

$2,222,000

Total Cost		Details
Construction	$1,060,726	pg 4
New Equipment/Spare Parts	$360,400	pg 5
Waste Transport/Outside Serv	$293,000	pg 6
Tools	$17,500	Assumption 1
Misc Parts	$35,000	Assumption 1
O & M Labor/Training	$338,454	pg 7
Airfare	$12,000	Assumption 2
Per Diem	$80,000	Assumption 3
KIB Admin	$25,000	

Borough Wide Utility Council

$269,000

	First Year	Second & Third Year
Administrator (new hire)	$46,000	$46,000
Travel	$20,000	$20,000
Supplies	$1,000	$1,000
Computer	$3,000	$0
Organiz. Cost	$5,000	$0
KANA Admin cost (29%)	$22,000	$19,000
Annual Subtotal	$97,000	$86,000

Community and Environmental Curriculum Development

$180,000

Annual costs for 3 year program	
Teacher Aide	$20,000
Travel	$10,000
Materials	$20,000
Production Costs and Demos	$10,000
Admin cost	$0

Community Organization for Waste Management

$168,000

Annual costs for 3 year program	
Facilitators	$48,000
Travel	$7,000
Supplies	$1,000
Admin costs	$0

Total

$2,839,000

Assumptions

1. Tools estimated at $2,500/community; Misc. parts estimated at $5,000 per community
2. Airfare = Trainees, 3 mtg. in Kodiak ($100 ea.). Trainers 1 RT to Kodiak every 5 wk. days $12,000
3. Per diem= $120/day for trainer residence days (see Labor detail) + 6 days in Kodiak for trainees $80,000

Kodiak Island Borough
Master Plan for Waste Management
Systems Development Construction Costs

	Units	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	Basis
Waste water									
Construct/Expand Septage Disposal Lagoon	cy	72	NA	55	77	77	248	330	Total volume of community septic tanks
Solid Waste (landfill, burn box)									
Landfill area (10 year)	sq. ft.	10,250		11,500	36,750	44,400	14,950	45,550	
Road upgrades (access to landfill)	linear ft.	2,000	NA	1,200	0	0	0	0	
Construct Landfill Cells	cy	2,460	NA	2,760	7,938	0	2,870	10,932	Annual SW disp vol plus 20% cover times 10 yr minus yr remain in current LF (Rpt 1, Table 5-1, 6-1). LB does not incl. Cannery wastes
Stockpile Landfill cover	cy shot rock	410		460	1,470	1,776	598	1,822	
Stockpile final cover for existing LF closure	cy shot rock	248		248				1,241	(PL-500X100 ftX8 in.), AK, K=100X100X8
New road (access to landfill), shot rock	cy shot rock	1,333		800					Road = 18 inches deep rock, 12 ft wide (i.e., 18 cu ft rock/lin. ft road)
Stockpile shot rock (misc. improvements)	cy shot rock	50		50	100	100	100	100	
Excavation requirements	cy	2,532		2,815	8,015	77	3,118	11,262	
Stockpile requirements	cy shot rock	2,041		1,558	1,570	1,876	698	3,163	
Total excavation and shot rock	cy shot rock	4,573		4,373	9,585	1,953	3,816	14,425	
Fence landfill	linear ft.	800		800	1,200		800	1,600	Fence double the area of the landfill (assuming 5 sq. ft/cy waste and cover)
Consolidate scrap metal at landfill	person days	10	10	10	20	10	10	30	
Used Oil and HHW									
Build unheated household haz. waste shed	sq. ft.	375	375	375	375	375	375	375	1/community, 375 sq. ft.

Item	Number	Units	Unit Cost	Extended Cost	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Point Lions	Basis
Waste water and solid waste			**Subtotal**	$638,226								
Blasting and excavating for landfill, lagoon, and shot rock	38,725	cy shot rock	$11	$425,972	$50,303	$0	$48,105	$105,435	$21,483	$41,975	$158,672	
Fence landfill	5,200	linear ft.	$25	$130,000	$20,000	$0	$20,000	$30,000	$0	$20,000	$40,000	
Drainage/grading of landfill drainage	4	acres	$3,000	$11,254	$706		$792	$2,531	$3,058	$1,030	$3,137	
Consolidate scrap metal at landfill	50	landfill area days	$1,420	$71,000	$7,100	$7,100	$7,100	$14,200	$7,100	$7,100	$21,300	person days, at 2 people/day plus backhoe with thumb, cut torch and truck
Used Oil and HHW			**Subtotal**	$332,500								
Build unheated household haz. waste shed	2,625	sq. ft.	$100	$262,500	$37,500	$37,500	$37,500	$37,500	$37,500	$37,500	$37,500	HHW shed assumed to be located in town.
Utility upgrades (power only to HHW shed)	7	lump sum	$10,000	$70,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	HHW shed adjacent to existing power drop.
General			**Subtotal**	$90,000								
Heavy Equip Storage (covered, unheated, 400 sq. ft. ea.)	1,600	sq. ft.	$75	$90,000			$30,000	$30,000		$30,000		
		Total		**$1,060,726**	**$125,609**	**$54,600**	**$153,497**	**$229,666**	**$79,141**	**$147,605**	**$270,609**	

Notes:
1. Karluk landfill can be constructed in soil (no blasting required). Budget number based on blasting and assumed to be comparable.

Kodiak Island Borough
Master Plan for Waste Management
Systems Development Equipment Costs

System/Item	Number	Units	Unit Cost	Extended Cost	Akhiok	Chiniak	Karluk	Larson Bay	Old Harbor	Ouzinkie	Port Lions	Notes
Wastewater			**Subtotal**	**$12,000**								
Septic Tank Pumper	3	each	$4,000	$12,000	$4,000	-		$4,000	-	-	$4,000	
Solid Waste			**Subtotal**	**$245,500**								
Burn Box	4	each	$5,000	$20,000	$5,000	-	$5,000			$5,000	$5,000	
Dump truck	5	each	$30,000	$150,000	$30,000		$30,000	$30,000		$30,000	$30,000	
Specialized Garbage truck	1	each	$50,000	$50,000					$50,000			
Dumpsters-like container	8	each	$2,000	$16,000	$2,000		$2,000	$4,000	$4,000	$2,000	$2,000	
Signage (LF, Incin, HHW, Used Oil)	7	batch	$500	$3,500	$500	$500	$500	$500	$500	$500	$500	
Upgrade incin. load/unload	2	each	$3,000	$6,000				$3,000	$3,000			
Used Oil and HHW			**Subtotal**	**$82,900**								
Upgrade used oil burner feed	2	each	$2,000	$4,000				$2,000			$2,000	
Antifreeze collection drums	14	each	$100	$1,400	$200	$200	$200	$200	$200	$200	$200	2 ea shed
Fish totes	14	each	$500	$7,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	2 ea shed
Used oil burner	2	each	$8,500	$17,000						$8,500	$8,500	
SmartAsh Burner	6	each	$3,500	$21,000	$3,500		$3,500	$3,500	$3,500	$3,500	$3,500	
SmartAsh Heat Recovery	4	each	$5,500	$22,000				$5,500	$5,500	$5,500	$5,500	
Safety and Spill Equip.	7	each	$1,500	$10,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	
Fuel System			**Subtotal**	**$14,000**								
Spill Response equipment	7	each	$2,000	$14,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	
General			**Subtotal**	**$6,000**								
Heavy equipment spare parts	6	each	$1,000	$6,000	$1,000		$1,000	$1,000	$1,000	$1,000	$1,000	
			Total	**$360,400**	**$50,700**	**$5,200**	**$46,700**	**$58,200**	**$72,200**	**$60,700**	**$66,700**	

Kodiak Island Borough
Master Plan for Waste Management
Systems Development Outside Services Costs

System/Item	Number	Units	Unit Cost	Extended Cost	Akhiok	Chiniak	Karluk	Larson Bay	Old Harbor	Ouzinkie	Port Lions
Solid Waste			**Subtotal**	**$35,000**							
Shot rock for landfill and septage			See Construction								
Permitting	7	each	$5,000	$35,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Used Oil and HHW			**Subtotal**	**$210,500**							
Operations plan/Regulatory doc.	7	each	$1,500	$10,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Scrap metal pickup, transport. and recycle	NA	each	NA	$200,000	$20,000	$20,000	$20,000	$40,000	$40,000	$20,000	$40,000
Fuel system			**Subtotal**	**$17,500**							
Spill response plan	7	each	$2,500	$17,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
General			**Subtotal**	**$30,000**							
Specialized Technical Services	6	each	$5,000	$30,000	$5,000		$5,000	$5,000	$5,000	$5,000	$5,000
Total				**$293,000**	**$34,000**	**$29,000**	**$34,000**	**$54,000**	**$54,000**	**$34,000**	**$54,000**

Kodiak Island Borough
Master Plan for Waste Management
Systems Development Labor/Training Costs

Activity	Group Train Hr.	Group Rate ($/hr)	Task cost per Village	Extended Cost	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	Notes
Wastewater treatment			**Subtotal**	**$31,872**								
Repair sludge pumping trucks	12	$42	$498	$2,490	$498			$498	$498	$498	$498	
Identify/ supr. construct septage lagoon	20	$42	$830	$4,980	$830		$830	$830	$830	$830	$830	
Pump septic tanks (all)	8	$42	$332	$18,592	$996		$664	$3,984	$664	$8,300	$3,984	
Inspect septic tanks and piping for plugs or restrictions	12	$42	$498	$3,818	$1,328		$498	$498	$498	$498	$498	
Install septic line cleanouts	24	$42	$996	$1,992	$996			$996				
Solid waste			**Subtotal**	**$122,508**								
Collect garbage	128	$42	$5,312	$31,872	$5,312		$5,312	$5,312	$5,312	$5,312	$5,312	4 hrs/week
Process through burn box (weekly)	128	$42	$5,312	$31,872	$5,312		$5,312	$5,312	$5,312	$5,312	$5,312	4 hrs/week
Place in landfill, cover	128	$42	$5,312	$31,872	$5,312		$5,312	$5,312	$5,312	$5,312	$5,312	4 hrs/week
Consolidate existing materials (in construction costs)	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Cover existing materials (in construction costs)	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Build fence (in construction costs)	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Make and put up signs (LF and HHW/Used oil)	8	$42	$332	$1,992	$332		$332	$332	$332	$332	$332	
Install burn boxes	20	$42	$830	$3,320	$830		$830			$830	$830	
Incinerator load/unload upgrades	20	$42	$830	$1,660				$830	$830			
Coordinate scrap metal marshalling	12	$42	$498	$2,988	$498		$498	$498	$498	$498	$498	
Prepare landfill closure plan	20	$42	$830	$4,980	$830		$830	$830	$830	$830	$830	
Used Oil and HHW			**Subtotal**	**$41,002**								
Process oily rags through smart ash burner	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	1 hr/2 weeks
Process used oil through used oil burner	64	$42	$2,656	$15,936	$2,656		$2,656	$2,656	$2,656	$2,656	$2,656	2 hrs/week
Install new used oil burners	40	$42	$1,660	$6,640	$0		$1,660	$0	$1,660	$1,660	$1,660	
Install new smart ash burners	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Change used oil burner filters	2	$42	$83	$498	$83		$83	$83	$83	$83	$83	
Cleanup and formalize used oil storage procedures	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Streamline feed system for used oil burner	24	$42	$996	$5,976	$996		$996	$996	$996	$996	$996	
Fuel Systems			**Subtotal**	**$14,318**	25	NA	25	50	90	75	80	# of bldgs.
Inspect residential fuel tanks (fix leaky connections, dig up c	57.5	$42	$2,386	$14,318	$1,038		$1,038	$2,075	$3,735	$3,113	$3,320	1 group hr./bldg.
General			**Subtotal**	**$128,754**								
Read and understand existing drawings												
Water system	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Wastewater system	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Bulk fuel systems	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Incinerator	6	$42	$249	$1,494	$249		$249	$249	$249	$249	$249	
Identify and order spare parts (7 systems)	40	$42	$1,660	$9,960	$1,660		$1,660	$1,660	$1,660	$1,660	$1,660	
Compile and be responsible for tool kit	8	$42	$332	$1,992	$332		$332	$332	$332	$332	$332	
Cleaning and maintaining tools and parts	8	$42	$332	$1,992	$332		$332	$332	$332	$332	$332	
Prepare operations and maintenance manuals												
Landfill	24	$42	$996	$5,976	$996		$996	$996	$996	$996	$996	
Burnbox/incinerator	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Used oil burner	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Smartash burner	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
HHW and Used Oil collection facility	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Prepare operations and maintenance checklist							$0	$0	$0	$0	$0	
Waste water system	12	$42	$498	$2,988	$498		$498	$498	$498	$498	$498	

Kodiak Island Borough
Master Plan for Waste Management
Systems Development Labor/Training Costs

Activity	Group Train Hr.	Group Rate ($/hr)	Task cost per Village	Extended Cost	Akhiok	Chiniak	Karluk	Larsen Bay	Old Harbor	Ouzinkie	Port Lions	Notes
Prepare and keep inspection and maintenance logs (8 systems)	64	$42	$2,656	$15,936	$2,656		$2,656	$2,656	$2,656	$2,656	$2,656	2 hr/week
Routine system inspections (8 systems)	64	$42	$2,656	$15,936	$2,656		$2,656	$2,656	$2,656	$2,656	$2,656	2 hr/week
Meet and talk with resources outside the community												
ADEC (solid waste)	4	$42	$166	$996	$166		$166	$166	$166	$166	$166	
ADEC (wastewater)	4	$42	$166	$996	$166		$166	$166	$166	$166	$166	
ADEC (pollution prevention)	4	$42	$166	$996	$166		$166	$166	$166	$166	$166	
PHS	4	$42	$166	$996	$166		$166	$166	$166	$166	$166	
DCRA (tanks)	4	$42	$166	$996	$166		$166	$166	$166	$166	$166	
Identify vendors, RFP, select and award contracts												
Scrap metal pickup, transport and recycling	2	$42	$83	$83	$83							
Dump trucks	1	$42	$42	$42			$42					
Burn box	2	$42	$83	$83					$83			
Fence	1	$42	$42	$42				$42				
Shot rock	2	$42	$83	$83							$83	
Lead acid battery transport	1	$42	$42	$42						$42		
Lead acid battery recycling	1	$42	$42	$42						$42		
Antifreeze, solvent transport	1	$42	$42	$42	$42							
Antifreeze, solvent disposal	1	$42	$42	$42	$42							
Used oil burners	2	$42	$83	$83							$83	
Smart ash burners	2	$42	$83	$166						$83	$83	
Used oil tanks	2	$42	$83	$83			$83					
Safety equipment	4	$42	$166	$166				$166				
Tool kit	8	$42	$332	$1,992	$332		$332	$332	$332	$332	$332	
Budgeting and prioritization	16	$42	$664	$3,984	$664		$664	$664	$664	$664	$664	
Subtotal	**1,228 group hours** *31 weeks*			**Subtotal**	**$47,875**	**$0**	**$46,837**	**$51,137**	**$50,056**	**$57,138**	**$53,117**	**$306,159**
Orientation/coordination/discussion (trainees)	40	trainee hours		$5,760	$960		$960	$960	$960	$960	$960	
Lesson planning/coordination/admin (trainer)	128	trainer hours		$26,880	$4,480	$0	$4,480	$4,480	$4,480	$4,480	$4,480	8 hours/week of residence
Total				**$338,454**	**$53,315**	**$0**	**$52,277**	**$56,577**	***$55,496***	***$62,578***	**$58,557**	

3	trainee					**Total**	**$338,799**
1	trainer						
$ 35	trainercost	**Total trainer hours:**	**4450.5**	**$155,768**	**per diem:**	556 days	
$ 8	traineecost	***Total trainee hours:***	**22815**	**$182,520**			
32	weeks of supervised activity in each village						
50%	Time for trainer in residence			$338,288			

Kodiak Island Borough
Master Plan for Waste Management
Systems Development Costs

Unbudgeted items

1. Supplemental salaries for trainees. Base pay, vacation pay, fringe
2. Shortfalls in labor/training salaries due to variations from the average training time (e.g. a community with lots to fix)
3. Labor for routine community services (e.g., trash collection, electric)
4. Transportation and disposal costs for household hazardous waste
5. Land for siting new facilities (heavy equipment storage, landfills, burn box, HHW center, etc)
6. Administrative costs in each community -- Meeting/work space, communications, computers, support services
7. Administrative costs for community education and implementation initiatives
8. On-going operations and maintenance costs for new facilities (e.g., burn box, used oil burners, etc)
9. Use of heavy equipment and fuel in community
10. Disposal/recycling cost of the scrap metal
11. Hazwoper training - Trainer and materials
12. Community-specific issues - e.g., Chiniak school leachfield, Akhiok septic outfall repair, etc.

APPENDIX D

Master Plan for Waste Management
Summary of Community Involvement
Kodiak Island Borough

April 28, 1998

Supported by EVOSTC Grant
Project Number: 97304
Montgomery Watson
Project Number: 1189056.010101

MONTGOMERY WATSON

SUMMARY OF COMMUNITY INVOLVEMENT

This Master Plan for Waste Management is the result of a cooperative and interactive effort between the communities of the Kodiak Island Borough, the Kodiak Area Native Association (KANA), the Kodiak Island Borough (KIB), the Alaska Department of Environmental Conservation, and the consultant team of Montgomery Watson and Alaska Village Initiatives. Before the consultant was chosen, the Kodiak Island Village Environmental Committee (KIVEC) was established to represent the people in the six remote villages of the Kodiak Island Borough, and the community of Chiniak.

Cameras were sent to the members of the Environmental Committee so that they could take pictures of what they considered to be waste management issues in their villages. At the initial meeting of the Environmental Committee, in November 1996, the pictures were reviewed and discussed. The photos allowed committee members to see the similarities of some of the issues faced by other communities as well as to see some of the differences.

Meeting of the Kodiak Island Village Environmental Committee (KIVEC)

At the kick-off meeting with the consultant, in February 1997, the photos were used again to emphasize the prospective of the community members. At that meeting a general discussion was held to introduce the consultants to the waste management issues on Kodiak Island and the specific issues in villages. Over the next ten days the consultants visited the seven

communities of the Kodiak Island Borough collecting information and talking to as many residents as possible.

The result of the information gathering was the first report, Inventory of Pollution Sources and Problems, which is Appendix A of the final report. The Environmental Committee met on April 23, 1997, to review the findings of the Montgomery Watson report. The meeting was also used to set priorities on issues the consultant should address in reviewing and developing potential solutions.

In August, 1997, Montgomery Watson submitted the second report, Alternatives Analysis and Potential Funding Sources, which is Appendix B of the final report. The Environmental Committee met on August 21 and 22, 1997, to review and evaluate this report. Committee members discussed their priorities and which of the recommendations they wanted to pursue.

In September, 1997, the Environmental Committee met and reviewed the alternatives and action plans developed in the August meeting. The village representatives listed the priority projects for the areas of solid waste, wastewater, used oil and household hazardous waste, scrap metal, and fuel delivery systems.

In December, 1997, the Environmental Committee met to review cost estimates for the proposed solutions and to prioritize projects for grant applications. The meeting was also used to develop consensus on the process of implementing the projects.
The membership of the Kodiak Island Environmental Committee, along with their positions in their communities, are listed below.

Akhiok
David Eluska, City Mayor
Tribal Council Vice President

Edward Phillips, City Council Member
Tribal Council Member

Chiniak
Betty Odell, Community Representative

Karluk
Alicia Reft, IRA Traditional Tribal Council President

Substitutes:
Dale Reft, Tribal Council Member
Kathryn Reft, Tribal Council Member

Larsen Bay
Randy Christensen, Tribal Council Member
City Council Mayor

Eli Squartsoff, City Council Member

Substitutes:
Mary Mullins, Tribal Council Member
Virginia Squartsoff, Tribal Council President

Old Harbor
Jim Nestic, City Council Vice Mayor

Jeff Peterson, Tribal Council Member
City Council Member

Substitute:
Russell Fox, City Accountant

Ouzinkie
Tom Quick, City Council Vice Mayor

Larry Chichenoff, Tribal Council Member

Port Lions
Wayne Lukin, City Council Member

Helen Harris, Tribal Council President

Substitute:
Arnie Kewan

U. S. Coast Guard
Steve Hunt

Alaska Department of Environmental Conservation
Laura Ogar
Bill Rieth

Kodiak Area Native Association (KANA)
Brenda Schwantes

Kodiak Island Borough (KIB)
Ron Riemer

Randy Christensen, Larsen Bay; Wayne Lukin, Port Lions; and Edward Phillips, Akhiok at a KIVEC meeting

The committee met on the following dates to discuss waste management, review the findings and recommendations of the consultant, and to set priorities:

November 6 & 7, 1996
April 23, 1997
August 21 & 22, 1997
September 29, 1997
December 17, 1997

Further information on the topics that were covered in the meetings, as well as the chronology of the project, are described in the following monthly progress reports. The philosophy of the Kodiak Island Borough throughout the planning process has been that the role of the consultant is to gather information and guide the development of alternatives while it is the responsibility of the Environmental Committee to decide the priorities that will be pursued.

MONTHLY PROGRESS REPORT NO. 1

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: Project Commencement through January 31, 1997

1. Establishing the Committee - In October 1996, the committee was established, consisting of the following:

a: Two representatives from Akhiok, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions. For each of these communities, one representative was chosen from the Tribal Council and one from the City government. The second village representative was funded by KANA. Karluk and Chiniak have one representative each.

b. Other representatives include ADEC (represented by Bill Rieth, who is being phased out of Kodiak), KANA, USCG, and Kodiak Island Borough (KIB).

2. Kick-off Meeting - The initial meeting of the Committee was held in Kodiak on November 6 & 7, 1996. All representatives attended the meeting. Village representatives had been sent disposable cameras to take pictures of what they consider to be waste management issues in their villages. The photos were developed and viewed during the meeting.

The meeting addressed the following issues:

- The Committee - Why are you here?
- Educational session on used oil, household hazardous waste, solid wastes, sewage, and scrap metal.
- A review of the Prince William Sound Management Plan
- Visit to the KIB landfill, Kodiak water and wastewater treatment plants, and the Recycle Center.
- Specific objectives of the project and methods to be used.
- Procedure for selection of the Consultant, including review of a preliminary request for proposal and establishing the selection committee.
- Preliminary Project Schedule.

A preliminary poll was taken of each village at the end of the meeting to prioritize what the major waste management concerns might be in their villages. The results are attached. There was definitely a showing of interest and enthusiasm for the project. The meeting was also attended by the Remote Village Worker for the Kodiak Island Village Utility Council and a representative from the Conservation Fund.

3. Consultant Selection - A request for proposal and qualifications was advertised starting November 20, 1996. Six proposals were received from consultants on December 12. The selection committee met on December 18. Montgomery Watson was selected as the Consultant for the project. Their team included Alaska Village Initiatives for assistance with public participation and funding. The Kodiak Island Borough Assembly will approve the contract on February 6, with the consultant starting work at that time.

4. Community Participation - The Consultant is scheduled to visit each village three times during the course of the project. Each visit will included a community meeting. The first visits to the villages will be in February and March to gather information on identifying pollution sources and problems. The next meeting of the Committee is scheduled for April after the Consultant has presented its draft report, "Inventory of Pollution Sources and Problems".

5. Administration/Budget - The grant agreement was finalized in December and paperwork finished in January. KIB decided to initiate the project prior to finalization of the grant, starting work in October. A verbal request was made of the Grant Administrator to consider reimbursement of expenses prior to the December 20 date of the grant agreement. These costs are associated with the initial meeting of the village representatives in early November and the selection/contracting of the consultant.

Travel arrangements and expenses for one representative from each village are being administered by KANA. KIB will reimburse KANA for these travel related expenses. KANA is financing the second representative from villages.

6. Project Schedule - The project schedule is attached. Project completion is scheduled for November 1997.

7. Anticipated Work for February -

a. Contract finalized with Consultant

b. Consultant meeting with KIB, KANA and USCG representatives in Kodiak and information gathering trips to the villages.

Submitted by: Ron Riemer, Project Manager, KIB - February 4, 1997

Preliminary Determination of Priorities for Master Waste Management Plan						
			Preliminary Priority			
Community	First	Second	Third	Fourth	Fifth	Sixth
Akhiok	Landfill	Sewage	HHW	*Scrap Metal	*Tanks	Waste Oil
Chiniak	HHW	Tanks	Landfill	Waste Oil		
Karluk	Landfill	Sewage	HHW	Waste Oil	Scrap Metal	Tanks
Kodiak	Landfill (Sludge)	Waste Oil	Scrap Metal			
Larsen Bay	Scrap Metal	Landfill	Waste Oil	HHW	Sewage	Tanks
Old Harbor	*Sewage	*Landfill	HHW	Waste Oil	Tanks	Scrap Metal
Ouzinkie	Sewage	Scrap Metal	Waste Oil	HHW	Tanks	Landfill
Port Lions	Landfill	Waste Oil	HHW	Scrap Metal	Sewage	Tanks
Note: * means the priority is shared						
Summary of Priorities						
Landfill	4	2	1	0	0	1
Sewage	2	2	0	0	2	0
Waste Oil	0	2	2	3	0	1
HHW	1	0	4	2	0	0
Scrap Metal	1	1	1	2	1	1
Tanks	0	1	0	0	3	3

PROJECT SCHEDULE

Master Waste Management Plan for Kodiak Island Borough

1996	
October	Establish Waste Management Committee
November 6 & 7	First Committee Meeting
November 18	All comments to KIB or KANA on Request For Proposal
November 20	Advertise Request for Proposal for Planning Consultant
Dec. 12	Proposals from Consultants due at KIB
Dec. 18 and 19	Meeting of Special Committee to select Consultant
1997	
February 6	KIB Assembly Approval of Consultant Contract
Feb 18 thru Mar 24	Consultant gathers data, has meetings with villages, etc.
April 7	Draft Report from Consultant to KIB - Inventory of Problems
April 23	Committee meets to Prioritize Waste Streams
June 16	Draft Report from Consultant to KIB - Alternatives and Funding
June 17 to July 8	Committee seeks community input and presentations to villages
July 9	Committee meets to Prioritize Alternatives
July 11 to July 29	Village representatives get community consensus
July 30	Committee meets to finalize Plan
August 13	Final Report to KIB
Aug 18 - Nov	Community meetings, grant applications, etc.

Revised: January 30, 1997

MONTHLY PROGRESS REPORT NO. 2

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: February 1 through 28, 1997

1. Consultant Agreement - The Kodiak Island Borough (KIB) Assembly approved the agreement with Montgomery Watson on February 6, 1997. The contract was executed, with the Consultant starting work on February 7, 1997.

2. Initial Meeting with Consultant - Representatives of KANA, ADEC, Kodiak Island Village Utility Council (KIVUC) and KIB met with the 4-member team from Montgomery Watson on February 18, 1997. Some of the items discussed were:

   a. The Harbormaster from Kodiak was brought in to discuss waste oil and waste solvent issues from fishing vessels and other boats.

   b. A general discussion was held to familiarize the Consultant with known issues in the villages, possible contacts for information on waste management on the Island, and to update them on the project status. The schedule was reviewed and there were no problems noted.

   c. The Consultant was taken on a tour of the Recycle Center in Kodiak and the KIB landfill.

   d. The Consultant was given a copy of the EVOS TC report format document.

   e. Photos taken by the Village Representatives for the November 1996 meeting were shown to the Consultant, along with some photos from ADEC.

3. Initial Data Gathering - The Consultant team started its trips to the villages on February 19, 1997, and had visited all villages by February 27. All 4 members of the team visited Port Lions and Ouzinkie. Then the team split into two groups and went to the other villages.

4. During the initial data gathering trips, the Village Representatives escorted the team within their villages and arranged for a community meeting. The next meeting for the Committee is scheduled for April after the Consultant has presented its draft report, "Inventory of Pollution Sources and Problems."

5. Administration/Budget - Contractual work has been finalized with the Consultant. The second invoice will be submitted with this report. The project is within budget.

6. Project Schedule - The Project is on schedule, with the Consultant finishing the initial data gathering trips to the villages by the end of February.

7. Anticipated Work for March -

a. Consultant will prepare draft report on the inventory of problems. The report is due April 7

b. Consultant will continue to make contacts and gather information needed to complete the data gathering phase.

Submitted by: Ron Riemer, Project Manager, KJB - March 4, 1997

MONTHLY PROGRESS REPORT NO. 3

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: March 1 through 31, 1997

1. During March, the Consultant was preparing the draft interim report of the inventory of pollution sources and problems.

2. Village Representatives were reminded about the next meeting scheduled for April 23, 1997. The purpose of the meeting is to review the draft report by the Consultant and to set priorities on the issues for which the Consultant is to develop solutions.

3. Administration/Budget - The third invoice will be submitted with this report. The Consultant has not submitted an invoice yet. The project is within budget.

4. Project Schedule - The Project is on schedule, with the Consultant planning to finish the interim draft report on April 7.

5. Anticipated Work for April -

   a. The interim draft report will be completed by the Consultant on April 7. Copies of the report will be distributed to the village representatives and other members of the Environmental Committee. The village representatives are to review the report with tribal and city groups and be prepared to set priorities on April 23.

   b. The next meeting of the entire Environmental Committee will be held in Kodiak on April 23.

   c. Following the April 23 meeting, the Consultant will begin work on developing possible solutions to the problems given priority by the Environmental Committee.

Submitted by: Ron Riemer, Project Manager, KIB - April 4, 1997

MONTHLY PROGRESS REPORT NO. 4

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: April 1 through 30, 1997

1. The Consultant, Montgomery Watson, completed the first draft interim report of the inventory of pollution sources and problems for the villages in Kodiak Island Borough. The report was completed on time (April 7) and was sent out to the members of the Committee for review. This report will remain a "draft" report until it is included with the final report.

2. Twelve Village Representatives which comprise the Kodiak Island Village Environmental Committee met on April 23, 1997. The purpose of the meeting was to review the findings of the Consultant and to set priorities on the issues for which the Consultant is to develop solutions. All communities were represented at the meeting. Others represented were ADEC, KANA, Kodiak Island Borough, Kodiak Island Village Utility Council, and Montgomery Watson.

The meeting included response from the Committee on the draft report, videos on two different trash incineration systems ("Burn Box" being used in Dot Lake, AK, and the TWERP incinerator - Tribal Waste Energy Recovery Plant - being used in Quinhagak, AK), discussing the pollution problems into by types, and prioritizing the issues. There was a discussion on education needs and impacts.

3. Administration/Budget - The fourth invoice is submitted with this report. The Consultant submitted its first invoice, which covers work from February 6 to the completion of the draft interim report. The Consultant and the overall project is within budget. Travel expenses for the second representative from villages is provided by KANA.

4. Project Schedule - The Project is on schedule. The next milestone is June 16 with the delivery by the Consultant of the report on alternative solutions.

5. Anticipated Work for May -
   a. The Consultant will be working on the alternative solutions to the problems identified in the draft interim report.
   b. The representatives are requested to send additional comments on the draft interim report to the Consultant.

Submitted by: Ron Riemer, Project Manager, KIB - May 5, 1997

MONTHLY PROGRESS REPORT NO. 5

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: May 1 through 31, 1997

1. The consultant, Montgomery Watson, is preparing the alternatives analysis and funding draft report. Montgomery Watson submitted a detailed outline and is proceeding with the draft.

2. A presentation about the Master Waste Management Plan was made to the morning Rotary Club in Kodiak on May 28.

3. Administration/Budget - The fifth invoice is submitted with this report. The Consultant and the overall project are within budget.

4. Project Schedule - The Project is on schedule. The next milestone is June 16 with the delivery by the Consultant of the report on alternative solutions and funding.

5. Anticipated Work for June -
   a. The Consultant will submit the draft report on the alternative solutions to the problems identified in the previously submitted draft interim report.
   b. The draft report on alternative solutions will be sent to the Committee members. The Village Representatives will seek community input. The next Committee is scheduled for July 9 to prioritize the alternatives.

Submitted by: Ron Riemer, Project Manager, KIB - June 3, 1997

MONTHLY PROGRESS REPORT NO. 6

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: June 1 through 30, 1997

1. The consultant, Montgomery Watson, is preparing the alternatives analysis. The draft interim report on alternatives and funding, due June 16, was delayed until mid July.

2. Administration/Budget - The sixth invoice is submitted with this report. The Consultant and the overall project are within budget.

4. Project Schedule - The Project is about 3 weeks behind schedule.

5. Anticipated Work for July -

   a. The Consultant will complete the draft interim report on the alternative solutions and funding for the problems identified in the previously submitted draft interim report.

   b. The next Committee meeting is scheduled for July 30 and 31. The purpose of the meeting will be to review the alternatives developed by the Consultant, to prioritize the alternatives, and to prepare for reviewing the alternatives within each of the villages (public participation).

   c. Village Representatives will discuss alternatives with village and tribal groups. Consultant will visit each village to explain alternatives.

Submitted by: Ron Riemer, Project Manager, KIB - July 1, 1997

MONTHLY PROGRESS REPORT NO. 7

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: July 1 through 31, 1997

1. The consultant, Montgomery Watson, continued to prepare the alternatives analysis. The draft interim report on alternatives and funding will be issued on August 4, 1997. Project Manager, Ron Riemer, met in Anchorage with Brett Jokela and Deb Luper of Montgomery Watson and with Ann Campbell and Perry Eaton of Alaska Village Initiatives (subconsultant) on July 23 to review the development of alternatives to the pollution problems previously identified.

2. Administration/Budget - The seventh invoice is submitted with this report. The Consultant and the overall project are within budget.

4. Project Schedule - The Project is about 7 weeks behind schedule. The schedule will be updated at the next Committee meeting (August 21 and 22).

5. Anticipated Work for August -

   a. The Consultant will complete the draft interim report on the alternative solutions and funding for the problems identified in the previously submitted draft interim report. The report will be issued August 4.

   b. The next Committee meeting is scheduled for August 21 and 22. The purpose of the meeting will be to review the alternatives developed by the Consultant, to prioritize the alternatives, and to prepare for reviewing the alternatives within each of the villages (public participation). Committee members will receive a copy of the report for review prior to the meeting.

   c. Village Representatives will discuss alternatives with village and tribal groups. Consultant will begin visiting each village to explain alternatives.

Submitted by: Ron Riemer, Project Manager, KIB - August 1, 1997

MONTHLY PROGRESS REPORT NO. 8

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: August 1 through 31, 1997

1. The consultant, Montgomery Watson, submitted the draft interim report on alternatives and funding on August 7, 1997. Copies of the report were sent to all Committee members.

2. A Committee meeting was held in Kodiak on August 21 and 22. The consultant reviewed its recommended alternatives. The Committee then evaluated these alternatives against each of the priority pollution problem areas. Some of the recommendations were modified and some new recommendations were established. The Consultant will rewrite the recommended alternatives section of the report to reflect the recommendations accepted by the Committee.

3. Committee requested that the EVOS Trustee Council be contacted to determine if the planning grant could be used to purchase a pilot incinerator (about $3,000) to be taken to each of the villages when the consultant visits each of the villages in October. The incinerator will be used for demonstrating used oil burning and left in one village for longer term demonstration.

4. Administration/Budget - The eighth invoice is submitted with this report. The Consultant and the overall project are within budget.

5. Project Schedule - The Project is about 7 weeks behind the original schedule. The schedule was updated at the August Committee meeting.

August 23 to Sept. 5	Village representatives get comments about selected alternatives from communities and sends comments to Consultant.
Sept. 5 to Sept. 24	Consultant redrafts Recommendations portion of report (Section 3).
Sept. 29	Committee meets again to finalize plan.
October	Consultant visits each village to review the waste management plan.
November	Start grant request activities.
December 5	Final Plan report submitted by Consultant.

5. Anticipated Work for September -

a. Village representatives will review the recommended alternatives within each of their villages and forward comments to the Consultant.

b. Ron Riemer and Brenda Schwantes will meet with the Consultant to review comments from the villages and review redraft of the recommendations portion of the report on alternatives and funding.

c. The next Committee meeting is scheduled for September 29. The purpose of the meeting will be to finalize the alternatives developed by the Consultant and the Committee. Schedules will be established for visiting each of the villages to review the alternatives.

Submitted by: Ron Riemer, Project Manager, KIB - September 2, 1997

MONTHLY PROGRESS REPORT NO. 9

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: September 1 through 30, 1997

1. Brenda Schwantes (KANA), Laura Ogar (ADEC) and Ron Riemer (KIB) met with the consultant, Montgomery Watson, on September 18 to review the project and to discuss the presentation of alternatives for the September 29 meeting.

2. A Committee meeting was held in Kodiak on September 29. The consultant reviewed the alternatives and action plans developed by the Committee at the August meeting. The village representatives listed the priority projects for handling problems in the areas of solid wastes, wastewater, used oil and household hazardous wastes, scrap metals, and fuel delivery systems. The consultant will make modifications to draft Report No. 2 to incorporate these priorities. The final waste management plan will be prepared by Montgomery Watson. The Committee decided joint meetings of both the City Council and Tribal Council should be arranged in each village to present the plan and get approval to proceed with projects and grant requests for the priority items. These meetings will be held in mid-November.

3. The EVOS Trustee Council approved our to purchase a pilot incinerator to be taken to each of the villages when the consultant visits each of the villages in October. The incinerator will be used for demonstrating used oil burning in the villages. The "Smart Ash" incinerator has been ordered.

4. Administration/Budget - The ninth invoice is submitted with this report. The Consultant and the overall project are within budget.

5. Project Schedule - The Project is going according to the revised schedule as presented in last month's report.

October	Consultant will revise draft Report No. 2, work on final waste management plan, and begin preparation of grants. Smart Ash incinerator pilot unit will be tried in villages.
Mid-November	Hold meetings with City Council/Tribal Council in each village.
December 5	Final Waste Management Plan report is to be submitted by Consultant.

6. Anticipated Work for October –

   a. Ron Riemer (KIB) and Brenda Schwantes will meet with the Consultant to review status of final plan and to plan November meetings in each of the villages.
   b. Consultant will revise draft Report No. 2 and work on Final Waste Management Plan.
   c. No Committee meetings were scheduled for October.

Submitted by: Ron Riemer, Project Manager, KIB - October 10, 1997

Kodiak Island Borough

Engineering and Facilities Department
710 Mill Bay Road
Kodiak, Alaska 99615
Phone (907) 486-9343 Fax (907) 486-9376

November 7, 1997

JoEllen Hanrahan
Alaska Department of Environmental Conservation
410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795

Re: EVOS Trustee Council Project 97304
Kodiak Island Borough Waste Management Plan
Request for extension of time

Dear JoEllen:

This letter is a request for an extension of time for the grant on the above referenced project. The grant agreement now expires at the end of the year. We believe that the work will not be complete by the end of the year, and request an extension of three (3) months.

Our present schedule calls for the draft of the final report to be submitted in December. Any required changes to the draft, publication of the final report, and final preparation of grant applications will likely extend into the first quarter of 1998.

It appears that the project will come in below budget. KANA and the Coast Guard have not charged for personnel time. KANA has picked up a significant amount of the travel expenses for the village representatives, and the consultant is under budget. We estimate that the grant funds expended will be approximately $20,000 below that authorized.

The Kodiak Island Borough requests an extension on the grant until March 31, 1998. Please give me a call if you have any questions. A copy of the most recent monthly report is enclosed.

Sincerely,

Ronald E. Riemer

Ronald E. Riemer
Environmental Engineer

CC: Jerome Selby, Borough Mayor
Brenda Schwantes, KANA

MONTHLY PROGRESS REPORT NO. 10

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: October 1 through 31, 1997

1. Brenda Schwantes (KANA) and Ron Riemer (KIB) met with the consultant, Montgomery Watson, on October 16 to review the project and to discuss the estimated costs for each of the alternatives selected for implementation.

2. Montgomery Watson developed cost estimates for the priority solutions/alternatives selected for implementation. Preliminary work started on grant preparation and planning the November visits to the villages. The Committee had decided joint meetings of both the City Council and Tribal Council should be arranged in each village to present the plan and get approval to proceed with projects and grant requests for the priority items.

3. The pilot incinerator (Smart Ash Incinerator) was received and test burns were conducted at the Kodiak Island Borough landfill. The unit will be taken to each of the villages when the consultant visits each of the villages in October. The incinerator will be used for demonstrating used oil burning in the villages.

4. Administration/Budget - The tenth invoice is submitted with this report. The Consultant and the overall project are within budget.

5. Project Schedule - The Project is going according to the revised schedule as presented in last month's report.

November	Hold meetings with City Council/Tribal Council in each village.
December 5	Final Waste Management Plan report is to be submitted by Consultant.

6. Anticipated Work for November –

   a. Joint meetings will be held with City and Tribal Councils in each of the villages.
   b. Consultant will revise draft Report No. 2 and work on Final Waste Management Plan.
   c. Work will continue on grant application preparation.
   d. An extension of time will be requested for the planning grant.

Submitted by: Ron Riemer, Project Manager, KIB - November 7, 1997

MONTHLY PROGRESS REPORT NO. 11

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: November 1 through 30, 1997

1. Montgomery Watson finalized the cost estimates for the priority solutions/alternatives selected for implementation. The total cost for the proposed solutions exceeded expectations, requiring additional prioritization of the solutions prior to holding meetings with the city and tribal councils in the villages. The prioritization will be completed during a meeting of the Committee scheduled for December 17 in Kodiak.

2. The joint meetings of both the City Council and Tribal Council, originally scheduled for November, will be held in late January. These meetings will be used to present the plan proposed by the Committee and to get approval to proceed with projects and grant requests for the priority items.

3. Test burns were conducted in the pilot incinerator (Smart Ash Incinerator) at the Kodiak Island Borough landfill. The unit will be demonstrated at the meeting of the village representatives on December 17.

4. Administration/Budget - The eleventh invoice is submitted with this report. The Consultant and the overall project are within budget.

5. Project Schedule - The Project schedule has changed. KIB requested an extension of time on the grant for 3 months (January through March, 1998).

December 9	Review Waste Management Plan at the Village Mayors Conference in Kodiak.
December 17	Committee will meet in Kodiak for additional prioritization of the options.
January 16	Final report submitted by Consultant to KIB.
Late January	Joint meetings of the City and Tribal Councils will be held in each village.
February/March	Prepare and submit grant applications.
End of March	End of Planning Project

Anticipated Work for December –

a. Brenda Schwantes and Ron Riemer to meet with Montgomery Watson in Anchorage to discuss cost estimates for solutions, grant applications, and plans for the December 17 Waste Management Plan Committee meeting.
b. Consultants will get final report format and complete final report by the end of December.
c. Ron Riemer will meet with the village mayors in Kodiak at their annual meeting to discuss the Waste Management Plan.
d. Committee will meet to do additional prioritization of the possible solutions on December 17 in Kodiak.
e. An extension of time was requested for the planning grant. Upon approval of the time extension, the contract with the Consultant will be extended.

Submitted by: Ron Riemer, Project Manager, KIB - December 5, 1997

MONTHLY PROGRESS REPORT NO. 12

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: December 1 through 31, 1997

1. Brenda Schwantes and Ron Riemer met with Montgomery Watson in Anchorage on December 2 to finalize cost estimates for implementation of solutions to pollution problems. Prepared for Environmental Committee meeting of the village representatives to finalize prioritization of projects.

2. The Environmental Committee met on December 17 to review cost estimates for solutions, to prioritize projects for grant applications and to develop consensus on proceeding with implementation of the projects.

3. The Village Mayors were updated on the status of the Waste Management Plan at their meeting in Kodiak on December 9.

4. Administration/Budget - The twelfth invoice is submitted with this report. The Consultant and the overall project are within budget.

5. Project Schedule - The Project schedule has changed. KIB received an extension of time on the grant for 3 months (January through March, 1998).

6. The joint meetings of both the City Council and Tribal Council, originally scheduled for November, will be held in February and March. These meetings will be used to present the plan proposed by the Committee and to get approval to proceed with projects and grant requests for the priority items.

7. Anticipated events:

January 16	Draft final report submitted by Consultant to KIB.
January 23	Draft Final report submitted to EVOS TC.
February/March	Joint meetings of the City and Tribal Councils will be held in each village.
February/March	Prepare and submit grant applications.
End of March	End of Planning Project

Submitted by: Ron Riemer, Project Manager, KIB – January 13, 1998

MONTHLY PROGRESS REPORT NO. 13

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: January 1 through 31, 1998

1. Montgomery Watson provided a draft of the final report to the Borough. Comments were returned to the consultant on January 30. The draft final report will be ready to send to EVOS/ADEC for review in February.

2. Project Manager attended the 1998 EVOS Restoration Workshop in Anchorage on January 29 and 30. Discussed the Prince William Sound Waste Management Project with the Mayor of Tatitlek. Project Manager also met with Montgomery Watson on January 30 to review status of the project.

3. Project Schedule and Budget - The Project is scheduled for completion in March 1998. The project is within budget.

4. The joint meetings of both the City Council and Tribal Council in each village, originally scheduled for November, may be held in March. Consideration is being given to holding these meetings later in the year when implementation is closer.

5. Anticipated events:

February/March	Joint meetings of the City and Tribal Councils will be held in each village. These may be postponed until later in the year.
February/March/April	Prepare and submit proposal for Phase 2 (Implementation).
End of March	End of Planning Project

Submitted by: Ron Riemer, Project Manager, KIB – February 6, 1998

MONTHLY PROGRESS REPORT NO. 14

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: February 1 through 28, 1998

1. A review was made of the Appendices to the draft final report and Montgomery Watson made the changes. The Appendices were finalized on February 27 and the draft final report will be sent to DEC in early March.

2. Project Schedule and Budget – Per phone conversation with JoEllen Hanrahan on ADEC on February 18, an extension of time until the end of April will be processed. This should provide sufficient time for review of the draft final report and to issue the final report. The project remains within budget.

3. Anticipated events:

March Submit draft final report to DEC

April Issue final report

Submit proposal for Phase 2 (Implementation). Joint meetings of the City and Tribal Councils may be held in each village. Eric Myers has suggested combining these meetings with community meetins on future uses of the Reserve. Previously, consideration was given to postponing the village meetings until later in the year..

End of planning portion of Project

Submitted by: Ron Riemer, Project Manager, KIB – March 3, 1998

MONTHLY PROGRESS REPORT NO. 15

KODIAK ISLAND BOROUGH MASTER WASTE MANAGEMENT PLAN

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROJECT 97304

Report Period: March 1 through 31, 1998

1. The draft final report will was sent to DEC for review and comment on March 2, 1998. Comments were received from DEC on March 24, 1998.

2. The draft proposal for the Implementation phase for the Waste Management Plan was submitted to DEC for review and comment on March 27, 1998.

3. Project Schedule and Budget – The addendum to extend the time until the end of April was received. This should provide sufficient time for review of the draft final report and to issue the final report. The project remains within budget. The trips to the villages with the final report will not take place in April. Because of the time span until the beginning of the implementation phase, it was decided to make the village trips in summer. Local funds will be used for the trips to the villages.

4. The Restoration Funds meeting by EVOS was held in connection with COM FISH on March 28 in the Kodiak Island Borough Assembly Chambers. EVOS staff traveled to the villages the following week.

5. Anticipated events:

April Issue final report.

Submit proposal for Phase 2 (Implementation).

End of planning portion of Project

Submitted by: Ron Riemer, Project Manager, KIB – March 3, 1998