



7 GENERATIONS

Addressing Village
Environmental Issues
for the Future Generations of Rural Alaska

"Our leaders were instructed to be men of vision and to make every decision on behalf of the seventh generation to come; to have compassion and love for those generations yet unborn."

Chief Oren Lyons

matalie

7 Generations: Addressing Village Environmental Issues for the Future Generations of Rural Alaska

Revised 2009

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This manual is dedicated to all of the people in rural Alaska who have committed time and energy to improving the environmental health conditions of their communities.

**Please send corrections, additions and updates to Bruce Wright at
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Environmental Change is about Commitment



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About this manual ...

Communities in rural Alaska are faced with many unique and complex environmental issues. The presence of honey buckets, permafrost landfills, remote access, and extreme winter conditions are examples of issues that make rural Alaska unique from other parts of the United States. This manual has been produced in order to address these unique environmental issues using a common sense approach that promotes and encourages community-driven environmental management (see example in Appendix D on page 181).

The approach to environmental planning taken in this manual can be described as “community-based.” A “community-based” approach to any type of planning is essential in order for communities to develop a greater sense of ownership to problems and solutions. **Environmental planning is most successful when the community is involved in the entire process from identifying problems to solving them.** Although many environmental planning guides focus on community-based efforts, this manual is specific to rural Alaskan issues and provides many examples from rural communities throughout Alaska.

7 GENERATIONS *Addressing Village Environmental Issues for the Future Generations of Alaska* is divided into three parts:

Part 1

Part 1 of the manual describes one approach to village environmental planning. It also describes how to use the surveys in Part 2 of this manual in village environmental planning.

Part 2

Part 2 of the manual includes the Village Environmental Planning Survey & Technical Environmental Survey. These surveys are used to identify community environmental priorities and to identify environmental issues. Both of the surveys are described in detail and examples from rural Alaska are included.

Part 3

Part 3 includes appendices.

Why do you need this manual?

7 GENERATIONS *Addressing Village Environmental Issues for the Future Generations of Alaska* is a manual designed for people in rural Alaska who want to accomplish environmental planning and management by using a community-based approach. The manual contains valuable tools that enable a community to prioritize and identify environmental issues of concern within their community. This manual was written to assist communities to more self-reliant and to take responsibility for their own environmental issues.

As communities begin to take more responsibility for their own environmental concerns and issues, they will rely less on others to solve problems. Clarence Alexander, Chairman of the Board for the Council of Athabascan Tribal Governments, described this issue at the Yukon River Inter-Tribal Watershed Summit:

Building community strength to identify and solve problems is a powerful process that can lead to a healthier and more sustainable community. A community that is driven by the interests of its members rather than by outside interests will have a greater sense of ownership and pride in its accomplishments. A self-governing community also will have a greater influence over the goals and future direction of the community in the environmental realm or other domains. Although this manual focuses solely on selected environmental issues, the people driven initiatives discussed are an effective way for a community to take its inherent right to self-govern in all areas by influencing and taking responsibility for educational, social, judicial and health efforts within a community.

“You know we always had our hands out. We were hoping that some miracle would happen that would help us survive in our land. And, today we are finding out that we are the ones who have to take the lead. We have to be the ones to initiate. We are the ones who have to do something in our community. We are the ones who have to teach in order for those younger ones to know.”
Clarence Alexander

Why are you here? Quotations from Rural Alaska

Environmental assessment training workshops have been held all over the State of Alaska to train local residents on how to use the tools in this manual to identify and assess environmental concerns in their communities. Most of these workshops are funded through Native non-profit health corporations through an Indian General Assistance Program grant from the U.S. Environmental Protection Agency.

At the start and conclusion of each workshop, participants were asked to answer the question “why are you here?” The following responses reflect the range of knowledge, technical tools and insights gained by the participants as well as the ownership and responsibility for applying what was learned when they return home. Moreover, they reaffirm the importance of developing a sustainable community-based approach to addressing environmental issues and problems that currently face rural Alaskan villages.

“...to become an example to the community in the prevention and reduction of solid waste garbage and other hazardous materials in our village. Also, to start a recycling program with our kids.”

Casey Kalmakoff, Ivanof Bay



Norton Sound Health Corporation, Nome

“I am here to learn from the experience of others. Here to become more aware of things that I know of now regarding the environment. I am here to take knowledge, resources and tools home. To improve the environment immediately.”

Charlie Nelson, Iguigig

“I am here to learn environmental issues and to bring back to our village information about

safe water and about solid waste. I have learned to test the water for chlorine levels... I also learned

about some very toxic wastes in the dump or landfill and of some ideas of what shouldn't be in there such as aluminum cans, plastic bags, also batteries which have acid in them and lead.”

Harry Wassily, Clark's Point

“I have learned a lot about drinking water and the landfill and what harm it can do to the community and the land around it. Education and being a role model will make the difference.”

Georgie Alexie, Nondalton

“I am here to learn as much as I can and become more aware of my environment. Being aware of how daily actions can be harmful. Making others aware of how ignorance is physically harmful to them and everything around them.”

Mary Ann Johnson, Portage Creek

“I am here because of the lack of understanding I had pertaining to the environmental issues that the community is surrounded by. I care more now than I did before I arrived.”

Roy White, Egegik

“I am here to learn about environmental issues that concern us all and to go back and present this to the community and make it a safer place to live. By educating them about the harmful things that we are doing to ourselves and to the world.”

Robert Larson, Koliganek

“To get the ball rolling on all environmental matters. I am going to check wells for safe water. Dump matters like capping the old ones and working on the existing ones. Get the schools to crush the cans. Not only the schools but the whole village. To set an example for my son so he can start at a young age to think about environmental matters. Change the villages’ eyes on environmental matters to open them towards prevention.”

Fred Tom Hurley, Ekwok

“To learn more about solid waste in the landfill and more about pollution. To learn ways to educate other people about environmental problems we must face. Also, the importance of water quality.”

Bobby Winer, Beaver



Council of Athabascan Tribal Governments,
Chalkyitsik

“I learned, listened and became very aware of how much the environment has to do with not only myself and others but with my children and possibly my future grandchildren. My only regret is that a lot more people are still in the dark—I am proud to be able (at least try) to explain this to my village. The 3 R’s—reuse, recycle and reduce.”

Valerie Carroll, Birch Creek

“Take back to members of our tribe the knowledge I have learned, especially to our most important resource, the children, to continue the important reason for preserving our natural resources. The environmentally sound management of all of our natural resources for the enjoyment of all, far into the future.”

Wally Flitt, Fort Yukon

“To protect our environment by educating others.”

Melinda Peter, Fort Yukon

“... I also learned the steps I need to take to make my home a safe and clean place to live for myself, my children and my people.”

Pamela Sam, Venetie

“During the course of the week I’ve learned what is involved with an environmental assessment/survey and problem areas to look for. There are many serious conditions in various parts of the village we’ve seen so often. They’ve become the background and we’ve been living

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among such things for so long it's not an issue. It is now my goal to identify problem areas, find solutions and educate the community about these issues."

Samantha Hoover, Kasigluk



Mannilaq, Kotzebue

"My goal is to share the information that I have gathered and put the tools to work, community awareness, solid solutions, without money, small steps, by example-talk the talk/walk the walk."

William Andrew, Marshall

"To use the tools I learned and use these tools to educate the community I work with."

Harvey Anvil, Napaskiak

"To pass on the knowledge and create environmental awareness and educate the youngsters and to keep trying no matter what."

Walter Johnson, Quinhagak

"I am here because I want to learn as much as I can about waste on the land and in the water. I want to know what I can do about it and I want to know what resources I have to work with. Also, on what this waste is doing to our people's health. Then I plan on taking this back to my community and teach the children and their families."

Ruth Farrens, Sand Point



Bristol Bay Native Association, Dillingham

"I am here to better my knowledge on how to better the environment in my community and make it safer to live in Nelson Lagoon for everybody."

Ray Johnson, Nelson Lagoon

"I will live here for the rest of my life. Our environment we are in today is unsafe. I would like to implement a program through our tribe to educate all who reside here, such as local

households, schools and processing plants about the importance of recycling, hazardous disposal and re-use."

Janis Krukoff, Unalaska



Part 1
**Environmental assessments and the
environmental planning process**

Part 1: Environmental Assessments and the Environmental Planning Process

Overview of Part 1:

In Part 1 of this manual you will find a definition of ‘environmental assessments’ and a summary of general steps that can be followed in village environmental planning. Included within the steps (mostly in Step 3) is a description of how you can use two different surveys in this manual to build an environmental assessment of your community. These two surveys were developed specifically for rural communities in Alaska. Both surveys are described in further detail in Part 2 of this manual.

Part 1—Environmental assessments and the environmental planning process

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Defining environmental assessment:

What does the word “environment” mean?



An elder best described the word environment as “everything outside of your body.” The word environment has different meanings to different people. Another definition of environment is everything that surrounds us, both living and nonliving. This includes plants, animals, earth, mountains, ocean, air, weather and sky. To many traditional cultures, the environment includes the natural world and spiritual world, and the connections between these two worlds. For example, in Yupiaq the word *ella* is the closest translation to the English word environment. When *ella* is combined with different Yupiaq words, it can mean weather, world, creative force, god, or awareness.

“This we know: the earth does not belong to man, man belongs to the earth. All things are connected like the blood that unites us all. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself.”

Chief Seattle, Chief of the Suquamish Indians

What is an “assessment”?

An assessment is the result of carefully looking at something and then making conclusions based on what you see. In other words, an assessment is the result of *analyzing* and *evaluating* something. Analyzing something involves making careful observations. Evaluating something involves making a judgment or opinion based on what you see and know to be true. For example, before crossing a river on a snowmachine in the winter, you would analyze how thick the ice is and then make a judgment, or evaluate, whether the river would be safe to cross.

What is an environmental assessment?

An environmental assessment is an analysis and evaluation of your surroundings. This may include plants, animals, air, earth, and water. For example, in Galena there is an old military site. When doing an assessment of the site, the community analyzed how many barrels of contaminants (dangerous or toxic materials) existed, the contents of the barrels, and how long the contaminants had been there. After analyzing the site, they evaluated the possible impact that the contaminants could have on human health and the environment. After all of the information is gathered the assessment is usually presented as a report or other document.

There are many ways to complete an environmental assessment in your community. One way that is described in this manual is by involving the community and using surveys. However, an environmental assessment also can be completed by intensive interviewing, research, producing a video, hiring a contractor or a combination of different methods. The two surveys described in this manual can be used to gather information to make a general environmental assessment of your village.

Where do environmental assessments fit into environmental planning?

Environmental assessments are generally done in the beginning stages of planning. Step 3, “Define your community’s needs using environmental assessment surveys,” in the process described below is where environmental assessments fit into the planning process described in this manual.

Environmental Planning

Environmental planning is a process of identifying, assessing and coming up with solutions to environmental issues. The goal of environmental planning is to improve the quality of the environment and the health and welfare of people.

Environmental planning in a community can be approached in a number of different ways. Described in “Village Environmental Planning Steps” on pages 17-32 is an approach to planning that uses the two surveys described in Part 2 of the manual. This manual focuses mainly on Step 3 of the Village Environmental Planning Steps.

Because communities differ in their issues, values, tradition, and culture, the same approach to environmental planning may not work for every community. Some processes already exist that work well in a community. If your community has an approach to planning that works, then use it!

Talk with people from other villages and find out how they have approached environmental planning in their own community. Many villages in Alaska are doing extensive environmental planning and may be able to provide you with helpful advice and technical expertise. Networking between rural communities about environmental issues will strengthen the local government’s ability to achieve its own goals and maximize its use of resources. You’ll want to use the information found in Appendix N, Grant, Funding and resources Directory found on page 302.

What is “community-based environmental planning?” It is planning that is performed by local individuals and groups in the community to address the community’s environmental concerns.

Village Environmental Planning Steps



Figure 1. Cycle of steps in village environmental planning.

Village Environmental Planning Steps

Step 1: Put together a planning team

The first step in village environmental planning is to find members of the community who are interested in being part of a planning team. Ask individuals, hold home meetings, or hold community meetings to find out who is concerned about environmental issues and wants to invest their time and energy in environmental planning. In Cordova, the environmental planner used a survey to find community members who were interested in being on a planning team. Over 30 people responded that they would like to be involved in environmental planning in some way.



Getting community leaders involved as well as a variety of people from different interests groups (i.e., water operator, school officials, residents) will give more complete input into the planning process. Remember to include the wisdom of elders and the concerns of youth. Involving children in environmental planning is not only educational, but also better insures that environmental planning will continue with future generations.



Involving children in environmental planning is educational and helps ensure that the planning will continue with future generations.

A planning team is most effective with a team of 5-10 interested people. Selecting one or two individuals to take the lead role as environmental planners in the group can be a very effective approach. Community members to consider on your team include:

Community Leaders:

Village elders
Chief
Mayor
Village council members
Health board members
Regional and village corporation board members
Youth representatives



Other Community Members:

Environmental planner
Water operator
Village sanitarian
Local health aide(s)
AmeriCorps Member
School officials
Lodge owners/other business people
Concerned residents- both youth and adults
Community association members
Emergency response people
Village safety officer
Others?

Once you identify a team of interested people, present the idea at the next village or traditional council meeting. Ask the council to officially form a “Village Environmental Planning Team.” The planning team can decide when and how often to meet.

Step 2: Develop a vision for the future

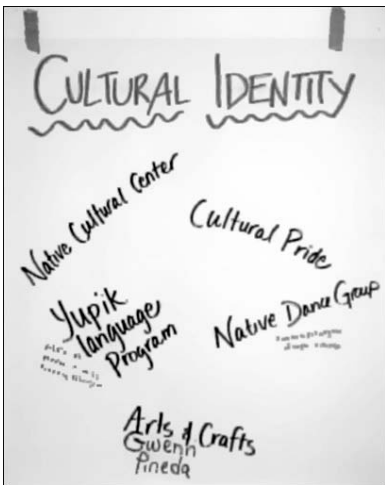
A vision is a long-term goal or dream:

A vision carries a powerful message that is based on the culture and values of the community. Before a community begins environmental planning or any other type of planning, the planning team gathers with community members to develop a vision for the future of the community. **A vision is a dream of what is possible. It is an overall picture of what the community wants to be and how it wants to look in the future.** For example, a community's vision could be that all children in the village are healthy.

Be daring with your vision. You may not be able to achieve everything you set out for, but your vision will give you a focus and direction. Keep in mind that villages grow with time. Vision your community with twice the amount of people, twice the number of homes, twice the 4-wheelers, and twice the fishing boats on the river.



A key element in developing a vision is community involvement. **All community members need to be invited to participate in all stages of the visioning process.** Future projects will have greater support and success if the community is involved. Encourage children, adults and elders to participate throughout the process. Involving all generations will bring a valuable exchange of information and ideas.



Accomplishments identified at a community “visioning” meeting in Aniak.

There are many other effective ways to get the community involved in visioning other than holding community meetings. For example, the community of Galena communicates their hopes, concerns, fears and priorities to the environmental planners through informal discussions that take place around the village offices, the post office, during river trips, in school classrooms and while just walking around town. The community has chosen to be involved in environmental planning in a way that fits easily into their daily routines.

“Our leaders were instructed to be men of vision and to make every decision on behalf of the seventh generation to come; to have compassion and love for those generations yet unborn.”
Chief Oren Lyons

Steps in developing a vision:

Where did we come from?

Developing a vision begins with thinking about the values and beliefs of your community and determining which beliefs are important to the local way of life. For example, the Koyukon people's way of looking at the world traditionally viewed wasting any part of a plant, animal or other resource as disrespectful. Because of this, waste was not allowed. Which values, beliefs and ways of looking at the world are important to people living in your community today? Do community members practice these? Using this knowledge keeps valued traditions and lifestyles alive and respected by community members.



Where are we now?

The next step in visioning is to build a picture of the community; identify what works for the community, what does not work, and what items are valued. Later, this picture will help create your vision.

One way to involve the community at this stage is to ask the question: “What environmental issues are of concern to the community?” Ask people to come up with all the environmental issues that are relevant to the village. Make a list of these issues. Make sure to write every person's comment on the list.

Some examples of concerns that may appear on the list include: too much garbage in the village, dust from the roads, and polluted river water. Later, you can use this list as a guide when developing a survey. You may want to refer to the issues identified on the Village Environmental Planning Survey on pages 35 to see if there are any issues listed that members of the community did not mention. These issues may be added to the list if the community feels they are important. Once you have all of the issues on a list, you may want to group similar issues together to shorten your list if necessary. You should also review Appendix A (Village Environmental Planning Survey Forms) on page 155.

COMMUNITY RELATIONS TIP

Make sure all concerns that are brought up by the community are addressed. Hard feelings will result if individuals' concerns are not acknowledged.

The Village of St. Paul used a similar approach to identify the cultural strengths of the community in an effort to do culturally sensitive economic planning. They used a video to document what people saw as cultural strengths. Some of the strengths identified were the importance of women cooking for large groups, and the fishing knowledge and experience of the men. After building on the fishing knowledge of the community, St. Paul developed a successful halibut industry.

Where are we going?

The next step in developing a vision is for community members to look at the direction the community will go if certain practices are not changed. For example, a village that currently benefits from commercial fishing may feel that the future fish population will be harmed if the harvest continues at the same rate.



This is an important step to determine whether the community is headed in a direction that does not harm the people or the environment. In other words, will present actions threaten the community's ability to survive or support itself in the future? If so, the community will need to consider alternative actions.

Where do we want to be?

Once you have looked at the past, where you are now and where you are going, the next step is to decide where you want to be in the future. This is your community's vision. **A vision is made up of a community's hopes and dreams.** It describes a picture of what the people want to see happening in the future. A community's vision is arrived at through community consensus, or agreement, and then written down in a statement. This is called a **vision statement**.



It is important for the community to aim for a method of decision-making where everyone's input matters. Consensus is only reached when all people agree on a certain issue. We need to hear each voice if we are truly striving for a people-driven, community-based approach to environmental planning.

Use the vision statement to guide your community throughout the process of environmental planning. You will need to reevaluate the vision over time. Vision statements may change as the community changes.

THE VILLAGE OF ILIAMNA'S VISION STATEMENT IS:

Through individuals working together for a better community, Iliamna will maintain the quality of life where residents and visitors will respect the people, land, resources and culture.

Step 3: Define your community’s needs using environmental assessment surveys

This step in community-based environmental planning is the main focus of the surveys in this manual. You will be able to identify some of your community’s environmental needs using the environmental assessment surveys included in Part 2.

Once an environmental planning team has been established and has met with other community members to develop a vision, the next step is to identify the needs and desires of the community. Consider the consequences of mining and ecotourism on your community, and climate change and global warming may have a dramatic impact on your community in the future. For more information about the effects of global warming in Alaska see Appendix L (page 263).



The Village Environmental Planning Survey (VEPS)

After the community has identified the environmental issues during Step 2, “Develop a vision for the future”, the next step is to prioritize these issues. Ranking the importance of environmental issues with community input can lead to greater community support and understanding of the

planning process. The community decides the best way to prioritize these issues.

One way to prioritize issues is by doing a survey so the entire community has the opportunity to give input. This allows everyone to be involved in the planning process.

The *sample* Village Environmental Planning Survey on pages 45-46 is designed for rural areas of Alaska. This survey is a tool to assist communities in prioritizing their environmental issues. You can use this survey as a model, and add or delete issues from it based on issues specific to your community. However, the best approach is to develop the survey with the help of the community.

Barrow's Village Environmental Planning Survey:

The results of the Village Environmental Planning Survey show how the community ranks different environmental issues in terms of importance. For example, after conducting a Village Environmental Planning Survey in the Native Village of Barrow, the results showed that the community viewed the top 3 most important environmental issues as:

- 1. Hazardous materials and toxic waste cleanup in dump sites and other designated areas;*
- 2. Raw sewage spills in the village and raw sewage disposed at the lagoon; and*
- 3. Barrow landfill (dump site).*

The results of this survey were very important to the Native Village of Barrow. Originally, the North Slope Borough Assembly was considering cutting 1.5 million dollars in Capital Improvements Program funding for the closure of the Barrow landfill. However, because the sewage lagoon, hazardous materials and toxic waste, and the Barrow landfill were the highest priority issues for the Barrow Tribal Membership, the Assembly eventually took action to keep the 1.5 million dollars for the Barrow landfill closure in the budget for the coming fiscal year. A survey can be a powerful tool! See Appendix B (page 165) for a copy of the Barrow survey results.



Many villages rank their landfill as a high priority.

Eyak's Village Environmental Planning Survey:

The Village of Eyak has also used the Village Environmental Planning Survey. The top 3 issues identified in the Eyak Environmental Survey are:

- 1. Safe drinking water*
- 2. Eyak Lake water quality*
- 3. Orca Inlet water quality*

Based on the overwhelming majority of tribal members who ranked safe drinking water and the water quality of particular water bodies as the top issues that needed attention, Eyak's Environmental Program has begun planning for an Eyak Tribal Water Quality Program.

For more information on how to develop and use the Village Environmental Planning Survey in Part 2 of the manual.

Technical Environmental Survey (TES)

Once you have identified the environmental priorities of community members using the Village Environmental Planning Survey, the next step is to identify some actual environmental issues in your community. Completing the Technical Environmental Survey can help you do this. Using these two surveys together can be an effective way to prioritize and identify environmental issues in your community. The two surveys are also excellent environmental tools for your community.

The Technical Environmental Survey is a series of questions concerning drinking water, wastewater, solid waste, fuel tank farms, and air quality. For example, one question on the survey asks whether there is a place in the village for residents to store used oil. If the answer is 'no,' it indicates a problem. The technical survey may bring out important environmental health issues in your village. By completing all of the questions, you will become more familiar with different environmental issues in your community.



Compare the issues identified in the technical survey with the results of the Village Environmental Planning Survey. For example, in an ideal world, if the community identified drinking water as the most important environmental issue, the technical survey would show that there are few or no problems associated with drinking water. If the surveys don't match, then community education may be necessary. Part 2 of this manual contains a Technical Environmental Survey that YOU can use to do an assessment of some of your village's environmental issues. See Appendix C (page 179) for a comparison of the issues covered on the two surveys.

Combine the information you gather from the Technical Environmental Survey with information you get from other sources such as different surveys, technical reports, or previous assessments. The more information that you gather about the environmental condition of your community, the more complete picture you will have of the environmental issues affecting your community.

Involving the community:

Once you have completed both surveys, it is important to review the results with the community. Individuals can then see which environmental issues the community identifies as most important (Village Environmental Planning Survey results). The community also will be able to see specific environmental problems identified using the Technical Environmental Survey.

Margaret McCaslin brings environmental news to the community of Selawik in a newsletter.

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NEWSLETTER	<p><i>The Alaska Eskimo Whaling Captains passed a resolution at their 1992 annual convention calling for reducing pollution in the Arctic Ocean, especially garbage. The resolution calls for all whaling crews to bring garbage back to land for disposal and encouraged all villages to prevent all off-shore garbage dumping.</i></p> <p><i>Source: Earl Finker, BKRW radio, as reported in Anchorage Daily News, Feb. 16, 1992.</i></p> <p>A good solid waste management plan can benefit Selawik now and in future generations. What is Selawik willing to do to receive these benefits?</p> <p>STOP BUYING TRASH SHOPPING LIST</p>		
	<ol style="list-style-type: none"> 1. Is this plastic or paper packaging necessary or just for looks? 2. Is this packaging recyclable? (Not mixed materials) 3. Can I reuse this container for something else? 4. Can this beverage container be returned or recycled? 5. Can I buy this product (razor, cups, utensils, diapers, etc.) in a non-disposable, longer-lasting form? 6. Is there a non-hazardous substitute for this cleaner, pesticide or solvent? 7. Can I use a fabric shopping bag or paper bags instead of plastic bags? 		

One way that you can present the results of the survey to the community is during a community meeting. The information can also be presented using newsletters, radio announcements or posters. Any approach that effectively brings the information back to the children and adults in the community is useful. Think of a system that would work best in your village for getting the information Margaret McCaslin brings environmental news to the community of Selawik in a newsletter back to the people and use this approach. The information in Part 2 of the manual can help guide you through

explaining the results of the survey to your community. The explanations also can be helpful when preparing an environmental assessment or work plan for your community.

COMMUNITY RELATIONS TIP

Be accountable to the community. If you make promises, make sure you fulfill the promises or you will lose your credibility.

The community may have identified certain issues as lower priority on the Village Environmental Planning Survey, yet the technical survey identified problems associated with those issues. For example, let's say that the community ranked the landfill number 6 in order of priority on the Village Environmental Planning Survey. Let's also say that the Technical Environmental Survey results identified the following serious problems associated with the landfill. For example,

- *No operator for landfill*
- *No fence around the landfill*
- *Uncontrolled access to the landfill*
- *Lead acid batteries and other hazardous materials in the landfill*
- *Large pools of water in the landfill*
- *Animals scavenging at the landfill*
- *No community education programs about solid waste*



This is an unsecured landfill.

People in the community who did not see the landfill as an environmental health problem at first may feel different once they understand the health hazards associated with a poorly managed landfill. Because

some serious issues associated with the landfill were identified with the Technical Environmental Survey, the community's viewpoint may change on the issue. In other words, the results of the Technical Environmental Survey can be educational and may alter some of the perceptions identified in the Village Environmental Planning Survey. **Education is a very important part of the planning process.**

Step 4: Identify possible solutions

After the community identifies, prioritizes, and discusses the environmental issues from both surveys, it is time to find solutions. At this step, it is important to determine all possible solutions to the problems identified and the costs to carry them out. Involving your community throughout the entire planning process and educating them on environmental issues will better prepare community members to help find solutions.

Involve community members, both children and adults, as much as possible when identifying solutions. The children in your community are a valuable resource. Connecting the young people to real issues in the community builds a stronger educational experience and benefits the community.



The youth in your community are a valuable resource such as these high school students in Aniak.

Remember to network with other communities when identifying solutions. There may be villages that found workable solutions to similar environmental problems. Knowing solutions that did not work is helpful as well. Your Regional Health Corporation or Native Association may be

able to connect you to villages with similar issues.



This is a simple solution for collecting batteries for recycling and from polluting the landfill.

Step 5: Put the plan together

Now that you have worked with the community and developed a vision statement, a consensus over perceived environmental issues, a list of environmental problems and needs, and possible solutions, it is time to produce your environmental plan.



Environmental plans are developed to achieve the community's goals or priorities in the area of environmental protection and health. The plan should focus on the highest environmental health priorities identified by the community. You want to solve as many of the urgent problems as possible using the resources available in your village. See the information found in Appendix N, Grant, Funding and resources Directory found on page 302.

Some things to consider when setting priorities for action include:

- *What support is needed?*
- *Which solutions involve short-term projects and which involve long-term projects?*
- *Are any issues beyond the ability of the village to control?*
- *What is the cost?*
- *Which issues are simple to solve?*
- *Are volunteers available to carry out tasks?*

Keep in mind when prioritizing issues that you may be able to address some less urgent issues with limited resources. For example, sanitation presentations at the school are a simple goal to achieve. Consider simple, achievable goals when prioritizing issues. Also, pay special attention to any solutions that can address more than one problem at a time.

Once you have determined the goals or priorities that make up your environmental plan, the next step is to break the goals down into smaller, more manageable steps. For example, if one goal is to begin a recycling program, you can break this down into the following smaller actions:

- *Raise awareness of problems with landfill*
- *Begin a solid waste/recycling education program*
- *Set up a system to collect recyclables*
- *Put together a recycling committee*
- *Identify volunteers to assist with recycling program*

Each of the above actions can then be broken down further into more specific steps.

Step 6: Carry out your plan

The next step in the planning process is to put your plan into action. This involves:

- *Developing a timetable for when you would like to accomplish tasks. Consider community members who need to be available for each task. If necessary, plan to carry out tasks when people are not away fishing, hunting or gathering.*
- *Determining the costs to carry out the plans and where funds will come from.*
- *Determining who will be involved in accomplishing each of the tasks (i.e. local government, individuals in community, outside organizations).*



COMMUNITY RELATIONS TIP

Give constant feedback to the community. In order to build the community's trust, they need to be informed of both good and bad developments at every step.

Step 7: Evaluate your plan

After you produce and carry out your plan, it is important to measure how well it worked and make any changes necessary to improve the plan. Develop a good monitoring system that guides workers/volunteers in measuring accomplishments. This way you will know if the actions taken have been successful or effective. Perhaps a community environmental advocacy group could be formed to monitor the progress of the projects. This will motivate the workers as well as provide the necessary checks and balances. An ideal monitoring system uses input from all age groups from both within and outside the community.



Outside consultants can be useful in evaluating a plan. However, in order for your planning efforts to continue and be supported by future generations, it is essential for your community to be involved with designing the evaluation plans. This creates community ownership of the plan.

An

environmental plan is constantly changing. Once you have reached the point of evaluating your plan, the whole process begins again. Environmental planning is a continuous cycle. You will need to revisit your vision and the needs of the community over time. The needs of the community will change; however, the community's vision may or may not remain the same.



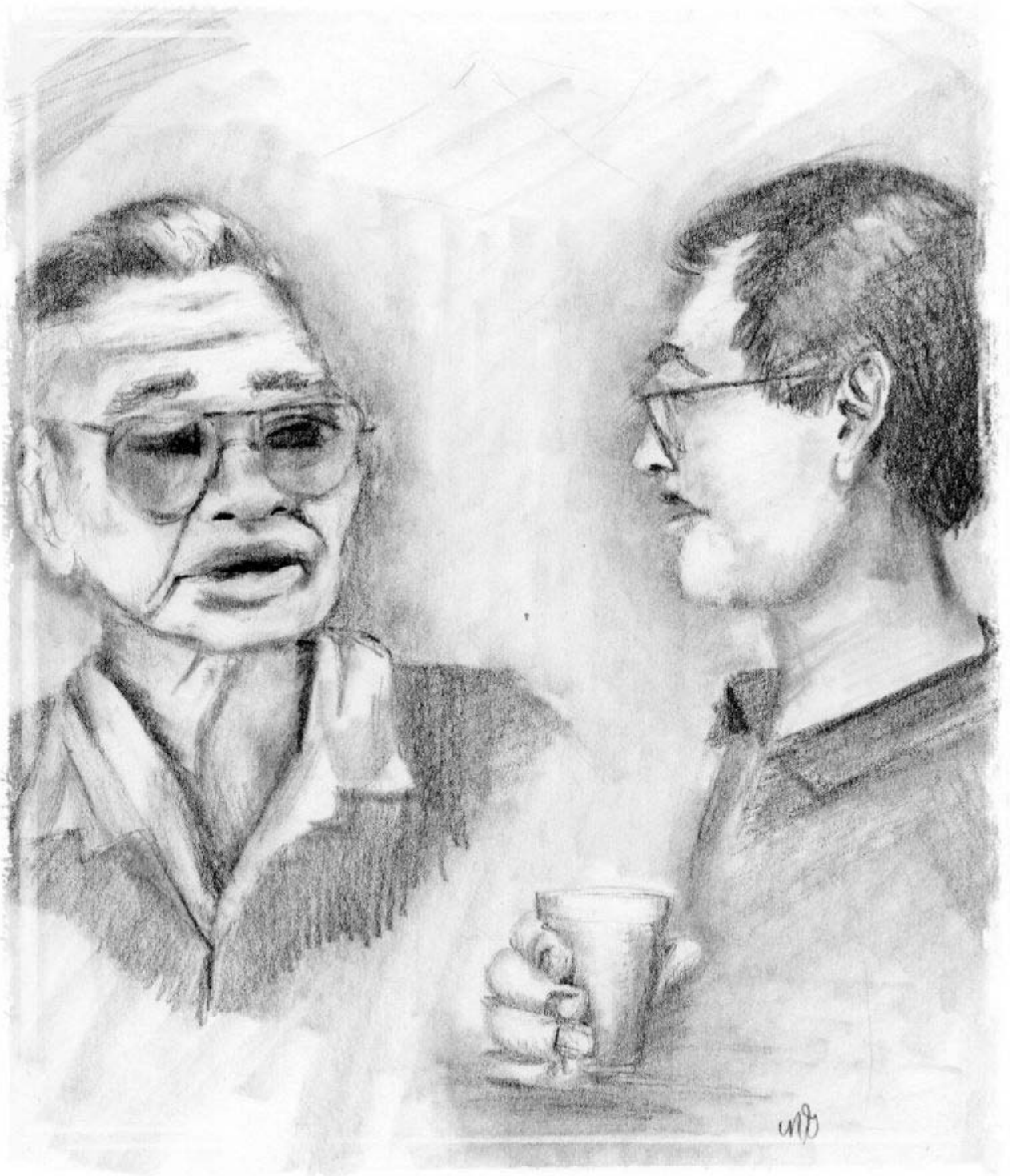
Part 2:
Environmental Assessment and
Environmental Planning Process

Part 2: Environmental Assessment Surveys

Overview of Part 2:

Part 2 of the manual includes the Village Environmental Planning Survey and the Technical Environmental Survey. These surveys are used to identify environmental priorities and issues within the community. This section describes both surveys in detail and includes examples from rural Alaska.

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Village Environmental Planning Survey

The Village Environmental Planning Survey

What is the Village Environmental Planning Survey?

A *survey* is a tool used to gather information. A survey can be a written document or a list of interview questions. There are many ways to gather needed information. The **Village Environmental Planning Survey** is used to identify a community's environmental priorities. The sample survey shown on pages 45-46 is used to build consensus, or agreement, within the community over environmental issues. The survey identifies many issues that are relevant to rural communities in Alaska. Some of these environmental issues may not relate to your community. You may also have environmental issues specific to your community that do not appear on the survey. For this reason, each community will want to design their own survey form to better reflect local issues and concerns.

Example

Village Environmental Planning Survey

Not important *Very important*

1 2 3 4 5 Safe drinking water

1 2 3 4 5 Abandoned vehicles, boats or other equipment left in and/or around the village

Issues covered on sample Village Environmental Planning Survey:

- *Safe drinking water*
- *Abandoned vehicles, boats, etc.*
- *Beach and/or river bank erosion*
- *Village dump/landfill*
- *Construction materials left by contractors*
- *Abandoned drums*
- *Raw sewage spills/sewage disposal*
- *Annual clean-up*
- *Indoor air pollution*
- *Fuel oil contaminated soils*
- *Air pollution outdoors*
- *Dead animals/fish left around village*
- *Trash left around village*
- *Contaminated subsistence foods*
- *Old military sites*
- *Hazardous or toxic materials*
- *Other issues*

Other environmental issues:

Sarah Weisner identified a serious environmental concern for her village of Shungnak: “We have villages living upstream from us. They also have dog teams and these dogs do waste along the riverbanks. When the river comes up and washes the beach, everything goes down river and we consume the water, fish, and animals and everything that comes with it. We are also a village upstream from other villages.”

Wilfred Ashby from the Village of Noatak is concerned with the impacts of nearby mining and how it may be affecting his village and the surrounding areas used for subsistence.



Explanation of Village Environmental Planning Survey issues:

A brief explanation of each issue on the Village Environmental Planning Survey on pages 45-46 is provided below. It may be useful to use these explanations and pictures when conducting your Village Environmental Planning Survey door-to-door.



Safe drinking water

Safe drinking water is water that is safe from disease and contaminants. Untreated or improperly treated water can make people sick, especially children and elders.

Annual clean-up program

Annual clean-up programs are a way to involve the community in improving the appearance of the village.

Beach and/or river bank erosion

Erosion of the river bank or beach means that soil or sand at the river, lake or ocean-side is being washed away by weather. Erosion can prevent fish from living and reproducing. Erosion also threatens housing, roads and old landfills.



Abandoned vehicles, boats or other equipment left in and/or around the village

Materials such as deserted cars, boats, old generators, engines, and snowmobiles left around the village are ugly and contain hazardous materials such as antifreeze and lead-acid batteries. These abandoned materials can pollute the environment and are dangerous to children who often play with them.

Raw sewage spills in the community and improper sewage disposal at the lagoon

In honey bucket communities, sewage spills can lead to the spread of infectious diseases.

Village dump/landfill

Many landfills in rural areas are uncontrolled and present public health problems. Some landfills contain hazardous materials that could potentially get into the drinking water.



Fuel oil contaminated soils in and/or around the village

Fuel from snow machines, ATVs, cars, fuel tanks and the power plant generator is a potential source of pollution. Small amounts of oil dripping on the ground can add up to a large amount over time. Oil can pollute the drinking water.



Abandoned drums in and/or around the village

A 55-gallon abandoned drum may contain hazardous materials that eventually leak into the ground and contaminate the water. Empty drums are ugly and can potentially be harmful to children.

Air pollution problems caused by the village electric generator, open burning at the dump, vehicles or smoke from burn barrels in the village

The air that comes out of generators, vehicles and from burn barrels may contain chemicals that are toxic, or poisonous, to your body. Some materials are known to cause cancer.

Indoor air pollution, such as cigarette/wood stove smoke

Cigarette smoke and wood stove smoke are sources of indoor air pollution and can be hazardous to your health.



Black mold

Black mold can become a problem when a home is too tight and the moisture levels are too high. Look for black mold along the bottom of window and room corners.

Contaminated subsistence foods

Hazardous materials that are not properly disposed of can potentially poison the subsistence foods your community relies on and make the food unsafe to eat.

Dead animals and dead fish left in or around the village

Dead animals and fish attract organisms that spread diseases.

Trash left in and/or around the village

Trash left around the village is ugly and can also contribute to the spread of disease.

Old military sites cleanup

Many old military sites have not been cleaned up and materials remain in or near villages. Some of these materials may be hazardous. Not every village has old military sites.



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Environmental issues beyond village control, such as ozone depletion, polluted oceans and/or rivers

There are many issues that may affect your village that you have no control over. For example, pollution created in places far away from Alaska contributes to the depletion of the ozone layer. This increases the chances for cancer caused by the sun's radiation.

Construction materials that are left behind by contractors

Contractors often leave behind materials such as paints, thinners, and plywood that are not used up completely. Some of these materials may be hazardous.



Other?

Add any other environmental issues that are specific to your community. For example, dust on the roads, polluted water upstream, environmental effects of logging, improper use/disposal of toxic household cleaning products, mining operations, leaking fuel transfer pipes, tourism, etc.

Consider the consequences of mining and ecotourism on your community, and climate change and global warming may have a dramatic impact on your community in the future. For more information about the effects of global warming in Alaska see Appendix L (page 263).

Hazardous or toxic materials left in dump sites and/or other areas around the village

Hazardous or toxic materials include things such as antifreeze, lead-acid batteries, fuel oil, many household cleaners, old lead paint, paint thinners, gasoline, aerosol cans, compact fluorescent light bulbs, electronics and asbestos. These materials should not be placed in your landfill because they can potentially get into the ground and contaminate the drinking water.

Why do you use the Village Environmental Planning Survey?

The Village Environmental Planning Survey is a powerful tool that can be used to build community consensus. Community-based environmental planning begins by finding out which environmental issues the community sees as the most important issues. The Village Environmental Planning Survey can be used to rank your community's perception of environmental issues. The results show a consensus, or agreement, over village environmental issues.



Benefits of doing a Village Environmental Planning Survey:

- *Allows for input from each person in the community*
- *Involves the community in environmental planning*
- *Serves as an educational tool for the community*
- *May help your village get funding*
- *Shows potential funders that the community is involved in environmental planning*
- *Helps people in the village work together*

“While environmental issues often polarize communities dealing with questions of economic development and the health of the environment, this survey gave the Tribe consensus about environmental issues without involving politics.”

Kate Williams, Eyak Environmental Program Coordinator

How is the Village Environmental Planning Survey used in planning?

Steps 2 and 3 discussed on pages 20-28 of the manual describe how to use the Village Environmental Planning Survey in the planning process.

The Village Environmental Planning Survey should be developed with the help of your community. Use the sample survey on pages 45-46 as a model, and add or delete issues from it based on input from the community. The Village Environmental Planning Survey provided in this manual can be used as a guide to help write a survey specific to your community's needs. Refer to Appendix C (page 179) for examples of Village Environmental Planning Surveys developed by different villages in Alaska.

When do you use the Village Environmental Planning Survey?

The Village Environmental Planning Survey is used at the beginning of the planning process to help identify the environmental priorities of the community. Part 1 of the manual describes in further detail when to use the Village Environmental Planning Survey in planning (Steps 2-3 of the Environmental Planning Process).

Native Village of Eyak:

The Native Village of Eyak has involved the community in the environmental planning process. Encouraged by the success stories of other villages that had conducted environmental surveys, the Village of Eyak developed a survey adapted to their local issues. The survey was a list of 31 environmental issues that were to be ranked, or prioritized, by tribal members. One hundred and fifty-eight people were surveyed. In a community like Cordova, with such a variable population between the summer and the winter, it was a big success to get such a large response at the end of the fishing season.

Two tribal members were hired as field assistants to conduct the survey door-to-door. It took almost the entire month of September to go through the tribal membership lists and then to survey people. Perhaps most encouraging were the positive comments that were written on the surveys about the need for the village to take an active role in environmental issues. There were 31 people who expressed an interest in serving on the Eyak Environmental Committee.

The results of the survey will be used to narrow work plan objectives and goals under Eyak's environmental program, based on the issues tribal members felt were a top priority. An environmental committee will be formed to provide input to the council and the coordinator regarding environmental issues in the village.

—Kate Williams, Eyak Environmental Program Coordinator

What other information can be added to the Village Environmental Planning Survey?

You may choose to add items to your survey to get more information. For example, the sample Village Environmental Planning Survey in this manual asks people to rank the importance of different issues. You may also want to find out how satisfied people are with the community's efforts on each of the issues. One way you could find out this information is by using the format below on your survey:

Example

	Importance of issue					Satisfaction with the community's efforts				
	<i>Not</i>				<i>Very</i>	<i>Not</i>				<i>Very</i>
	1	2	3	4	5	1	2	3	4	5
Safe drinking water										
Abandoned vehicles, boats or other equipment left in and/or around the village	1	2	3	4	5	1	2	3	4	5

When you are developing your survey, remember to keep the survey simple and easy to understand. A complicated survey is difficult to answer and may end up giving you false information. Also, it is important to develop a survey that can be used again in the future to monitor the environmental changes that take place in your village. If you keep the survey the same, you will be able to see the progress your village has made over time.



Village Environmental Planning Survey

Village of _____

There may be very serious environmental pollution problems in our village. We need your help in ranking the environmental issues listed below.

This *survey form* is designed to obtain your input to develop our village environmental plan. Our goal is to make our community an environmentally safe place to live and raise families. Your participation in this survey will greatly assist us in reaching this goal. This survey will help us address serious problems with solid waste, hazardous/toxic pollutants and other environmental issues in our village. Listed below are some environmental health problems or issues that may need to be addressed.

Each environmental issue listed below should be **ranked** as to how important you believe the issue is in our village. “**1**” is the lowest ranking (not important), and “**5**” is the highest (very important).

Circle the value of importance that you would give to each of the issues below. Please respond to each issue.

<i>Not important</i>		<i>Very important</i>			
1	2	3	4	5	
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Abandoned vehicles, boats or other equipment left in and/or around the village.
1	2	3	4	5	Beach and/or river bank erosion.
1	2	3	4	5	Village dump/landfill.
1	2	3	4	5	Construction materials that are left behind by contractors.
1	2	3	4	5	Abandoned drums in and/or around the village.
1	2	3	4	5	Raw sewage spills in the community and improper sewage disposal at the lagoon.
1	2	3	4	5	Annual clean-up program.
1	2	3	4	5	Indoor air pollution, such as cigarette/wood stove smoke.
1	2	3	4	5	Indoor air pollution relating to mold.
1	2	3	4	5	Fuel oil contaminated soils in and/or around the village.
1	2	3	4	5	Air pollution problems caused by the village electric generator, vehicles or smoke from burn barrels in the village.
1	2	3	4	5	Dead animals and dead fish left in or around the village.
1	2	3	4	5	Trash left in or around the village.
1	2	3	4	5	Contaminated subsistence foods
1	2	3	4	5	Old military sites cleanup.
1	2	3	4	5	Hazardous or toxic materials left in dump sites and/or other areas around the village.
1	2	3	4	5	Other environmental issues beyond village control, such as ozone depletion, polluted oceans and/or rivers
1	2	3	4	5	Road dust.
1	2	3	4	5	Other?

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Please use the space below for comments or if you feel that there are other environmental health issues in our village that you feel need to be addressed.

This survey information is very important to our village. Thank you for taking time to complete it.

OPTIONAL. If you would like to receive a copy of your survey along with the results of the survey, please write your name and address below:

Name _____

Address _____

Conducting the Village Environmental Planning Survey:

Who do you give the survey to?

Ideally, every person in your community should complete a survey. The information that you collect will better represent the village's concerns if more people fill out the survey.

It is important to involve teachers and students in taking the Village Environmental Planning Survey. It would be interesting to compare the children's perceptions of environmental issues to those of the adults.

What is the best way to survey the community?

The best way to survey the community is by going door-to-door and to wait while the survey is being filled out. You will get the most responses if you administer the survey this way. This also allows people to ask questions in case there is confusion. The disadvantage to this method, however, is that it can take a lot of time. Other methods, such as mailings or dropping the survey off at a person's house, may take less time but will also yield fewer responses.

You may need to interview people and fill in the survey for them. Do not exclude people from taking the survey if they cannot read or understand the survey. Each person's input is very important. The pictures and explanations of survey questions on pages 38-40 may be helpful when giving the survey.

It's a good idea to get feedback on your survey from a few people before giving the survey to the entire community. This way you can correct any problems and make improvements to your survey.



How do you fill in the Village Environmental Planning Survey?

Each issue on the survey should be ranked with a number between 1 and 5 with the number 1 indicating "not important" and 5 indicating "very important." It is important that a response is given for each issue; otherwise the results will not accurately show the community's views. You will be able to control this better if you give the survey door-to-door. If a person has a question about a certain issue on the

survey, you will be there to assist him/her.

Each person should rank the issues on the Village Environmental Planning Survey according to how important each issue is to him/her EVERY DAY or all of the time. For example, you are not trying to determine if people think “safe drinking water” is an important issue only at a certain moment. Rather, you want to know how important they feel “safe drinking water” is *all of the time*.

If the person filling out the survey does not understand one of the statements, make sure you help him/her without giving your opinion about the statement. For example, when you explain the statement “safe drinking water” on the survey, don’t change the intent of the statement by the way you ask the question. Do not say, “Safe drinking water is an issue, *isn’t it?*” Instead, say “Is safe drinking water an issue with you?”

Encourage people to fill in the section on comments. This is a valuable part of the survey and can reveal important information that is not addressed in the rest of the survey.

Why is there a space for people to put their name and address on the Village Environmental Planning Survey?

At the end of the Village Environmental Planning Survey, there is a section for the person being surveyed to put their name and address. This allows you to return a copy of the survey to that person along with a copy of the survey results for the entire community. Encourage people to fill this information in but let them know that it is optional. Some people may prefer not to put their name on the survey.

It is a good idea to make a list of all the people who have completed the survey just in case some people do not fill in their name and address. Then, you will know who has completed the survey.

Make sure that each person who filled out a survey gets a copy of his or her survey along with the results from the community. Bringing the survey back to each person gives ownership in the whole planning process. People should be aware that their names will be marked as filling out the survey, EVEN if they don’t put their name down, or they might be upset afterwards when they receive their copy of their survey.

Compiling the results from the Village Environmental Planning Survey:

After all of the surveys are filled out, the next step is to take the answers from the surveys and summarize them to show the results for the entire village. One way you can put together the results is described below.

Using the example of “Safe drinking water” on the sample Village Environmental Planning Survey, we will go through one way to compile the information. For example, let’s say that the answers below for “Safe drinking water” came from ten people who filled out the survey:

1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.
1	2	3	4	5	Safe drinking water.

If you add up all the points for the drinking water statement, the total points equal 35. You can then use this number and compare it with the total points you get for other statements. For example, if you do the same for “Village dump/landfill” and you get a total of 39 points, then you can conclude that the community sees the dump as a higher priority issue than safe drinking water. After adding up the answers for each issue, you can arrange the numbers in order from highest to lowest to show the issues from highest to lowest priority.

For examples of how some communities have compiled their Village Environmental Planning Survey results, see Appendix B (page 165).

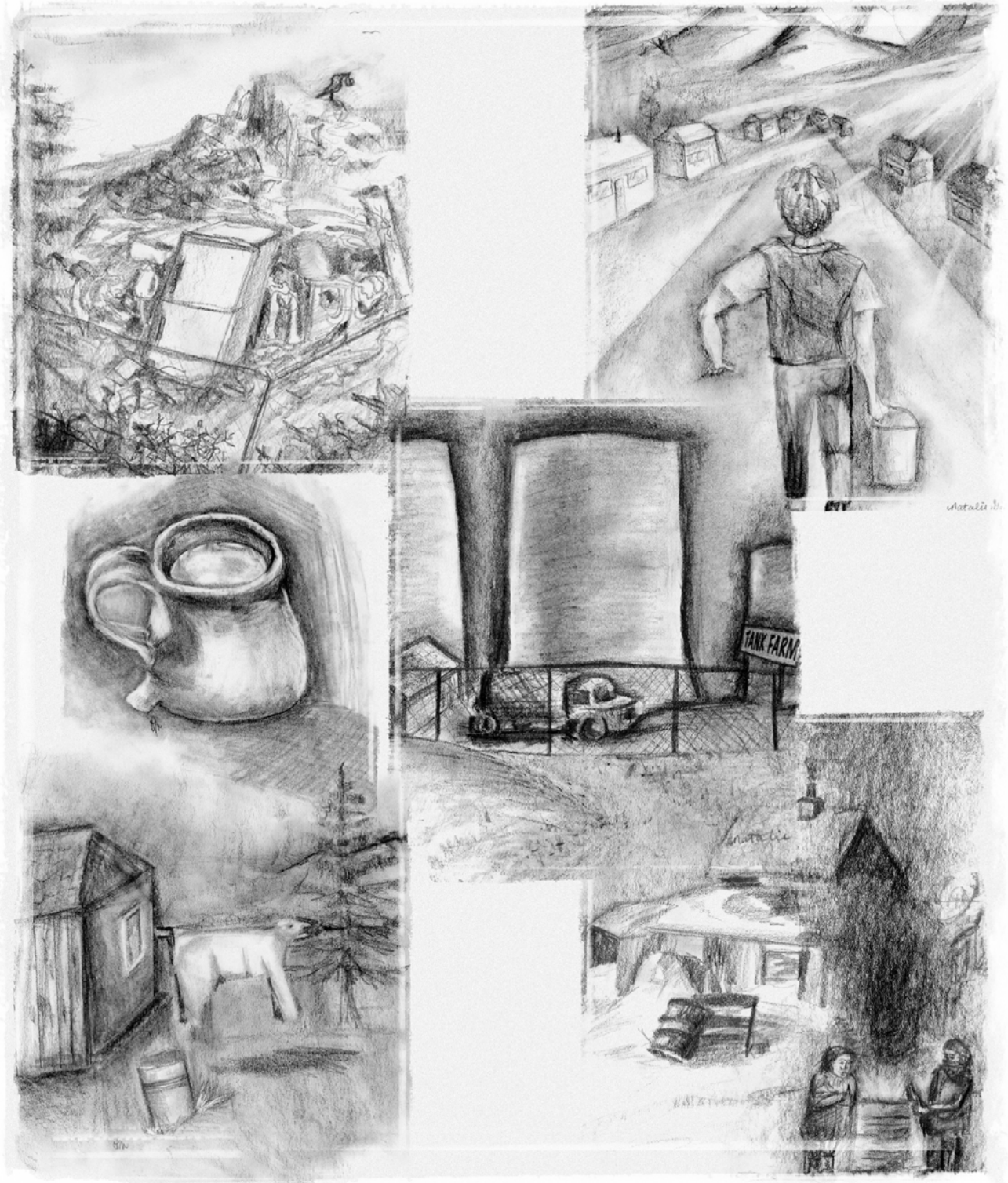
TIP FOR GOING THROUGH THE SURVEYS:

On a piece of paper, (or in Excel using a computer) make a list of all the issues on the Village Environmental Planning Survey. As you go through each person's survey, write his/her response next to each of the issues. Do this for each survey. When you are done, add up all of the responses to get your total.

Your final results might look something like this:

Example

Priority	Position on Survey	Issue	Number of People Responding	Total Points
1	D	Village dump/landfill	10	39
2	N	Contaminated subsistence foods	10	38
3	P	Hazardous/toxic materials left in dump	10	36
4	A	Safe drinking water	10	35
5	C	Beach and/or river erosion	10	34
6	G	Raw sewage spills in the community	10	34
7	K	Air pollution problems...	10	33
8	O	Old military sites cleanup	10	31
9	J	Fuel oil contaminated soils	10	30
10	M	Trash left in or around village	10	30
11	B	Abandoned vehicles, boats...	10	28
12	H	Annual clean-up program	10	27
13	F	Abandoned drums in village	10	26
14	L	Dead animals and fish left around village	10	22
15	Q	Other environ. issues beyond village control	10	20
16	I	Indoor air pollution	10	16
17	E	Construction materials left behind	10	14



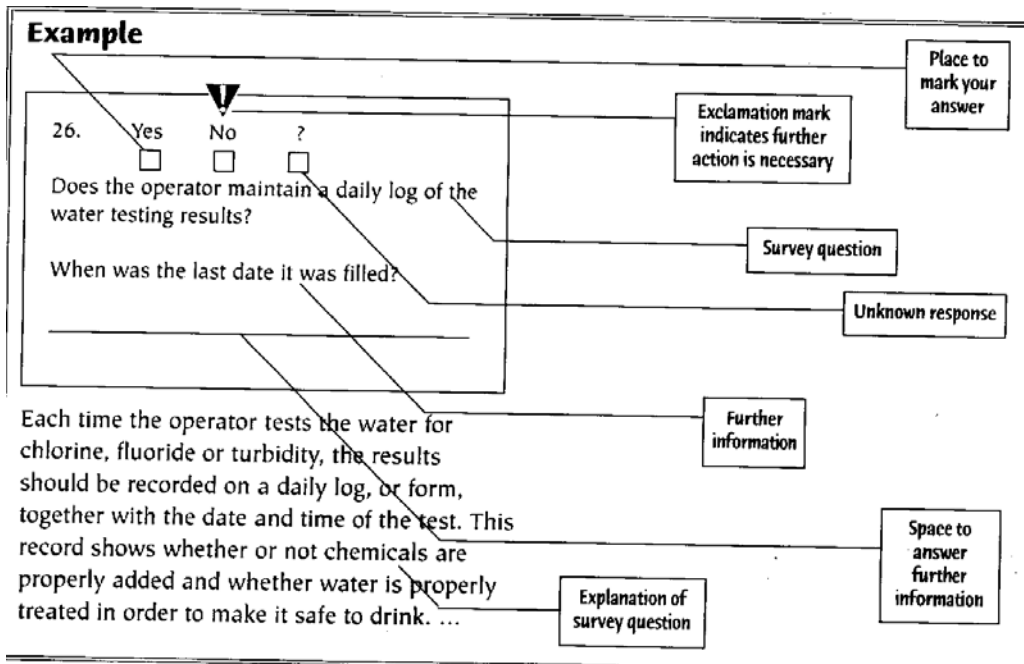
Technical Environmental Survey

The Technical Environmental Survey

About the Technical Environmental Survey:

What is the Technical Environmental Survey?

The Technical Environmental Survey includes the topics of community information, drinking water, wastewater, solid waste, fuel tank farms and air quality. The survey helps to identify environmental issues relevant to rural Alaskan communities. Most of the questions require a yes/no response and many ask for further information. See pages 55-155 for a copy of the survey and explanations for each survey question. See Appendix I (page 211) for a copy of the survey without the explanations.



Why do you use the Technical Environmental Survey?

The Technical Environmental Survey is used to identify environmental issues in your community. The identified issues can then be used to help develop a plan to address these environmental issues.

Who fills out the Technical Environmental Survey?

Any interested person in the community can fill out the Technical Environmental Survey. Only one person needs to fill in this survey. The person completing the survey is not expected to know all of the answers to the questions. The questions require the help from many people in the community.

Each section on the survey has a box at the beginning that identifies who to ask for information. For example, in the “drinking water” section, the person to ask for information is the water treatment plant operator. You may need to set up appointments with the people you need to speak with in order to complete the survey.

The questions on the Technical Environmental Survey are written so most people can pick up the survey and complete it. This manual provides an explanation for each question on the survey in order to assist the person conducting the survey.

How is the Technical Environmental Survey used in environmental planning?

The Technical Environmental Survey is used in environmental planning to help identify environmental issues and needs in your community and to assess the current environmental conditions. The results of the survey can be used to help develop an environmental plan.

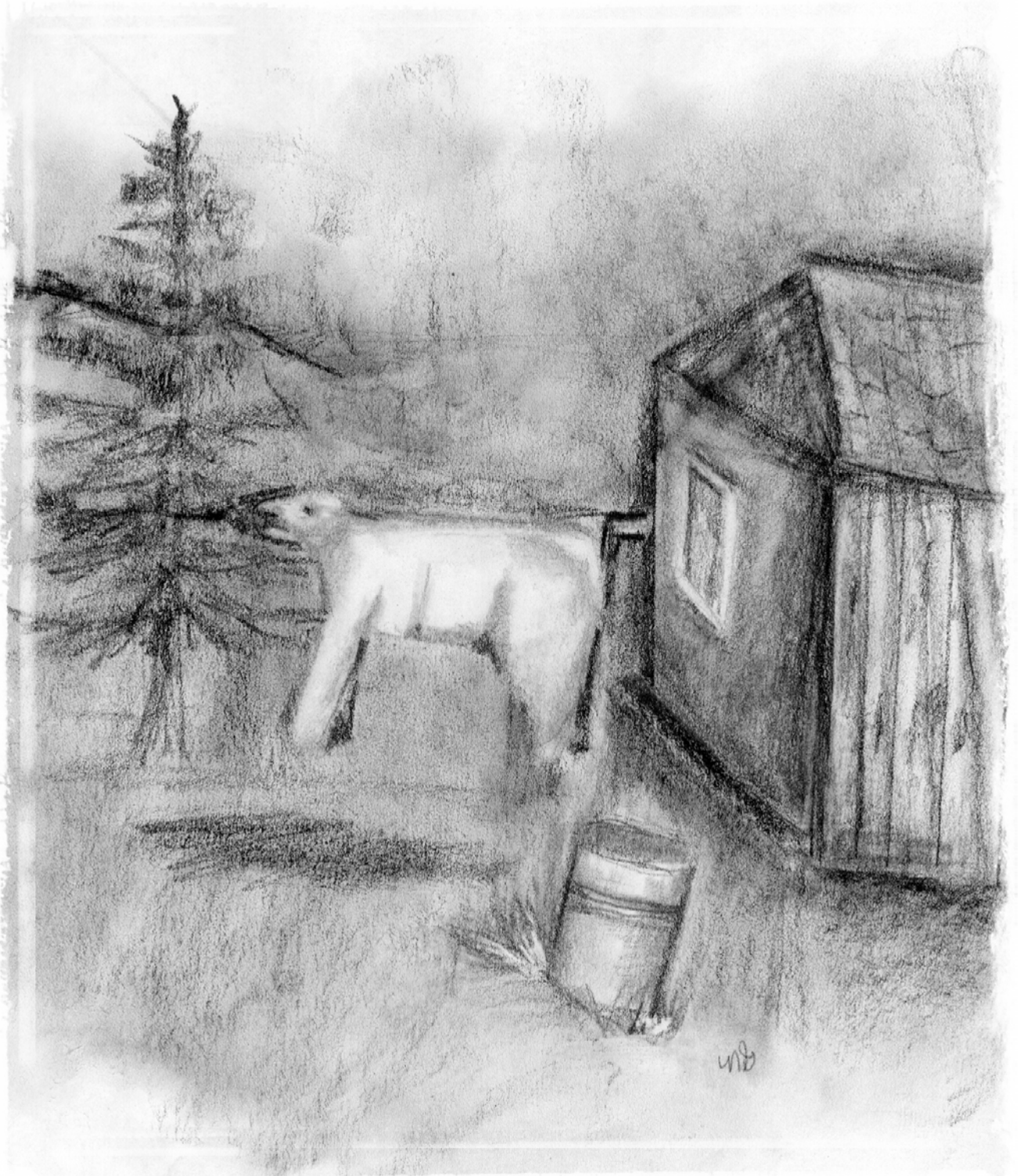
When do you use the Technical Environmental Survey?

The Technical Environmental Survey is used in Step 3 of the environmental planning process described in Part 1 of the manual: ‘Define your community’s needs using environmental assessment surveys.’ See pages 18-32 for more details.

How do you fill in the answers on the Technical Environmental Survey?

Most of the questions on the Technical Environmental Survey require a yes/no response. There is also a space to mark if the answer is unknown (?). *However, the response “?” should only be used as a last resort.* The person filling out the survey should make every effort to contact the right person in order to get a response for each question.

Many questions on the survey require more information than just a yes/no response. There is space on the survey form to write in the information. This information should be filled in as completely as possible. Often, these added comments are the most valuable information.



General Community Information

Technical Environmental Survey

Village _____ Date _____

Surveyor & Title _____

This survey is a list of questions about environmental issues that may be present in your village. To the best of your ability and knowledge, answer each question that applies to our village. Most of the questions can be answered with a YES, NO or ? (unknown) response. Many questions will ask for a specific answer that involves time or amounts. Some of the questions will require that you contact the village council or the person(s) or operator responsible for a particular facility, such as the water treatment plant. As necessary, search out the answer to each question using the response “?” only as a last resort. Please note that an exclamation mark is used to show a response that indicates a problem.

General Community Information

Who to ask: city and/or IRA/Traditional Council, school principal

Many villages have more than one governing council. The purpose of this question is to identify the council(s) that is responsible for making decisions about sanitation services in your village. This way concerns can be directed to the correct governing council.



The village council office in Venetie.

The sanitation facilities (i.e. drinking water system, sewage system and the landfill) in your village are owned by one of the village governments. Residents in the community, however, often refer to the water plant or the sewage plant as the “PHS” or the “Village Safe Water Plant.” This name can be confusing because some people believe that

these organizations own and are responsible for the operation of these facilities. This is not true. The village or Tribal Council owns and is responsible for the safe operation of these facilities. For this reason, it is important to know which village council is responsible for providing sanitation services. If there are operational problems with the facilities, the responsible council can take steps to address the problems.

1. Does your village have a city council, IRA/Traditional Council or both? Which council is responsible for the sanitation services in your village? City Council IRA/Traditional Council or joint ownership/utility board?

Providing safe water, safe sewage disposal and safe landfills for a village requires money. A village that does not regularly collect user fees will not be able to hire trained operators to properly operate and maintain the village sanitation facilities. If the village wants to improve sanitation services, it is important that the village councils and residents understand that user fees must be collected to pay for those services.

Having a system in place for regularly collecting user fees when applying to the Village Safe Water Program (at the Department of Environmental Conservation) for funding. The Capital Budget Questionnaire awarded fifty points toward funding for water, sewer or solid waste projects if a village had a system for collecting user fees. Another fifty points were possible if your village had identified Operation and Maintenance Costs/Funding. Your village, therefore, has a greater chance of getting funding for projects if there is a system in place for collecting user fees for village services. See Appendix E (page 195) for a copy of the Village Safe Water Capital Budget Questionnaire.

The Rural Utility Business Advisor (RUBA) Program, which is part of the Department of Community and Regional Affairs, offers management assistance and financial training



related to water and wastewater utilities to cities and villages. The RUBA Program is a helpful resource for questions concerning collecting fees for village services. See the Directory in the back of the manual for contact information.

The new RUBA regulations concerning water and waste water user fees or other sources to sufficiently cover operating expenses: In order for a community to be considered for a Capital Improvement Project Grant from the Village Safe Water (VSW) Program, a RUBA Assessment must be conducted and all of the “RUBA Essential Indicators” must be met in order for the utility to be eligible for a VSW Grant (see Appendix J, page 228).

2. Yes or No? Do the village council(s) regularly collect fees for village services? If yes, which services? Water? Sewer? Landfill? If no, how does the village pay for the services?

There are many environmental/public health programs and agencies that provide technical assistance to villages in Alaska. If your village council(s) feels that no technical help is being provided to the village, it may be that the resources available are unknown. Being familiar with the programs/agencies and the services they provide can be a useful tool in environmental planning.

For a list of programs/agencies that provide services in rural Alaska, see the Directory in the back of this manual.

Pollution refers to contaminating the air, land or water with materials that are harmful to living things. Examples of different pollution problems that may be issues in your village include: littering in and around the village, an overflowing dump, flooding of the sewage lagoon, unsafe water, improper disposal of batteries, waste oil, fuel spills, abandoned drums and vehicles, and toxic smoke from burning plastics.

The village councils have the ability to make decisions that affect the entire community. If pollution problems are an issue with the councils, there is a greater chance of these problems getting attention. It is important that the council representatives are educated on pollution issues so they are better able to make decisions that will protect the health of the community. To increase the chances of grant funding being awarded the proposal would benefit if it provided documentation of incidences of unsafe water and raw sewage events that have a direct health impact on the community and photos with documented dates and times.

3. Yes or No? Does your village council(s) receive technical help from environmental/public health programs or agencies? If yes, whom?

4. Yes or No? Are local pollution problems an issue with the village councils? If yes, what issues?

The school district should include environmental education in the curriculum at all grade levels. Environmental concepts can be included in the school curriculum in all subject areas. There is no need to have a separate class to cover environmental information because with planning this information can be applied to mathematics, language arts, science, history and other subjects.

Environmental programs that are community-based and centered around local environmental issues can be a very effective way to get information across. They also can benefit the community.

The Village of Galena has established an excellent environmental education program in their schools. A major factor in the success of this program is the good relationships established between various programs early on. The environmental education program is the result of a Memorandum of Agreement between the Louden Tribal Council, the Galena City Schools, and US Fish and Wildlife Service. The Agreement ensures that environmental education is integrated into all the disciplines for all school-age children. By pooling the resources of all these entities, the schools are well on their way to having a first-rate watershed education and stewardship program that will benefit the entire community.

5. Yes or No? Does the village school have an environmental education curriculum? If yes, which grade levels?



The third grade class in Emmonak saves aluminum cans for recycling.

Pollution prevention concepts are often integrated into environmental programs. What is pollution prevention? Pollution prevention means not creating “waste” in the first place. Activities that avoid, eliminate, or reduce waste at its

source prevent pollution. For example, using the same canvas bag over and over again at the village store prevents the waste of many plastic bags.

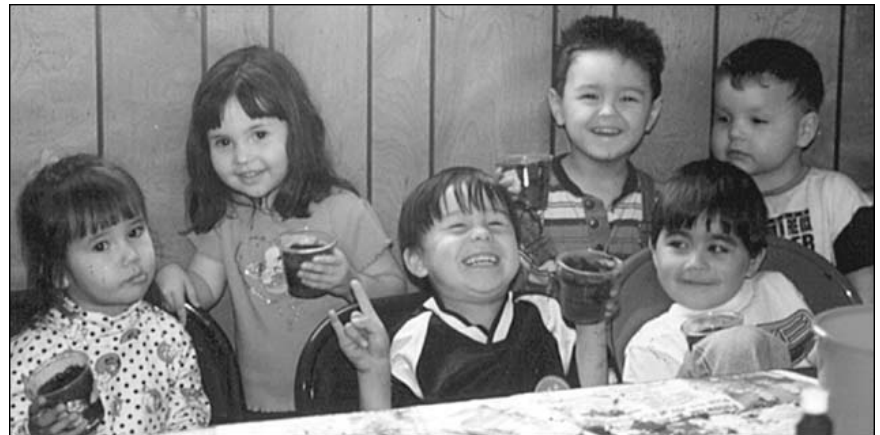
Pollution prevention requires a change in thinking from asking the question “How do I properly dispose of my waste?” to “How can I prevent waste in the first place?”

Sand Point, Alaska

In Sand Point, former AmeriCorps Member Ruth Farrens, focused on working with the school children of the village to teach environmental education. Some of the projects they worked on included;

- *reading stories about the environment and coloring pictures of what the stories meant to them.*
- *planting seeds in reused styrofoam coffee cups and clear plastic juice cups.*
- *making Mexican shakers out of old light bulbs the children collected old newspaper and flour paste. The kids painted these and made a dance routine using the shakers.*

One of the rewards of Ruth's work in Sand Point was having a parent tell her that their daughter came home and told the father not to put his pop can in the garbage. Instead, the daughter told him to keep a bag hanging on the door knob in the kitchen for recycling aluminum!



Children in Sand Point make Mexican shakers out of old light bulbs.

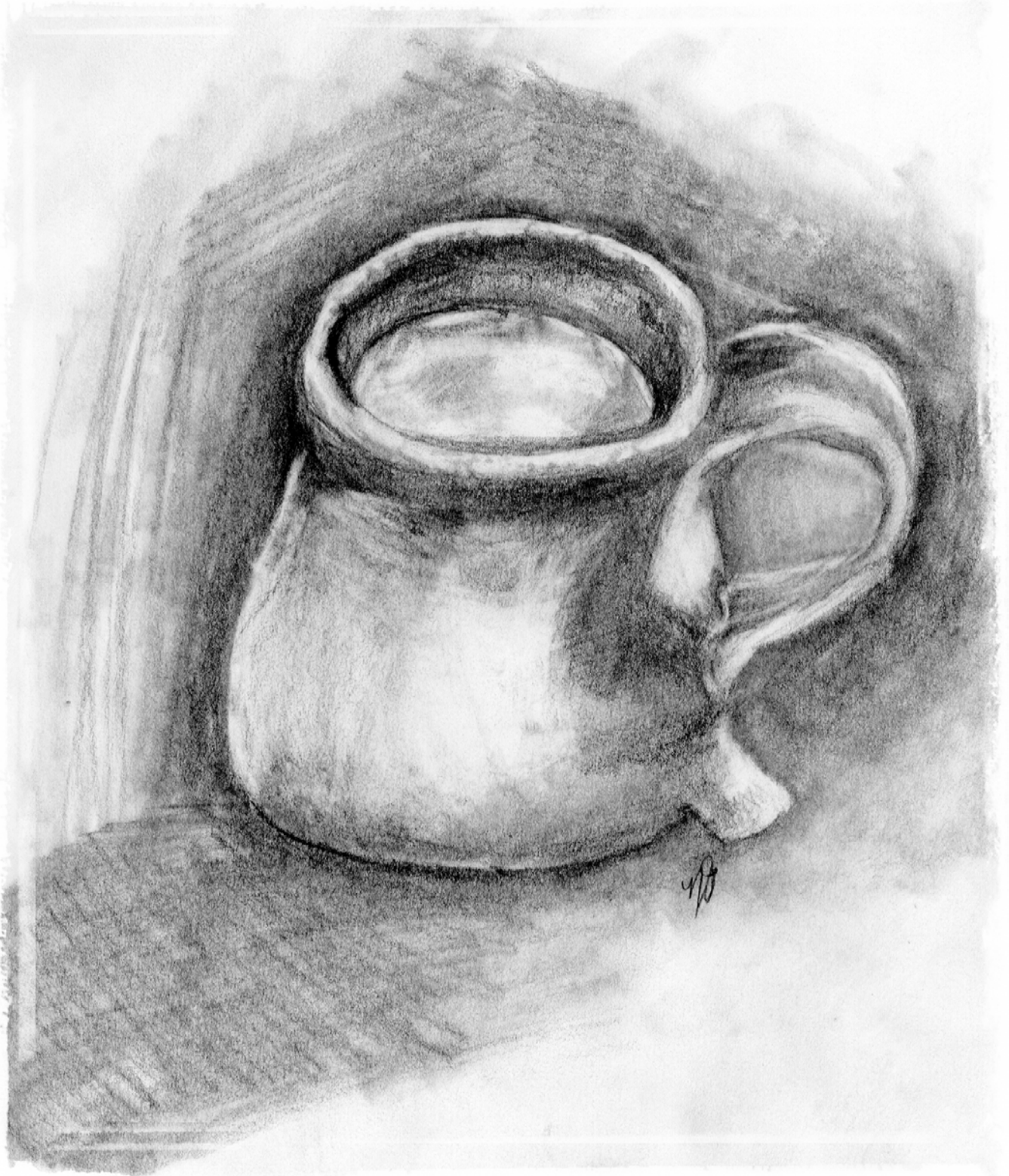
“Teaching the children first was a joy in itself, because they took this teaching home with them and showed their parents, siblings and grandparents what they had learned ... Because of going to our children and teaching them, they have done the job of teaching their elders. It’s like a chain reaction. You start on one end and it escalates from there.”
—Ruth Farrens, AmeriCorps Member, Sand Point

One way to involve the community in environmental issues is to form groups and/or begin programs that focus on environmental issues. Environmental groups can be helpful in accomplishing the environmental/public health goals of the community. A committed group that meets regularly and gains the support of the community will be a benefit to the community. Examples of groups or programs that cover environmental issues include annual clean-up groups, environmental newsletter committees, environmental work groups and recycling committees. Sometimes, villages include environmental issues within programs such as spirit camps.

6. Yes or No? Does the community have any environmental programs or groups that meet regularly? If yes, what are they?



Environmental focus groups can help accomplish the environmental goals of the community.



Drinking Water

Drinking Water

Who to ask: water treatment plant operator

There are many benefits of having your water treatment plant attached to another facility such as a clinic or washeteria. If the facilities are combined, it is possible to share operation and maintenance costs. For example, by having one heating source for the facilities to share instead of several different sources, the village saves both energy and money. An example of a community that has combined facilities is the village of Chalkyitsik. In Chalkyitsik, the water treatment plant is connected to both the washeteria and clinic. In this case, the clinic has piped water and sewer and shares the heating with the other facilities.

7. Yes or No? Is your water treatment plant attached to a washeteria, clinic, or other facility?



A surface water system.

A water treatment plant either gets water from a well, spring, pond, lake, river, stream or snow catchment basin. Water that comes out of a well is **groundwater**. Water that comes from

ponds, lakes, rivers, and streams is **surface water**. A spring can be either groundwater or surface water.

Surface water can become polluted easier than groundwater because it is directly exposed to the pollutants we put into the environment. Consequently, surface water systems require more treatment than groundwater systems. Groundwater systems, however, are not safe from contamination. Pollutants can enter the soil and eventually find their way into the groundwater. Contaminated groundwater can be much more difficult to clean in comparison to contaminated surface water.

8. Does your water treatment plant get water from a: well, spring, pond, river, stream or snow catchment basin?

The purpose of a water treatment plant is to supply safe and good-tasting drinking water. If village residents are not using the water from the water treatment plant, they may be gambling with their health by getting water from another source. For example, in some villages, the treated water is cloudy and yet it is safe to drink. Many people, however, prefer river water or chopped ice that “looks” cleaner but may be unsafe to drink.

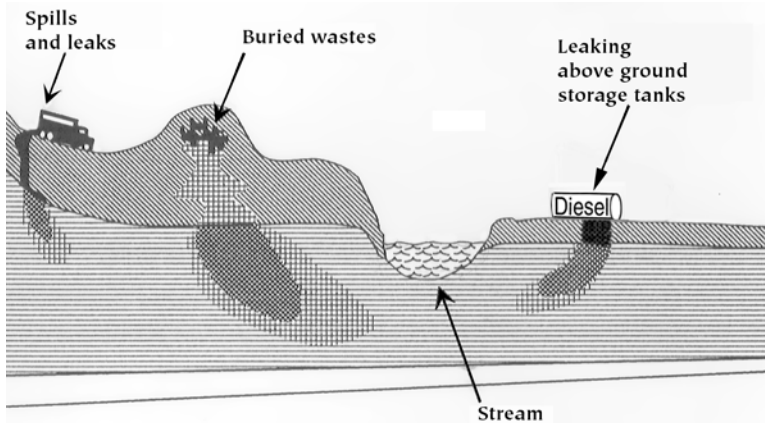
If there are people in your village who do not use the water from the water treatment plant, find out the reason(s). Sometimes people will not drink the water because they feel that the added chemicals give it a bad taste. When used properly, added chemicals, such as chlorine, can actually improve the taste of water.



If you don't like the taste of chlorine in your water, you can solve this by leaving the water in a pitcher or jug for 30 minutes or more. When chlorine gas is dissolved in water, it is similar to the gas in soda pop that makes it fizz. After the water sits out for awhile, the chlorine will escape, similar to when a soda loses its fizz and becomes flat. Once the chlorine escapes, you no longer taste it in the water!

9. Yes or No? Do most village residents use the water from the water treatment plant? If no, is the required water testing performed? If yes, is that water ever tested to see if it meets water quality criteria? Does the cost of piped water influence how much people are using?

It is important that the village residents believe that the water from the water treatment plant is safe to drink. If people do not believe that the water is safe to drink, they are likely to drink water from other sources that may be harmful to their health. Find out why people feel the water is not safe to drink. This can be a useful tool to educate them about safe drinking water. It may even bring out a problem that exists at the water treatment plant that hasn't been discovered.



It may be useful to post the results of water testing each day so community members can see that the water is being treated and is safe to drink.



Students in Aniak use a water model to learn how materials from the landfill and sewage lagoon can get into drinking water.

If village residents feel that the sewage lagoon, landfill, old military site or tank farm is contaminating the drinking water supply, it is likely that they won't drink the water. Find out why people think the water is not safe to drink, so the problem can be addressed. One way to address this

problem is by doing routine water testing for contaminants and informing village residents of the results.

10. Yes or No? Do most village residents believe the water from the water treatment plant is safe to drink? If no, why not and where do they get their drinking water?

11. Yes or No? Do the village residents feel that the sewage lagoon, landfill, old military site, or tank farm, has an effect on the drinking water supply? If yes, how?

A community's health improves as the amount of safe water available increases. When safe drinking water is in limited supply, you have a greater chance of catching diseases from poor hygienic habits and sanitation.

Diseases that result from a lack of water tend to be a serious health hazard. When people use very little water, it may be difficult if not impossible to maintain good personal hygiene. Diseases that affect the eyes and skin may result when limited water is available for washing and bathing. Intestinal infections can also spread much easier from one person to another when water is in limited supply.

A recent study from the Centers for Disease Control (CDC) and Prevention's Arctic Investigations program in collaboration with the Alaska Native Tribal Health Consortium found that limited access to in-home water services causes high rates of respiratory and skin infections in the rural Alaska Native population. Research has shown that health benefits are seen when people use at least 8-14 gallons of water per person per day. While some rural residents who have to travel to remote watering point locations to haul their water are reported to use as little as 1.8 gallons of water per person per day, while the average American uses 80-100 gallons per person per day.

There are communities in rural Alaska that experience water shortages every year. If water is in short supply, the community may need to consider the following:

- *Investigating the cause of limited water supply. For example, there may be an undetected leak in the system.*
- *Inadequate water supply. New sources of water may need to be found.*
- *Limited storage capacity. The storage capacity of the tank used may be too small to serve the entire community.*
- *Water conservation. Residents may need more information on how to use water safely if treated water is limited in supply or unavailable.*

12. Yes or No? Does your village's water treatment plan ever run out of water? If yes, how often and when?

The purpose of questions #13–16 is to see what type of water system(s) is in your village. The reason for identifying the drinking water systems and the number of people in the community using them is that the problems associated with each type of system are different. For example, the potential health problems associated with a piped water system are less than the problems associated with private wells, flush-haul systems and watering points.

Private wells are not regulated water sources and do not have to meet State of Alaska drinking water requirements. Consequently, private wells have a greater chance of contamination not being detected. The location of the well is a very important factor. Wells should be located, constructed and maintained to reduce the possibility of contamination. Residents who have wells should annually (or more frequently) check the water quality (i.e. bacteria and nitrate levels) to make sure that the water is safe to drink. Fecal bacteria and nitrates in the water indicate sewage contamination.



A piped water system.

Piped water is water that is connected to a water treatment center and piped out to homes and other buildings in the community. In a piped water system where water has been properly treated, there is very little chance of water becoming contaminated before it reaches the user.

13. Yes or No? Does your village have private wells? If yes, how many?

14. Yes or No? Does your village have piped water to the houses or other buildings? If yes, to how many?

A **flush-haul water system** is a system where water is transported from the water treatment plant or water storage tank to the customer. The water is transported with a truck, trailer, or a snow machine. Each customer has his/her own storage tank that is filled. This system is almost as sanitary as a piped water system as far as providing safe drinking water.

The hose at the village's watering point should not touch the ground. Cleaning the hose at least once a day with a weak bleach solution will help kill any possible contaminants. The best strategy, however, is to prevent the hose from touching the ground or walls so it does not become contaminated.

15. Yes or No? Does your village have a flush-haul water system? If yes, to how many houses or other buildings?

16. Yes or No? Does your village use dip buckets to store drinking water? If yes, how many houses or other buildings use them?



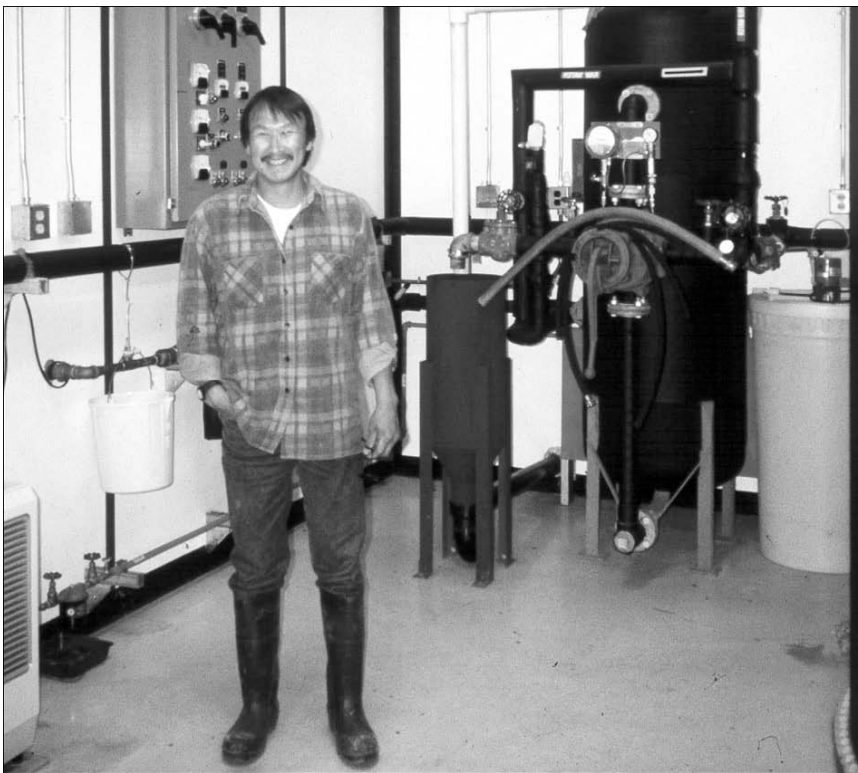
Village watering point in Venetie.

Dip buckets are used in homes of villages with a central watering point. The water treatment plant may have a hose on the outside where you fill your dip bucket.

The water contained in a dip bucket is easily contaminated if not handled with great care. The handle, or dipper, used to gather water from the bucket is the main source of contamination. Dip buckets have the greatest potential for contamination of all the drinking water systems mentioned.

Very few people have more control over the health of the community than a water treatment operator. A water treatment plant should have operators who are capable of regularly keeping the water safe to drink. There should be two or more operators that run water treatment plant in the village. If one operator is sick, on leave, or away from the village, another equally qualified operator should be available to take over the duties.

Some ways to help assure you have capable and qualified operators are to require training, certification, and decent pay. The most important factor, however, is getting the community to understand the important role the operator plays in keeping the community safe. Only when this is understood does the operator gain the respect deserved. Very few people have more control over the health of the community than the water treatment operator.



An operator's pay should be high enough so that the position is competitive and encourages a high quality operator to stay with the job. A high turnover of operators for the water treatment plant is usually harmful and may create unsafe drinking water.

The community needs to understand that safe drinking water is not a free service. Getting

good compensation for the work of operating the water treatment plant provides an incentive for the operator to do a good job and to stay with the job. It also helps give respect to the operator and provides safe water for the community.

17. Yes or No? Does the water treatment plant have operators? If yes, how many and who?

18. Yes or No? Do the water treatment operators get paid? If yes, how much and for how many hours a day?

The benefit of having certified/qualified operators is that it gives some indication to your community that the operator is knowledgeable about his/her job and that the drinking water is properly treated.

Another benefit of having certified operators is that it greatly improves your village's chances of getting state funding for sanitation facilities. The points earned for having trained and certified operators can improve the chance of your village receiving grant money. It is worth getting your village's operator(s) certified in order to benefit from this. See Appendix E for a copy of Village Safe Water Capital Budget Questionnaire.

While some small systems are classified and require certifications such as "Small Treated" or "Small Untreated", they still require the operator to obtain a "State Certification" and they are required to attend additional training in order to maintain their certification. The "Provisional Level 1" certification is the minimum certification required by the State of Alaska. It is possible to obtain a Provisional Level 1 certification after completing an approved course and taking the "Water Operator Level 1" exam. After the operator has completed the required number of hours in the water treatment facility the Provisional Level 1 certification automatically becomes a Level 1 Certification. Additional training is required in order for the operator to maintain their certification.



The "operator-in-training" certification is the minimum certification required by the State of Alaska. It is possible to obtain an operator-in-training certification after completing an approved course and taking a test. You can also get this certification if you have three months of experience in a water treatment plant.

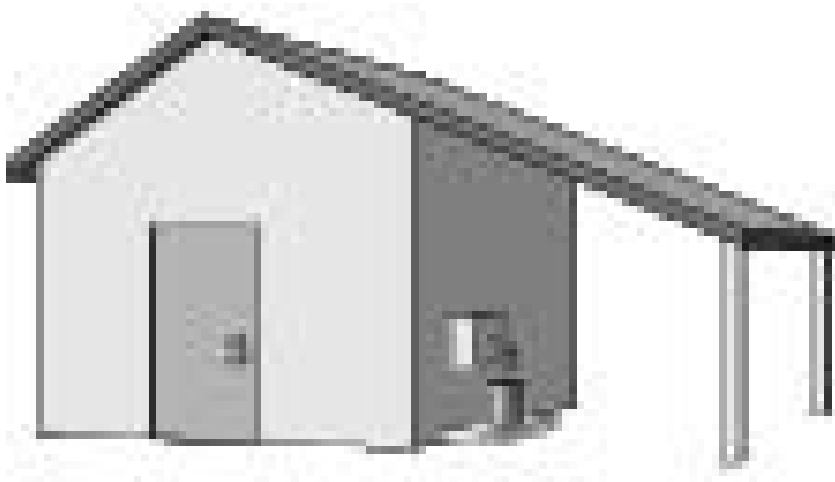
It is also very important for operators to keep any certifications current. Skilled operators are in high demand in many communities in Alaska. Keeping a certification current

can be advantageous for employment and for maintaining one's skills. Having a certified water operator is a great benefit to your community.

19. Yes or No? Are the water treatment plant operators certified by the State of Alaska? If yes, when do the certifications expire?

The water treatment plant should always be locked when the operator is not in the building. If the doors are unlocked, anybody can enter the building and potentially vandalize the equipment and/or make the water unsafe. Also, if someone enters the water plant and ends up getting hurt or harmed by chemicals, the operator may be held responsible for this accident. Keeping the water plant locked is a necessary safety precaution that every operator should practice.

20. Yes or No? Is the water treatment plant locked and secure when the operator is not there?



There are several companies that manufacture the test kits. Testing equipment is used with some tests, in which case the equipment would have to be calibrated using manufacturers recommendations to ensure accuracy. Water treatment operator may test for more than required.

There are three common tests that the water operator does to monitor the quality of the drinking water: the chlorine test, turbidity and the fluoride test. A chlorine test is done every day, whereas the turbidity and fluoride test is done every time water is being made.



In order to do both of these tests, the operator must have complete test kits with chemicals that have not expired. The chemicals contained in each of the kits have a limited shelf life. *Therefore, you need to check the expiration dates on the test chemicals to make sure that they are still effective.* There should be enough test chemicals on hand to perform the test for several months. Always check the expiration dates on chemicals to be sure they are still effective.

Types Of Water Monitoring Tests Required For Surface Water, Groundwater Under The Direct Influence Of Surface Water (GUDISW) and Groundwater Systems:

Type of test(s) required:

GUDISW	Surface water	Groundwater
Chlorine test (daily)	Chlorine test (daily)	Chlorine test (if added)
*Fluoride test (if added)	*Fluoride test (if added)	*Fluoride test (if added)
Turbidity (daily)	Turbidity test (Daily)	

New regulations set by EPA and ADEC may require more frequent monitoring and reporting for Chlorine and Turbidity. Check with your ADEC Drinking Water Environmental Specialist.

(*Fluoride is not a required chemical for water treatment. However, if fluoride is being added to the water, it must be monitored each time water is being made.)

21. Yes or No? If chlorine and/or fluoride are added to the drinking water at the water treatment plant, does the operator have the chlorine and/or fluoride test kits and chemicals to monitor the water quality? If yes, are there enough chemicals to last several months? Are the chemicals still effective? (check expiration date)

Turbidity is a measure of the cloudiness of the water. Water that is cloudy has a high turbidity and requires more chlorine than water that is clear. If your water has a high turbidity, there is greater risk of the water being unsafe because it will use up the chlorine required to disinfect the water properly. Because the turbidity of surface water changes often, it is very important for the operator to measure turbidity every time water is being made. Check the turbidity meter to make sure that it is operating and has been calibrated (Quarterly) for accuracy.

Most surface water and GUDISW are required to have a water treatment (filtration system) installed. Turbidity is still required every day that water is being made.
NOTE: Making water is referring to treating water or to make it potable (safe to drink).

22. Yes or No? If your water treatment center uses surface water, does your operator measure turbidity? Is the turbidity meter operational?

Water with low turbidity is clear and water with high turbidity is cloudy.

Chlorine is a chemical that is added to water in order to disinfect, or kill, pathogens (disease-causing organisms) in the water. In order to be effective, the correct amount of chlorine must be added to the drinking water system. If too little chlorine is added to the system, it will not kill all of the pathogens.

A chlorine test is an extremely important test that is required in almost all water systems in Alaska. If chlorine is added to the system this test is required be done every day. In order to find out if the right amount of chlorine is being added to the system, the operator tests for a **free chlorine residual**. A free chlorine residual is the amount of chlorine left over in the water after the chlorine has done its job killing pathogens. Having left over chlorine tells you that there was enough chlorine to get the job done. It is also important that some chlorine remains in the system to provide extra protection against diseases in case pathogens enter into the system.

23. Yes or No? Does operator take a free chlorine residual test every day? If no, how often? What is the chlorine residual today? How many days, weeks, or months of chlorine supply does the operator have on hand for use?

If there are residents in your community who use dip buckets, it is recommended that a chlorine residual of 0.3 mg/l be maintained in the drinking water system. This number is slightly higher than the amount required to produce safe drinking water. A little higher chlorine residual has a greater chance of keeping the containers disinfected and is not harmful.



Darcy Kameroff from Russian Mission learns to test for chlorine residual at an environmental assessment training (Seven Generations workshop) in Aniak.

State regulations require that the operator maintain **at least 0.2 mg/L free chlorine residual at the entry point (first service connection)** which results in only a trace amount of chlorine coming out of the drinking water tap at home. It is a good idea, however, to keep the chlorine residual higher at the entry point so that a 0.2mg/L residual is found in the water at your home or at the watering point. **The maximum allowable free chlorine level is 4.0 mg/l at the entry point.**

Numbers that are lower than 0.2 mg/L (such as 0.1mg/L) show that there is not enough chlorine being added to the system (this may begin to lead to chlorine taste and odor complaints). However, if the chlorine residual reaches higher numbers such as 0.6 mg/L, the water may also begin to have a bad taste of chlorine. If your water has too much chlorine in it (or too little) you can simply leave it in a pitcher or jug for awhile. After a short time, the chlorine from the water will disappear like fizz from a pop into the air and the chlorine taste will be gone.



Melinda Peter of Fort Yukon reads her chlorine residual at an environmental assessment training (Seven Generations workshop) in Chalkyitsik.

Chlorine supply:

There should be enough chlorine on hand to treat the water for at least 2–3 months. You do not want to risk running out of chlorine. However, having too much chlorine on hand can be hazardous as well. Safety precautions should be put into place to ensure that canisters containing chlorine are secure (example: chained to the wall) in case of an earthquake or other unanticipated situation.



TIP FOR FISH CAMP:

If you are going to fish camp or away from a reliable source of safe drinking water, one way you can disinfect your water very easily using household bleach. All you need to take with you is a small container of unscented, regular bleach (enough to contain one or two spoonfuls of bleach) and a medicine eyedropper. For every gallon of clear water you have, add 1–2 drops of bleach. If the water is cloudy, add 2–4 drops. After adding the bleach, you need to mix the solution and let it

stand for 20–30 minutes before drinking so that the chlorine has time to kill the pathogens (disease-causing organisms). This will kill almost all pathogens. Also, make sure that you pick your drinking water source carefully!

The most common method of disinfecting, or treating, water is by adding chlorine. Chlorine for water treatment comes in three forms: gas, liquid and solid. The most common form of chlorine used in rural Alaska is the solid powdered type, calcium hypochlorite which is called **HTH**. HTH contains around 65% chlorine and is dangerous if not handled and stored properly.

CHLORINE CONTAINER SIZE:

For safety reasons, when using HTH or chlorine powder, it is preferable to purchase it in small containers, such as the 3 1/2 pound to 8 pound size. Smaller containers are easier to use and store and reduce the risk of chlorine exposure to the operator. Containers of chlorine that are 25–100 pounds are potentially very dangerous and have a greater chance of being a health problem to the operator and the community. Each time the operator opens the chlorine container, he/she is exposed to chlorine gas. Chlorine gas can be hazardous or deadly if inhaled in large enough quantities. For this reason, the operator should always wear a respirator mask when working with chlorine. Other safety precautions include wearing rubber gloves to prevent chlorine burns, face shield for eye protection, long sleeves shirt or apron with sleeves and rubber apron to protect your clothing.



Damaged containers of chlorine (HTH) are dangerous.

Storage:

It is very important to store HTH in a warm and dry place away from other chemicals. If water is added or spilled on HTH, there will be an uncontrolled release of chlorine gas, which is very dangerous. The lid of the container should be tightly sealed at all times to avoid chlorine gas from escaping. Damaged containers of chlorine (HTH) are dangerous. Chlorine can react violently when mixed with some other chemicals, particularly oil products. Therefore, it is important that chlorine is stored separately and away from other chemicals or only with other materials that are compatible (don't cause dangerous reactions). Chlorine warning signs should be posted in all areas where chlorine is stored.

NOTE: In case of a chlorine fire, use water to extinguish and dilute. Chlorine is an oxidant and creates its own oxygen; it will burn even if it is smothered.

24. Yes or No? Does the operator use HTH (chlorine powder) to disinfect the drinking water? If no, what form of chlorine is used? Where is the HTH or other disinfectant stored?

Fluoride is added to drinking water systems to strengthen the growing teeth of children and to reduce dental cavities. It is effective for children up to the age of eight to ten years. If fluoride is used in a drinking water system, it is extremely important that it is added correctly. If it is not added properly, it can be harmful to people. Excess amounts of fluoride can damage teeth and lead to bone disease.



Some water treatment systems add chlorine and fluoride.

Fluoride is not a required chemical for producing safe drinking water. However, if fluoride is added to the drinking water system, a fluoride test should be done EVERY DAY water is made. The results of the fluoride test should be entered into a log book. If the operator is not monitoring the fluoride level, the water may be unsafe and fluoride use should be stopped. **The fluoride level (residual) should be in the range of 1.1 to 1.7 mg/L.** The operator should never allow the fluoride level to be greater than 4.0 mg/L, nor should the level range above 2.0 mg/L for long periods of time.

25. Yes or No? Is fluoride added to the drinking water? If yes, how often does the operator do a fluoride test? What is the fluoride level today?

Each time the operator tests the water for chlorine, fluoride or turbidity, the results should be recorded on a daily log with the date and time of the test. This record shows whether or not chemicals are properly added and whether water is properly treated in order to make it safe to drink. If the operator is not maintaining a daily log of the water testing results, there is no way to guarantee the operator has been doing his/her job and that the water is safe to drink.

26. Yes or No? Does the operator maintain a daily log of the water testing results? When was the last date it was filled in?

When filling out this survey question (#26), make sure you ask the operator to see the daily log. Write down on the survey the last date that the log was filled in. By looking at the log, you will be able to see if the operator is actually completing the tests every day.

27. Yes or No? Are chlorine warning signs posted on the entrance doors to the water treatment plant?

The entrance to the water treatment plant, or any other area where chlorine is being stored, should have warning signs posted along with a Materials Safety Data Sheet (MSDS) for chlorine. The MSDS for chlorine is an information sheet describing the chemical chlorine and how to safely handle it.

The fire department requires that chlorine warning signs be posted wherever chlorine is stored for the safety of the handler as well as the community. The reason for this is that if water is sprayed on dry powder chlorine (HTH), there will be a release of chlorine gas. Chlorine gas can be dangerous or deadly if inhaled. HTH is a useful chemical for producing safe water, but it must be handled and stored very carefully. Chlorine is one of the most dangerous chemicals in your community and it needs to be used with caution.



Bruce Wright is teaching the use of a chlorine residual instrument at an environmental assessment training (Seven Generations workshop) in Wainwright.

A chlorine respirator is a type of gas mask used by the operator when working with chlorine. The mask should be worn every time chlorine is handled. New chlorine cartridges (yellow cartridges) should always be available for use. Proper use of the mask will prevent the operator from being exposed to immediate hazards from chlorine and will reduce the long-term health effects from the chemical as well.

Inhaling chlorine is harmful to your lungs. It can make you cough and make breathing more difficult. If too much chlorine is inhaled, it can be fatal. Chlorine can also irritate your eyes. If chlorine comes into contact with your eyes, it can cause painful burns which could potentially lead to loss in vision. For these reasons, it is very important to wear a chlorine respirator when handling chlorine. A chlorine respirator should be used by the operator every time chlorine is being handled.

TIP:

The chlorine respirator should be stored away from the chlorine so that it remains effective. Store the respirator in a tightly covered container, such as Tupperware, will help prevent chlorine vapors from getting into the cartridges. If you can smell chlorine in the cartridge of the respirator, this indicates that the cartridge is no longer effective.

28. Yes or No? Is there a chlorine respirator available for the water treatment operator? Does he/she use the respirator when handling HTH (chlorine)?



A chlorine respirator should be used by the operator every time chlorine is handled.

Equipment that is broken or not operating in the washeteria and/or water treatment plant should be fixed immediately, particularly if the parts are necessary to supply safe drinking water. For example, if a chlorine pump breaks and there is no replacement pump, chlorine will not be added to the water and the water may be unsafe to drink. If a critical part breaks, the operator may not be able to produce safe drinking water.

A clean and orderly washeteria and/or water treatment plant is often a positive sign of the quality of the operator's work. A dirty facility may indicate that the safety of the water is questionable. A dirty facility may also be hazardous (i.e. misplaced chemicals and equipment left to stumble over). Operators must have a critical spare parts inventory showing all of the equipment needed to safely operate the drinking water facility. For important pieces of equipment, such as a water pump and chlorine pump, there should always be two of each on hand. The Remote Maintenance Workers (RMWs) in each region can be helpful in determining what items should be listed as critical spare parts.

29. Yes or No? Are there any pieces of equipment in the washeteria and/or water treatment plant broken or not operating? If yes, what are they?

30. Yes or No? Does the operator have a critical spare parts inventory? Are all of the parts there?

31. Yes or No? Is the washeteria and/or water treatment plant clean and orderly? If no, describe.



A clean water treatment plant is often a good sign of the operator's quality of work.

Every water treatment plant should have a *written* **Standard Operating Procedure (SOP)** posted. A Standard Operating Procedure is a document describing all of the actions required to ensure water is properly filtered and disinfected. It is a step-by-step guide to making safe drinking water that is specific to the water treatment plant in your village. Because every water treatment plant operates a little differently, this “cook book of water treatment procedures” is an important document for training new operators.

A **master log** is a record of all the activities that the operator performs during each workday. It is like a diary of events for the day. It is extremely important for your operator to record all of the things that he/she does while at work in the water treatment plant. This log provides an historical account of the water treatment system. It can be useful for finding problems or errors in the water system, for ordering chemical supplies in the future, and for letting other operators know what has happened in their absence.

Both a master log and a Standard Operating Procedure are valuable tools needed to properly operate a water treatment plant. They are also important records to have in the event that a new operator is hired to operate the system. Instead of re-learning the entire water treatment system and repeating past mistakes, the master log and Standard Operating Procedure allows a new operator to transition into the job easier and makes safe drinking water. **Years of experience and skill can be preserved by having a Standard Operating Procedure and master log instead of being lost when an operator quits or retires.**

32. Yes or No? Does the water treatment plant have a written Standing Operating Procedure (SOP) and master log?

The washeteria and/or water treatment plant should be inspected periodically to see if there are any safety defects. Examples of some safety defects include bare electrical wires, leaks, and split or cracked chemical containers. These defects should be corrected immediately so they do not present a hazard to the facility or to the people working there. Your Remote Maintenance Worker (RMW) can do an inspection and find any safety defects that may be present.

33. Yes or No? Does the washeteria and/or water treatment plant have safety defects (i.e. such as bare electrical wires, split or cracked chemical containers)? If yes, what are they?

34. What are your village's main complaints with the washeteria and/or water treatment plant?

The water at the water treatment plant may be safe to drink, but at the same time has a bad taste or smell. If there are specific complaints regarding the washeteria and/or water treatment plant, these should be brought to the attention of both the operator and the council responsible for maintaining the facility. It is the operator's job to provide safe and good-tasting water to the community.



Wastewater

Wastewater

Who to ask: wastewater operator, health aides, public health nurse.

The village health aide or the public health nurse should have a record of any disease outbreaks related to sewage that have occurred in your village.

A sewage-related disease, such as Hepatitis A, is spread when a person comes into contact with fecal material from a contaminated person or object and then transmits the contamination to his/her mouth. If an infected person does not clean his/her hands thoroughly after going to the bathroom, disease may be spread to others either by touching them or when preparing food.

People may be carriers of a disease and not always show signs of sickness. Dogs and other pets may also be carriers of disease. Proper handling of wastewater and good sanitation helps prevent the spread of diseases associated with sewage.

Sewage-related diseases are greatly reduced with good health sanitation education and practices. The village health aide can be used as a resource to educate people on proper sanitation practices.

35. Yes or No? Have there ever been outbreaks of sewage related diseases in your village? If yes, what diseases and when?

KOTLIK, ALASKA

During the summer of 1990, the Village of Kotlik experienced an outbreak of viral meningitis, an extremely infectious, painful illness that can be fatal when left untreated. Viral meningitis is transmitted by contact with human sewage. It is spread through contaminated food and water, often by people who have germs on their hands, don't wash, then contaminate food or drink consumed by others. Nearly 80 people in the village were stricken with the disease. What was the cause? Two leaky underground bunkers filled with sewage which had been contaminated with the meningitis virus.

In the past, Kotlik's full honey buckets were dumped into underground bunkers-lidded pits dug into the permafrost and scattered between homes throughout the village. The bunkers got full. Their contents oozed into the muddy summer soil, and the children played in the puddles nearby. The children tracked mud into houses, where babies crawled on floors.

Health aides need to be told when there is a sewage spill in the village, so that they can inform the State of Alaska. There are other reasons why the health aide needs to be informed of sewage spills:

- *The health aide can educate the community and explain the health risks associated with a sewage spill.*
- *The health aide will then know the source of any stomach illnesses that may have been caused by the spill.*

36. Yes or No? Are health aides told when there is a sewage spill in the village?

Most villages have a sewage lagoon where sewage is dumped. A properly located sewage lagoon can help reduce some of the potential health problems associated with sewage. The sewage lagoon should be located at a safe distance from the residential section of the village. If the lagoon is too close to the residential section of the village, there is a greater chance of diseases being spread. For example, if a person in the community lives near the sewage lagoon and is drying fish on a rack, the fish can be exposed to disease-carrying flies that visit the sewage lagoon and then land on the fish. On the other hand, in villages where honey buckets are used, the sewage lagoon should not be so far from the village that people are tempted to dump elsewhere.



Building a sewage lagoon with a liner.

Both the distance and direction of the sewage lagoon from the residential section of the village are important factors in determining the location of the sewage lagoon. Prevailing winds can carry unhealthy vapors or smells from the sewage lagoon to the residential area if the lagoon is located improperly. Birds landing in the sewage lagoon may later carry diseases to your drying meat. If you have a surface water source, birds and other animals may also carry these same diseases to your drinking water supply.

37. Yes or No? Does the village have a sewage lagoon? If yes, how far is it from the village?

Raw sewage from a leaking or overflowing sewage lagoon is a potential source of disease and a public health risk. Some reasons why a sewage lagoon may leak or overflow include:

- *Structural damage. The sides of the lagoon may break down.*
- *Inadequate size. The size of the lagoon may be too small to handle the amount of wastewater.*
- *Flooding. Spring and fall flooding may cause the lagoon to overflow and spread to the residential area.*
- *Poor location. A sewage lagoon that is improperly located may leak or overflow.*



If flooding of the sewage lagoon is continuously a problem in your village, it may be necessary to relocate the lagoon. This is particularly true if overflowing sewage affects the community's water supply.

38. Yes or No? Does the sewage lagoon ever leak or overflow? If yes, why and when? Do home septic systems in your village ever overflow?

The intent of questions #39-43 is to find out how many different types of sewage collection and disposal systems are in your community and how many homes or other buildings utilize each of the systems. For example, the City of Noorvik is often labeled as a piped sewer community, yet about 30% of the people still use honey buckets. This is important information because the health risks associated with each type of system are different.

Below is a description of the various types of sewage systems and the levels of risk (hazard) associated with each system.

Levels of health risk associated with different sewer services

Piped sewer Lowest health risk

Septic systems

Sewage-holding tanks/Flush-haul system

Honey bucket haul

Pit toilets

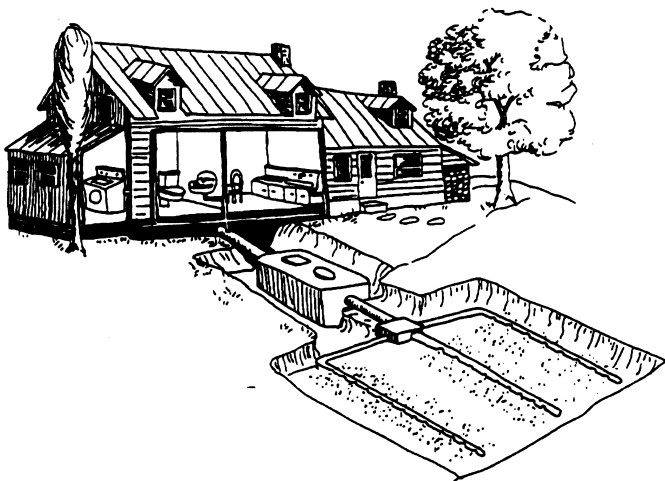
Honey buckets Highest health risk

Piped sewer. A piped wastewater system has the least risk of all types of sewer services because no one is exposed to sewage. The number of houses or other buildings on piped sewer is an indication of the number of people who have a very sanitary method of wastewater disposal in your village.

Septic systems. A septic system normally consists of a piping system in the home that collects wastewater from your toilet, shower, bathroom fixtures and kitchen sink. This wastewater leaves the home through a pipe that flows into a tank and then into a drain field next to the home.

39. Yes or No? Does your village have a piped sewer? If yes, to how many houses or other buildings?

40. Yes or No? Does your village have septic tank systems? If yes, to how many houses?



A Septic system.

Sewage holding tanks (Flush-haul system).

After piped water systems, sewage-holding tanks are the most sanitary method of wastewater disposal. The health risks associated with using a sewage holding tank lies mostly with the operator who empties the tanks. The operator is usually the only person in danger of becoming contaminated as she/he must unscrew the valves to empty the tanks. Flush-haul operators may be exposed to raw sewage when emptying the tank.

41. Yes or No? Does your village have sewage holding tanks (flush-haul system)? If yes, to how many houses or other buildings?

42. Yes or No? Does your village use privies or outhouses? If yes, how many houses or other buildings?

Privy/Outhouse. A privy and an outhouse are the same thing, an outdoor toilet. An outhouse is one step better than using a honey bucket because you don't have to transport the sewage.



Flush-haul operators may be exposed to raw sewage when emptying the tank.

Outhouses can be a problem because they can potentially pollute the drinking water source in a community (Consult your local water utility before constructing an outhouse or dumping any sewage). This is why they should be at least 100 feet away from the high water marks of lakes and rivers. The bottom of the hole for an outhouse should be at least 4 feet above groundwater. Try and locate your outhouse as far away from your drinking water source as possible.

Outhouses are home to a variety of bacteria and organisms that carry disease. The flies that gather at the outhouse are the same flies that end up landing on the fish you are drying and on the food in your house. It is a good idea to occasionally cover the waste in your outhouse with lime or baking soda to help reduce the number of flies. Using a toilet seat with a cover in your outhouse will help keep out the flies. The number of flies can also be reduced by covering any openings/vents with screen material. Poorly located outhouses can be a problem because they can potentially pollute the drinking water in a community. Is there an adequate supply of hydrated lime or baking soda in the community store or utility?



Poorly located outhouses can be a problem because they can potentially pollute the drinking water in a community.

Honey buckets. A honey bucket is a type of toilet that is usually made from a five-gallon plastic bucket lined with a plastic bag. Sometimes a toilet seat is placed on the top of the bucket for seating.

The honey bucket is the wastewater system most likely to spread disease. This

is because people using honey buckets must carry the waste from their homes to the disposal site.

Honey bucket users have the highest chance of coming into contact with human waste. The number of outhouses or buildings that use honey buckets within the community is an indicator of the number of people who are at a greater risk of catching diseases associated with sewage.

43. Yes or No? Does your village use honey buckets? If yes, how many houses or other buildings?



Honey bucket users are at the greatest risk for catching sewage-related diseases.

If your village uses honey buckets or has sewage holding tanks, there must be an operating sewage removal system to haul the sewage away from the homes and to the sewage lagoon. An operating sewage removal system consists of someone reliable who is employed to haul the sewage from homes and other buildings, and maintain sewage removal equipment in good working order. It also means that the person who is hauling the sewage does the job safely so that no sewage is spilled on the way to the sewage lagoon. A haul system that is not operated correctly means that there is greater risk of sewage related diseases infecting the community.

44. Yes or No? Does your village have an operating honey bucket haul or flush-haul system?



Operating a honey bucket system.

If any of the equipment for hauling sewage is broken or not working properly, removing sewage safely from the village cannot be done safely. It is important that the haul system is in good operating order and that essential spare parts are available in case there is an emergency. For every day that the haul system is not working, the community is exposed to health risks related to sewage. It is important that all equipment needed to safely operate the haul system is in good operating order and that essential spare parts are available.

45. Yes or No? Is any of the equipment for the honey bucket haul or flush-haul system broken? If yes, for how long?



It is important that all equipment needed to safely operate the haul system is in good operating order and that essential parts are available.

Tips for maintaining equipment for sewage haul systems:

Routine maintenance and repairs on sewage haul equipment can prevent an accident from happening. For example, to safely operate a honey bucket hauler:

- *The equipment should be greased and/or inspected on a regular basis.*
- *A damaged container should be repaired immediately to avoid spills.*
- *For a flush-haul system, the tank should be flushed with clean water after each use in order to clean the valves and prevent deterioration of the haul tank.*
- *The tank, valves and pressure pump should be inspected at least once a year.*

Preventative maintenance such as the suggestions mentioned above can help to eliminate some potential breakdowns in your sewage haul system.

Spills from honey buckets occur during transportation and when the buckets are dumped at the collection site. One of the major problems with these systems is accidental spills. No matter how careful the handler is, there will always be spills. The sewage that is spilled can be washed downstream into another village's water intake. In addition, the spill may be spread around the community by humans, dogs, snowmobiles, ATVs, birds and flies.

Once sewage has been spilled, it is very easy for the sewage to be carried into a home on the shoes of adults and children or paws of dogs. Once the pathogens (disease-causing organisms) are tracked into a home, it is easy for children, who typically play on the floor, to pick up the disease-causing organisms on their hands and transfer them to their mouth. This is one of the primary ways sewage diseases are spread.



In communities that use honey buckets, each individual is responsible for preventing spills. If a spill occurs, the individual responsible must make sure it is cleaned up. The area of the spill needs to be sanitized with chlorine or lime, especially if the spill is in a place where people commonly spend time. In communities that use honey buckets, each person is responsible for preventing spills.

TIPS FOR CLEANING UP SEWAGE SPILLS:

After removing all visible sewage from the ground, a lime (hydrated lime or quick lime) and water solution, called "milk of lime," can be poured over the spilled sewage. Milk of lime is made by adding 1 pound of hydrated lime to 1 gallon of water. Larger amounts can be made by mixing a 50 pound bag with 50 gallons of water in a clean 55-gallon drum. Hydrated lime can be purchased in 50 pound bags through commercial distributors in Anchorage and sometimes in the gardening section of department stores.

Care should be taken to prevent children from coming into contact with milk of lime. This substance can cause severe skin and eye irritation. When mixing the lime, an apron, goggles and rubber gloves should be worn to avoid contact.

A safer alternative for cleaning up sewage spills in open areas is to use a weak bleach (water mixed with bleach) solution to pour over the cleaned up spill.

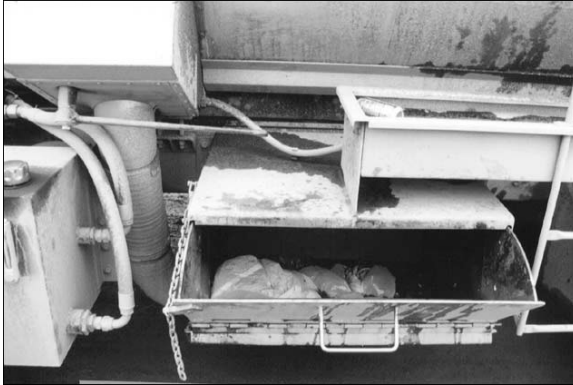
46. Yes or No? Is the honey bucket haul or flush-haul system operated safely so that no sewage is spilled on the ground in the village?

47. Yes or No? Do all village residents properly dispose of their honey buckets?

Honey buckets should be disposed of at a collection site, an outhouse or at a lagoon. Residents who dump their honey buckets behind their homes or in other places around the village are putting the entire community in danger. Sewage that is dumped in or around the village is a source of disease and feeds disease-causing organisms.

The village council should address the issue of assisting elders with sewage disposal. There have been cases where elders have been forced to dump their sewage behind their home in the winter because they were not physically able to dispose of the sewage in an outhouse or lagoon. Having a program to assist elders could prevent some cases of improper disposal.

Educating people in the community about the dangers involved in improperly disposing



of sewage is the most important key to preventing sewage-related problems in your village. When people are aware of how easily sewage-related diseases, such as Hepatitis A, can be spread throughout an entire community, they will begin to think twice before dumping their honey bucket improperly.

Honey bucket bag collection system.



Honey bucket disposal system.

Honey bucket haul or flush-haul operators have the important job of removing sewage from containers in the community so sewage-related diseases do not occur in the village.

48. Yes or No? Do the honey bucket haul or flush-haul operators get paid? If yes, how much and for how many hours per day?

The honey bucket haul or flush-haul operator has a tremendous effect on the public health of a community. If the operator(s) is not doing his/her job properly, the entire village is at risk.

49. Yes or No? Do the honey bucket haul or flush operators have a place to clean up and change out of their work clothes before going home? If yes, where?



Insulated flush-haul equipment.

Is an operator's pay should be high enough so that the position is competitive and it encourages the operator to stay with the job. The community needs to understand that safe sewage disposal is not a free service. Getting good compensation for the work of operating the honey bucket haul or flush-haul system gives greater incentive for the operator to do a good job and to stay with the job. It also helps give the respect that the operator truly deserves.

It is very important that the honey bucket haul or flush-haul operators have a place to clean up, change, and store their work clothes before going home. If the operator changes his/her clothes at home, it is almost guaranteed that the operator will carry raw sewage and diseases back to family members and other members of the community. Some communities provide their honey bucket haul operators with a daily token for a shower at the washeteria as part of the compensation for their work. The health of the operator should be a concern for the entire community.

The village school should promote safe sanitation at all grade levels, K-12. Often, the school curriculum teaches safe sanitation at the early primary grade levels while neglecting to encourage sanitation education at the upper levels. Safe sanitation must include all different areas (i.e. hygiene, solid waste disposal, safe drinking water, etc.) and be stressed at all grade levels.

There are many ways to incorporate safe sanitation into the curriculum in the upper levels of schooling. For example, students should be studying life cycles of disease-causing organisms, the importance of water, testing water, recycling, hygiene and methods of waste disposal. These topics are not limited to the subject of science as they can be incorporated into all subject areas.



Former AmeriCorps member, Shadow Hotch, teaches students about recycling.

The village school can be a resource to the village regarding sanitation issues. Information can be made available at the school for the village residents to use. For example, if there was a Hepatitis A breakout in the village, the school could have information available explaining how to deal with such a problem. The village health aide and the village school can work together to address all public health issues relating to the village.

50. Yes or No? Does the village school actively promote safe sanitation methods and/or have a sanitation curriculum? If yes, what grades?



Playing a game called "Popcan Pond" in King Cove to learn about recycling.

The health aides in your village are a valuable resource for sanitation issues. Involving the health aides in the schools and having them assist with presentations can help prevent sanitation problems in your village. The health aides are familiar with the results of poor sanitation and can help educate students. Working with students also gives the health aides a better idea of some of the issues surrounding safe sanitation with children. By playing an active role in the school, the health aide is focusing on prevention rather than treatment.

51. Yes or No? Do the health aides assist the village school with sanitation presentations?



A health aide teaches students.



Solid Waste

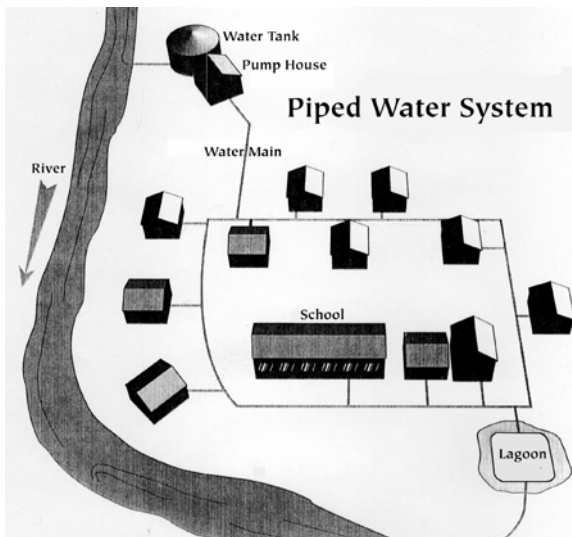
Solid Waste

Who to ask: landfill operator, village store owner, village school principal, power plant operator.

Are there written and enforced ordinances, guidelines regulating the landfill, hours of operation or instructions how to separate items such as burnable material, discarded/broken household appliances, metals, and vehicle disposal? As a general guideline, the landfill should be located about one mile (or more) from the airport or airstrip. It should be located far enough from the airport or airstrip so birds and other animals (bears, fox, etc.) that typically feed at the landfill do not present a hazard to incoming and outgoing planes. There have been incidents of birds flying into the engine of a plane and causing the plane to crash. New landfill sites require a waiver from the FAA if located less than one mile from an airport.

52. How far is the landfill from the airstrip?

53. How far is the landfill from the village? Water plant? Water plant surface runoff? Wastewater plant effluent? Water intake?



Where would you put the landfill in this village?

Properly located landfills are far enough from housing and school areas so that they are not a safety hazard and sanitation problem or used as a play area by children. However, the landfill should not be so far from the village that people avoid using it or that it becomes too costly or time-intensive to maintain road or boardwalk access.

A poorly managed landfill that is too close to the village is a nuisance because of the odor produced by burning and rotting garbage. Also, flies are attracted to rotting garbage and honey bucket wastes and tend to concentrate at a landfill that is not properly managed. These same flies end up in your home and school and carry diseases with them.

Dogs can also spread disease. If dogs have easy and close access to the landfill, they will bring back diseases on their paws that will then be carried into the village and homes. A properly operated landfill that is located a safe distance from the village is less likely to be a source of disease in the community.

A maintained road, trail, or boardwalk to the landfill site is needed to provide access year round and to prevent people from dumping outside of the landfill. The easier it is to dispose of garbage safely, the more likely residents will dispose of their garbage properly. If the access road to the landfill is not maintained and it is difficult to reach the landfill, people are more likely to throw their garbage in inappropriate places.

54. Yes or No? Is the landfill accessible all year round?



A maintained road, trail or boardwalk to the landfill site is needed to provide access throughout the year.

Heavy equipment is required at the landfill to consolidate, compact and cover the waste with soil or other materials. The solid waste needs to be compacted and covered to improve the sanitation of the landfill. Compacting and covering will also increase the length of time that a landfill can accept waste.

The equipment used to compact or cover the material at the landfill should be maintained so that it stays in working order. If the equipment is damaged or out-of-order it isn't possible to compact and cover the waste properly.



A bulldozer is being used to consolidate, compact and cover waste at the landfill.

If possible, the materials in the landfill should be compacted regularly, especially in the summer months when the soil is not frozen. A landfill that is not compacted regularly will fill up much quicker than one that is being compacted. In villages where it is not possible to compact or cover garbage in the landfill adequately, controlled burning of wastes should be considered as a waste treatment method. Burning will reduce the volume of the waste and the amount of blowing litter. It will also reduce the number of flies and animals. If burning is used to manage waste, however, proper burning practices must be followed to reduce the amounts and types of pollutants created by burning wastes.

55. Yes or No? Does the landfill have any type of heavy equipment to compact or cover the solid waste? If yes, what kind? Does the equipment work?

Solid waste needs to be covered with soil to control disease, fires, odors, blowing litter, and to keep animals away. If you reduce the amount of exposed material in the landfill by covering it, animals like bears, birds, dogs and foxes will not be attracted to the area.

Because of permafrost and lack of soil cover material available in certain areas of rural Alaska, it isn't always possible to adequately cover the waste in the landfill. Ideally, six inches of soil should be used to cover waste in a landfill. Some communities have a permit to use crushed glass, tarps, and other materials instead of soil to cover the garbage in their landfill.

Depending on the size of the landfill and the number of people served by it, soil cover material may need to be added daily, weekly, or monthly. Uncovered trash or sewage attracts flies that carry disease back to your home.



A landfill with covered wastes.

56. Yes or No? Is the trash being covered or buried? How often? What is the material used to cover the trash?

TIP

Super sacks provide an alternative way to manage solid waste and blowing litter. Super sacks are 4 foot by 4 foot polypropylene bags. The bags are like giant bread bags. They are open at the top and can be tied closed after the bag is filled. The Village of Nightmute has used super sacks to contain waste since there is no soil material available to cover the waste at the landfill. The solid waste is contained in the bag which prevents the garbage from being blown all over the tundra. For information on where to obtain super sacks, see the Directory in the back of the manual.

Every landfill needs an operator. The main duties of the landfill operator include:

- *monitoring what goes into the landfill*
- *controlling access to the landfill (i.e. locking the gate after hours)*
- *burning of wastes in a burn box or incinerator*
- *making sure that hazardous materials do not go into the landfill*
- *compacting and covering the materials in the landfill*
- *storing hazardous materials, such as lead-acid batteries, prior to shipment*

An operator's pay should be high enough so that the position is competitive and it encourages the operator to stay with the job. The community needs to understand that disposal of solid waste is not a free service. Getting a good compensation for the work of operating the landfill not only gives incentive for the operator to do a good job and to stay with the job, but it also helps give the respect that the operator deserves.

57. Yes or No? Does the village landfill have an operator? If yes, who? How much and for how many hours a day is the operator paid?



Garbage pile in a non-controlled site.

A landfill that is enclosed by a maintained fence helps to control access to the area. It is important that the fence is in good condition and has an entry way with a lock so that access can be controlled.

Benefits of a fenced landfill area:

- *Prevents people from dumping garbage in the landfill when there is no operator available to monitor what types of materials are being placed into the landfill.*
- *Reduces the amount of windblown litter.*
- *Helps to control animals from scavenging.*
- *Reduces the possibility of children playing in the garbage and picking up diseases and hurting themselves. Children playing in the landfill may cut themselves on rusty metal objects and get tetanus, which can be fatal.*

58. Yes or No? Does the village landfill have a fence around it? If yes, is it in good condition?



A fence in poor repair surrounding a landfill.

A landfill with controlled access means that:

- *A fence with a locking gate surrounds the landfill area.*
- *Hours of operation are posted and followed.*
- *Scavenging, uncontrolled burning and shooting are not permitted.*
- *Random dumping is not permitted.*

A landfill with easy access is an invitation for children to play and to pick up diseases and injure themselves. Dogs that are easily able to enter the landfill can carry back disease into the village and can potentially spread this disease to humans.



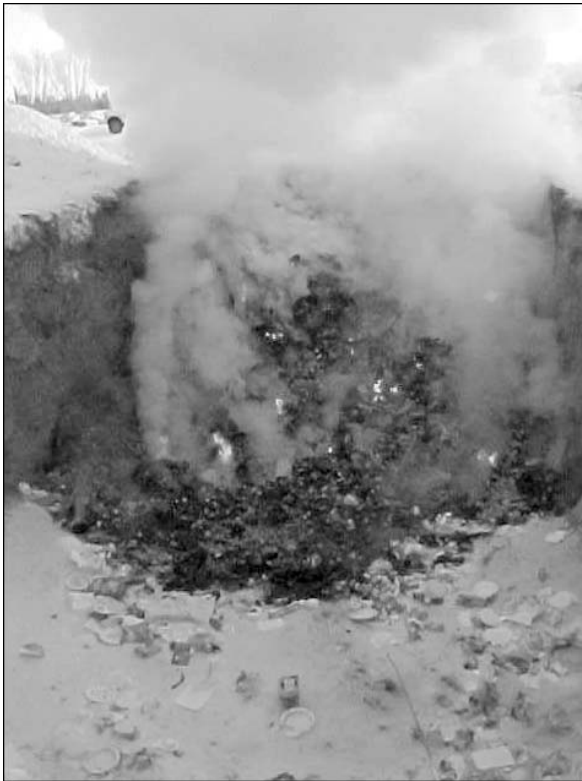
An uncontrolled landfill is an uncontrolled mess.

A landfill without any site control usually means that garbage is being dumped anywhere. One possible solution to a landfill that has no site control or fencing would be to strategically place 55- gallon drums along the front of the landfill to direct people where they should take their wastes. The best solution, however, is to educate people about the importance of properly disposing of their wastes.

59. Yes or No? Is access to the landfill controlled? Is the landfill being threatened by erosion such as from climate change? Do people swim or eat shellfish or other natural foods where there is runoff or leachate (are tests performed to detect runoff or leachate and how contaminated they might be?) from the dump site?

Uncontrolled open burning is burning a pile of garbage on the ground at the landfill. Uncontrolled burns are often seen as the solution to reducing the amount of garbage at the landfill. However, if uncontrolled, open burning is not only ineffective but is also a fire hazard. Forest fires have resulted from uncontrolled burning practices.

Burning garbage on the ground is a very ineffective way to reduce waste. It is ineffective because it usually doesn't significantly reduce the amount of garbage. Most of the energy used in burning the material is used to dry the material out rather than to reduce its volume. Unless the material you are burning is very dry and combustible, you end up with close to the same amount of garbage that you started with. This results in the garbage burning very slowly and producing smoke which is dangerous to breathe.



Burning garbage on the ground is a very ineffective way to reduce waste.

Open burning can be dangerous if toxic and hazardous materials are not separated from the other trash. Burning material such as plastic is toxic and the black smoke produced is dangerous to breathe. Some hazardous materials can cause dangerous explosions if they are in a fire. Toxic and hazardous materials must be removed before garbage is burned.

Smoke and odors from uncontrolled open burning are also nuisances to surrounding property owners and may endanger workers at the landfill and interfere with the operation of the landfill. Many communities are solving the problem of uncontrolled open burning by building a burn box in their community to more safely and efficiently burn wastes.

60. Yes or No? Is uncontrolled open burning allowed at the landfill?

Controlling an open burn means that:

- *Someone is removing materials that are hazardous or non-combustible from the burn pile.*
- *The fire stays under control. There should be someone on duty to keep the fire controlled while waste is being burned.*
- *Only paper, cardboard, wood, and other clean burning materials are ignited.*

A burn box is a steel box with a door, grates, and an air vent that is used to burn paper, cardboard, and wood products more efficiently. It is very similar to a wood burning stove in its construction. Burn boxes are very efficient at burning waste because the materials get hot quickly and burn faster and more completely than a pile of garbage on the ground. If a burn box is used correctly, it can reduce the volume of waste by about 80%.



Burn boxes have been created from simple materials around the village such as scrap iron, old tanks, sheet metal and old truck beds such as this in at Dot Lake.

Burn boxes differ from incinerators because they are less expensive to build and operate and do not require a permit. However, the air emitted from a burn box is usually lower in quality than the air from an incinerator. Because they are a practical and inexpensive solution to managing solid waste, burn boxes

are more commonly used than incinerators in rural Alaska.

Burn boxes have been created from simple materials around the village such as scrap iron, old tanks, sheet metal, and old truck beds. The Tanana Chiefs Conference has been very successful at converting old dump truck beds into burn boxes for their villages.

Burn boxes must also be correctly sized for the community, and must also be covered to keep material dry until ready to burn. If not used correctly, a burn box is no better than open burning on the ground. There are also a couple companies in Alaska that design and sell burn-boxes.



Burn boxes can reduce the volume of waste by about 80%.

61. Yes or No? Is there a burn box at the landfill? If yes, who operates it?

It is important that a designated person be responsible for the burn box so that it is properly maintained. Correct use of a burn box requires that someone is in charge of:

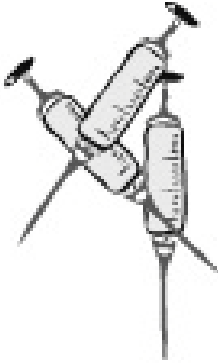
- *Removing plastic and hazardous materials before burning.*
- *Watching and controlling the burn.*
- *Removing the ashes from the burn box and putting them in the landfill.*

If there are several operating burn boxes in your village, the amount of waste going to the landfill will be greatly reduced. The village school and store produce large amounts of waste that end up in the village landfill. If the cardboard and other paper wastes produced by the school and store are reused, recycled, or burned in a burn box, this will eliminate a large amount of material from going to the landfill.

The village school, store and other places in the community produce significant amounts of waste. This should be considered when developing a solid waste management plan for your village. One solution for the village to consider is to have these places operate their own burn box, but this could be dangerous! A burn box in the landfill being run by trained personnel should be encouraged if anything. There are many waste reduction techniques used through-out Alaska. Villages should conduct some research and choose methods best suited for the needs of the community and health of the environment.

62. Yes or No? Are there other burn boxes in the village (such as the village school or store)? If yes, who operates them?

63. Yes or No? Are the health clinic medical wastes and/or veterinarian wastes disposed of at the landfill? If no, how and/or where are they disposed?



Medical wastes should not be disposed of in the landfill. Infectious diseases can potentially be spread throughout the village if medical wastes are not disposed of properly. Certain wastes, such as needles, must be safely packaged and sent to the Regional Health Corporation or hospital for incineration and disposal. Other medical wastes, such as used paper products, can often be burned in a burn box in the village. Check with the environmental health specialist at your Regional Health Corporation to find out the correct procedures for disposing of medical wastes in your region.

Litter that has blown from the landfill into surrounding areas is not just ugly but can be a fire hazard, attract animals that carry disease, and injure animals. For example, near Platinum, Alaska some men saw a seal with a plastic bag wrapped around its neck. The litter surrounding the landfill also interferes with other subsistence activities such as berry picking.

The problem of windblown litter can be eliminated if the landfill area is fenced and if the garbage at the landfill is burned and/or compacted and covered periodically. Windblown litter can also be reduced by decreasing the amount of plastic bags used in the village, through the store switching to paper bags or through community ordinance. Many villages have an annual clean-up day to help control the amount of windblown litter.

64. Yes or No? Is there windblown litter around the landfill? If yes, how much and how far does it go?



King Cove Youth Litter Patrol.

NATIVE VILLAGE OF KING COVE:

“I utilized the ALPAR (Alaskans for Litter Prevention and Recycling) Grant this summer for our Youth Litter Patrol. Working with the Mayor and Council members, I set up a budget with details on plans of how our group would work to beautify our city, educate and encourage our community members not to litter and to continue recycling aluminum cans. The city was very willing to promote the program and agreed to fund it throughout the summer. We planted wild flowers at the base of our light poles throughout our town. We utilized ten 55-gallon drums and turned them into colorful trash and can bins. We placed these in areas where litter was found most. There are volunteer city workers who help keep the barrels empty. It has worked out well for our community.”

Connie Newton, AmeriCorps Member, King Cove

65. Yes or No? Is there a lot of plastic in the windblown litter? If yes, what can your village do about it?

66. Yes or No? Do the village stores recycle the white plastic shopping bags or offer rebates (money back) for reuse of the white plastic bags? If yes, which store(s)?

If you look around the area of your landfill, you might see many white plastic bags littering the nearby bushes and ground. Plastic bags can blow a long distance from the landfill because they fill up with air and float away like a sail. Some people call these bags “landfill snow birds” because of the way they “flock” around a village landfill. Plastic bags that blow away do not disappear; however, when buried, they may take hundreds of years to decompose, or break down. Until then, they blow across the land used for berry picking and hunting. Wild animals have been discovered with plastic stuck in their mouths, thus preventing them from eating. Many communities have banned plastic bags in their communities.

Seventeen Chiefs from the Gwich'in Nation signed a resolution to ban Styrofoam and plastic bags from their communities. In addition, the resolution also states that the communities will establish fines for littering and polluting and that they will establish a battery collection site at each of their landfills. See Appendix H (page 209) for a copy of the resolution.

Some stores offer a type of rebate or cash back to customers who bring in their own shopping bags. Every time a plastic bag is reused, this reduces the amount of plastic waste going into the environment by 50%! Plastic shopping bags have been recycled to create beautiful crocheted backpacks, bags, hair clips and other items.



Plastic shopping bags have been recycled to create beautiful crocheted backpacks, bags, hair clips and other items.

A large amount of the waste found in a landfill comes from white plastic bags provided at the village store. Your village store can help reduce the amount of litter in the village and landfill area by providing alternatives to plastic shopping bags. By using paper or canvas bags or used cardboard boxes, the amount of plastic going to the landfill can be reduced significantly. Canvas bags can be used over and over again and are the best option. The school children in Galena decorated canvas bags to distribute to each member of the community.

67. Yes or No? Do the village stores offer paper or canvas bags as an alternative to plastic bags? If yes, which stores?

TIPS THAT WORK ...

The Louden Tribal Council passed a resolution to banish plastic retail bags from their village stores in order to prevent excess plastic litter in and around their landfill. They are working with local retail outlets to replace these plastic bags with reusable canvas bags and making paper bags available for a fee. When Louden Tribal Council wanted to keep white plastic bags out of Galena, they chose to first get the cooperation of the store owners before making a formal resolution. Foresight to involve the store owners from the beginning has made the process much smoother. See Appendix G (page 207) for a copy of the resolution.



The school children in Galena decorated canvas bags to distribute to each member of the community.

Some communities have implemented a plastic bag tax that stores must charge customers if they opt for plastic instead of bringing their own bag. This tax is then used for litter prevention and clean-up efforts.

The school lunch program in the village goes through large numbers of tin cans that end up in the village landfill. These large uncrushed tin cans take up about one-fifth of the landfill volume in some cases. One solution to this problem is to ask the school to remove both ends of the cans so they can be easily crushed. Crushed cans take up less space in the landfill. Ask the school to crush empty cans so they take up less space in the landfill.



Ask the school to crush empty cans so they take up less space in the landfill.

Another problem with uncrushed cans is that they collect water in the landfill. ? The water then passes through the garbage, like water passing through the filter on a coffee machine, and produces a liquid called **leachate** that enters into the soil. Leachate can potentially pollute your drinking water.

68. Yes or No? Does the landfill have uncrushed tin cans from the school lunch program?

There are several good reasons to recycle aluminum cans in your community:

- *Aluminum cans are 100 percent recyclable and are worth money. One case of pop, or 24 cans, equals about a pound of aluminum.*
- *Recycling aluminum can extend the life of the landfill. Because it is expensive to close and open landfills, reducing the volume of waste going into the landfill saves the village money in the long run.*
- *Aluminum cans take hundreds of years to break down in a landfill.*

If there are a lot of aluminum cans in your landfill, set up a recycling program and encourage the entire village to participate. Giving some kind of incentive for recycling may increase your success at getting a recycling program to work. For example, some village schools have used the money from recycling to fund trips for students.

69. Yes or No? Does the landfill have a lot of aluminum cans?

70. Yes or No? Are aluminum cans being recycled? If yes, by whom?

Find out how many cans of pop are purchased by the village store and then calculate how much money could be made off of aluminum cans in one year. Contact a recycling center to find out the current market rate for aluminum. See the Directory in the back of the manual.



Aluminum cans can be recycled for money which can be used to support environmental programs or youth groups, and is an improvement from filling the landfill unnecessarily.

Did you know that it is much cheaper to collect and reuse aluminum than it is to mine for the aluminum? The energy saved by recycling one aluminum can alone is enough to keep a television running for 3 1/2 hours!

The Flying Cans Program with Alaskans for Litter Prevention and Recycling (ALPAR) will carry aluminum cans from villages throughout the State (accessible only by air) of Alaska to a recycling center in Anchorage for free. The recycling center will then send the village a check for the value of the aluminum. It's a win-win situation. See the Directory in the back for information on how to contact ALPAR (274-3266).



Aluminum cans for recycling.

CHISTOCHINA VILLAGE:

Chantelle Hobbs' tips for people interested in recycling:

- *Send out monthly flyers with positive environmental messages.*
- *Let people know how the program is going. (For example, how many cans have been collected and how much money has been saved).*
- *Use the money earned from recycling to buy recycling bins or can crushers for people's homes.*
- *Collect used paint from community members and use it for projects such as painting signs and picnic tables with the kids.*
- *Put signs up around your community saying "We are a litter free community" or "Leave only foot-prints-trash goes in the trashcan".*
- *Take a nature walk with the kids and pick up trash along the way.*
- *Use a local newsletter to spread the good news about recycling.*
- *Make a video with the kids to educate the community about the importance of recycling.*

CHILKAT INDIAN VILLAGE/NATIVE VILLAGE OF KLUKWAN:

“My name is Shadow Hotch and I serve as an AmeriCorps Member in the village of Klukwan. When I began my AmeriCorps service, I wanted to start a recycling program. I wanted to reduce the waste that was filling our community dump rather rapidly. I found out while taking the students on a village spring clean-up that the children had already started a recycling program and were keeping the cans stored in the school garage and didn’t have enough room for the whole village. Soon after, I asked the tribal village council if I could use the old Klukwan Fire Hall and turn it into the Klukwan Recycling Center. After permission was granted, I cleaned up the place and painted it with the help of the kids from the community. We then started to make recycling barrels out of old unused 55 gallon oil barrels that were just laying around and looking ugly. They were put out in front of the houses of those who wished to help in the recycling effort. I would go around and pick up the cans on Tuesdays and Fridays and then take them back to be stored at the Klukwan Recycling Center. A generous volunteer then ships the cans out of the village.

Today, we not only store aluminum cans but also batteries from the dump and local homes. I have gathered glass and used oil to be shipped out of our village to protect the safety of our children. The residents of Klukwan collect cardboard to be shipped out as well. Together as a community we have done these things and I am proud. I know that with the little efforts and goals that we AmeriCorps Members have, we will make the future a little bit brighter for our children.”

Shadow Hotch,

AmeriCorps Member, Klukwan



Cardboard and other paper wastes generated by the village store take up a large amount of space in the landfill. Sometimes, nearly half of the material in the landfill is cardboard or other paper wastes. A large portion of this paper waste comes from the village store.

Cardboard is a valuable resource and can be profitable to recycle; however, transporting cardboard from your village to a recycling center that accepts cardboard may be too expensive. If it is not cost effective for the village store to recycle the cardboard, it could be used for other purposes such as to make logs or to pack lead-acid batteries for shipment. If it is not possible to recycle or reuse most of the cardboard and other paper wastes in your village, the alternative is to burn them. These solutions will significantly reduce the amount of waste in the landfill. The community should work together with the village store to find solutions that will prevent cardboard and other paper wastes from being unnecessarily dumped in the landfill.

71. Yes or No? Does the landfill have cardboard or other paper wastes from the village store? If yes, in general terms, how much? What are the other sources of large amounts of paper and cardboard wastes that accumulate?



KOTZEBUE, ALASKA

Several large businesses and organizations in town collect scrap office paper instead of throwing it away in the trash. Every few weeks, this paper is delivered to local daycare, children's homes, and the local tribal school to be reused. The kids love it and it cuts down on paper to the landfill as well as the cost to each facility for new paper.



Various large burn boxes that can be used to burn cardboard and reduce waste going to the landfill.

There should be a warning sign posted at the entry to the landfill that clearly tells the users that disposal of hazardous wastes in the landfill is not allowed. A poster showing drawings of common materials that don't belong in a landfill can be a useful tool in preventing hazardous waste disposal at your landfill.

Hazardous materials may chemically react to cause fires, explosions and poisonous gas that creates a hazard to landfill operators and the surrounding community. Hazardous substances can also seep into the ground and pollute the drinking water.

72. Yes or No? Is there a “No Dumping of Hazardous Materials” warning sign at the landfill entrance? Are there options in the community for properly disposing of these materials and if so, are community members educated about the dangers these materials pose and where to take these materials so that they are not illegally disposed of outside of the landfill?

Some examples of hazardous waste materials include:

- Antifreeze
- Diesel fuel
- Kerosene
- Batteries
- Disinfectants
- Motor oil
- Bleach
- Gasoline
- Oil-based paints
- Brake fluid
- Insecticides
- Paint thinner
- Common household cleaners
- Solvents
- Lead-acid batteries
- Fluorescent lights



An old, cracked lead-acid battery found in a landfill.

Hazardous wastes such as those listed on page 115 can pollute water, soil, and air if improperly disposed of or used incorrectly. Before disposal, these materials should be used up for their intended purpose. Hazardous materials should be separated from other garbage and should not be placed in the landfill.

Many hazardous materials can easily catch fire if mixed with other materials in the landfill. When they mix, there may be an explosion, fire, or toxic smoke that may be colorless. You can determine if a material is hazardous by looking at the label. If you see words such as flammable, corrosive, toxic, combustible, explosive, and volatile you have a hazardous product.

73. Yes or No? During the inspection of the landfill, were paint cans, used oil containers, lead-acid batteries or other hazardous materials observed? If yes, in general terms, what and how many?

How many children have had blood lead levels checked? Are there other contaminated sites in the area? Is there evidence of asbestos or lead paint in buildings, particularly in old community and school buildings? Do children have access to volatile chemicals that can be used for huffing?



People need to have a place to put their unused hazardous materials when they no longer need them. Bulletin boards are used in some communities for people to advertise unused hazardous materials they are willing to give away or sell. Materials exchange programs can also be set up in the community so that hazardous materials have a greater chance of being used up rather than disposed of improperly. This way people can bring any unused materials to a central place where other people have access to them.

If a central location is used to store certain hazardous materials, it is important that materials that are dangerous when mixed together are not stored together. Otherwise, the areas can turn into a dangerous dumping ground. It is important that the area is well managed. Personnel should be HAZWOPPER certified and materials should be clearly marked and stored properly. Proper handling is crucial, as some materials can become very dangerous, even deadly, if mixed together.

Some alternatives for hazardous waste disposal include:

- *Using up all of the material*
- *Exchanging unused materials with other people*
- *Recycling*
- *Shipping to a hazardous waste disposal site*

KAKE, ALASKA

In the Village of Kake, the environmental focus group identified a problem with handling of hazardous waste. Kay Larson said: “It all started with monthly “listening sessions” where we shared observations about conditions in our local environment. Our plan for management of hazardous materials began with awareness of a need, and commitment from the group to find solutions that work. Our goal was simply to make sure that household toxics and other dangerous substances did not enter the waste stream. Our plan was to create alternative methods of collection and disposal.”

With input from the Focus Group and support from the City Council, an Indian Health Service grant was developed for the City of Kake to build a household hazardous waste shed. A design for the structure was drafted, research was done on materials, bids were sent out and supplies were ordered (over 100 hours of volunteer time). Due to growing interest in the community, donations were made to pour the cement for the foundation and the cost to ship materials. When work began, students in a Construction Technology class were invited to the site to learn about elements of construction and help with the actual labor. Later, science students and others will be asked to help promote a communitywide education program to encourage full participation in the project. Collection, storage, and shipment will require HAZMAT training and city council involvement.

“Creating positive change to protect our environment is like making “little cuts” to a diamond each day ... How many “jewelers” and how many “cuts” does it take for the environment to sparkle and shine?”

*Kay Larson,
AmeriCorps Member, Kake*

Community education is critical for any recycling program and to inform residents of available collection areas whether it is solid waste or hazardous wastes, including batteries.

If there is no designated drop off location for lead-acid batteries in the community, chances are they can be in the landfill or other improper disposal sites throughout the village where their potential for causing harm to humans and the environment is high. Disposing of batteries from cars, 4-wheelers, snow machines and boats in a landfill or around the village can be dangerous. They contain sulfuric acid and lead, which can hurt people and wildlife directly or indirectly by contaminating water and soil. Lead contamination alone can cause everything from a headache to central nervous system damage in small children, leading to severe learning disabilities. Sulfuric acid can cause severe burns if it contacts your skin or blindness if it gets in your eyes. The acid can also eat holes in your clothing if it splashes or leaks on you so it's not a bad idea to wear protective gear such as Tyvek suits, rubber gloves and safety goggles when handling old batteries.

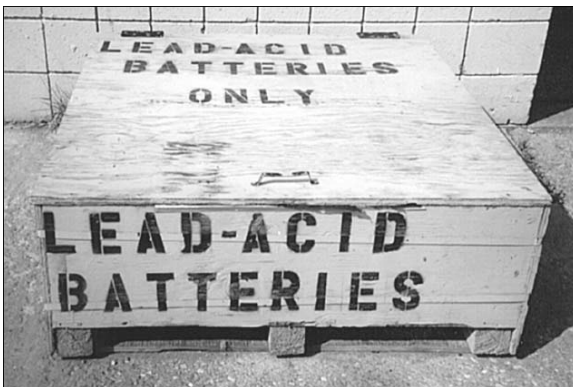


Landfill car battery collection point.

Ideally, used batteries should be stored in a dry place in the community, like a shed, freezer van or covered fish tote. Community members and visitors need to be educated about the location which should be easily accessible. Cardboard should be placed between the layers of batteries. If batteries are exposed to sun, rain and cold temperatures, they may crack

exposing the lead and sulfuric acid inside to the environment.

If the batteries are kept in a covered fish tote, the acid won't leak out onto the ground even if the batteries crack. When a fish tote is used to store batteries, it should be permanently labeled "used lead-acid batteries" so that it will not be used again for holding fish or other purposes.



74. Yes or No? Is there a specific place to put lead-acid batteries in your village? If yes, where and how are the batteries contained?

It is illegal to dispose of lead-acid batteries in landfills in Alaska because they are hazardous and can potentially pollute your drinking water. Lead-acid batteries should be collected and sent to recycling centers where the contents can be safely handled and recycled. Both the lead and sulfuric acid found in batteries can be recycled and used again. Even the plastic casing can be recycled. A single lead-acid battery, such as a car battery, contains 11 pounds of sulfuric acid, 18–20 pounds of lead and three pounds of plastic. Battery recyclers value used lead-acid batteries as an important source of lead for new batteries.

75. Yes or No? Are lead-acid batteries being recycled? If yes, by whom?



Joe Nevak teaches students in Emmonak about the parts of a car battery.

KOTZEBUE, ALASKA

In Kotzebue, an agreement was made between Maniilaq Corporation (non-profit) and the local Native Corporation in order to establish a battery collection program in Kotzebue. KIC (Native Corporation) now accepts both auto and boat batteries through its local NAPA store to be

recycled. All residents in Kotzebue are allowed to use this program. Solution: what about imposing a local rule that stores must accept used lead-acid batteries when new lead-acid batteries are purchased?

It is important to recycle lead-acid batteries because the contents are hazardous and do not belong in the landfill. Getting these hazardous materials out of the community assures that they will not be a potential risk. It is important to remember that it is much less expensive to manage batteries properly than it is to clean up batteries that are disposed of improperly.

Information on how to prepare batteries for shipping and recycling are available from the Solid Waste Alaska Network at <http://www.ccthita-swan.org/main/index.cfm>. See the Resource section at the end of this manual for information on how to obtain a copy of these manuals.



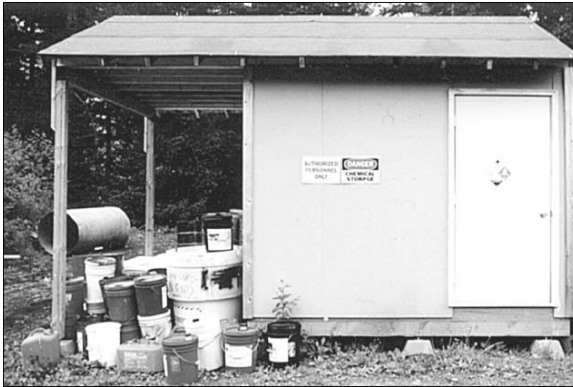
Lead-acid batteries getting packed for recycling.

Investigate the options for backhauling hazardous materials, household appliances, vehicles or metal. This is a very difficult process to get set up, but if number of communities combined efforts a feasible program may be worked out.

Used oil produced by generators, snowmachines, outboards, cars and other machines is considered a hazardous waste if it is disposed of improperly. It is hazardous because it contains polycyclic aromatic hydrocarbons (PAHs), toxic metals and other contaminants. Used oil should be collected at a central location in a container labeled “used oil” for later recycling and/or burning to heat a building. If there is no collection point for used oil in the village, then there are probably many areas throughout the village where used oil is either being stored or disposed of improperly.

Improper storage or disposal of used oil can pollute land and water. When used oil is dumped on the ground, it can reach the groundwater and surface water through rain and snowmelt. Used oil doesn’t evaporate or go away. It lasts for a long time in the environment. Because of this, it has great potential to pollute the drinking water source.

Providing a place in your village for residents to bring their used oil can help prevent the problem of improper storage and disposal of used oil. A **used oil collection center** can be established for this purpose. The collection center is a place where residents can drop off their used oil in a drum or tank. A used oil collection center must be registered or recognized as such by the local government as a place to manage used oil.



Recycling center where used oil is collected.

The release of only one gallon of used oil (a typical oil change) can make a million gallons of fresh water undrinkable. This is enough water to satisfy 50 people in a year!

76. Yes or No? Is there a place at the landfill or in the village for residents to put used oil? If yes, where?

Properly managing a used oil collection center requires the following responsibilities:

- *Displaying a sign showing that used oil is collected there*
- *Providing a container for the used oil that is easily accessible to the public*
- *Making regular visits to the collection site*
- *Making arrangements with the hauler to recycle the used oil if it is not burned on site to heat a building*
- *Preventing people from dumping oil that is mixed with other materials such as paint, gasoline, and antifreeze*
- *Preventing fire hazards*
- *Being prepared to control and respond to a fuel spill*

Once a collection point is made for used oil, it is important that community members are aware of its location. You may need to advertise the collection center over the radio, in the newspaper, on posters, brochures, flyers, or during meetings. You can use this opportunity also to educate the community on the importance of recycling used oil.



Oil that makes its way into waterways such as oceans, rivers and creeks can harm or kill wildlife. For example;

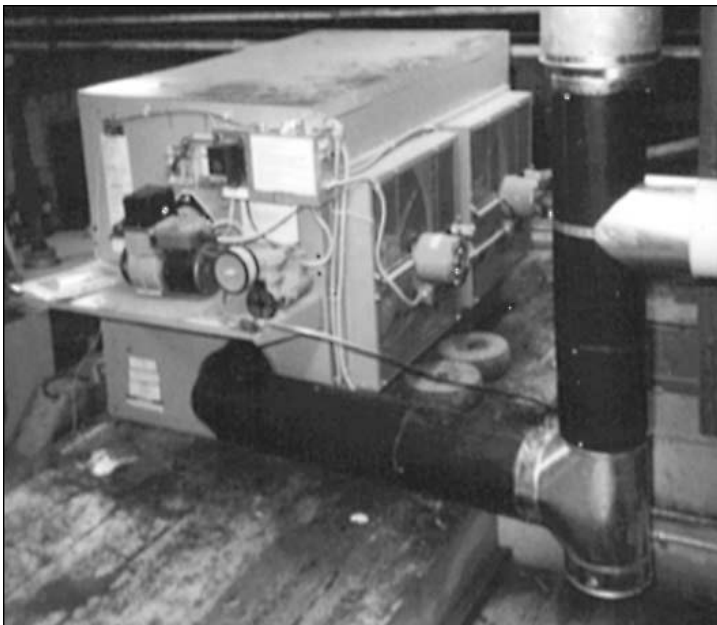
- *Birds that get oil on their feathers can die from hypothermia or consume the oil when cleaning (preening) their feathers resulting in death or reproductive failure.*
- *Oil slicks can kill spawning herring, their eggs and their larvae.*

Burning used oil to produce heat is the most common way to recycle used oil. The used oil that is collected in your community can be used to operate a used oil burner. Used oil burners convert used oil to heat for buildings. If your community does not have a used oil burner or does not produce enough used oil to make it beneficial to purchase one, find out if a neighboring community has one. Other communities that have used oil collection centers with used oil burners may be willing to accept your used oil, giving you an alternative to purchasing your own burner. For example, the Village of St. Michael has transported their used oil to the Village of Stebbins to burn in their used oil burner.

Keeping large amounts of collected used oil in your community can be a potential hazard. If your community does not have the ability to reuse used oil, the collected used oil should be transported by barge or other means to a location where it can be recycled. Used oil should not be transported in quantities greater than 55-gallons without approval from the Environmental Protection Agency. See the Directory in the back of the manual for a list of companies that sell used oil burners.

77. Yes or No? Is used oil being recycled? If yes, by whom?

Waste oil to energy converter (WOTEC) systems are perhaps more appropriately called used oil/diesel fuel blenders. They essentially clean used oil and used diesel (with filters) and then blend the oil/diesel with new fuel. The result is totally cleaned, precisely blended, water-free fuel that can be used in a diesel engine, furnace, or other such fueled device (see http://www.ccthita-swan.org/pdf/WOTEC_print.pdf). Some villages don't have a waste oil furnace, they use the SmartAsh Burner.



Used oil burners can be used to heat buildings.

The electrical generator is the largest producer of used oil in your community. The used oil produced by the generator should be either burned in a used oil burner on site or transported out of the village to a location where used oil can be recycled or burned.

All used oil generators, from electrical utilities to individuals, are responsible for managing their used oil through recycling or shipping it out. Utilities can sometimes assist communities in addressing used oil issues. Consider contacting your local utility for potential collaboration.



Keeping large amounts of collected used oil in your community can be a potential hazard.

78. Yes or No? Is the power plant operator correctly disposing of the used oil produced by the electrical generator? If yes, how? If no, what is happening to the used oil?



Drums of used oil at an old generator site.

Fuel spilled by individuals nationwide every year amounts to several times the amount of oil spilled during the *Exxon Valdez* oil spill in 1989. Even drops of fuel begin to add up over time. In the case of oil, one drop/second adds up to 410 gallons in a year!

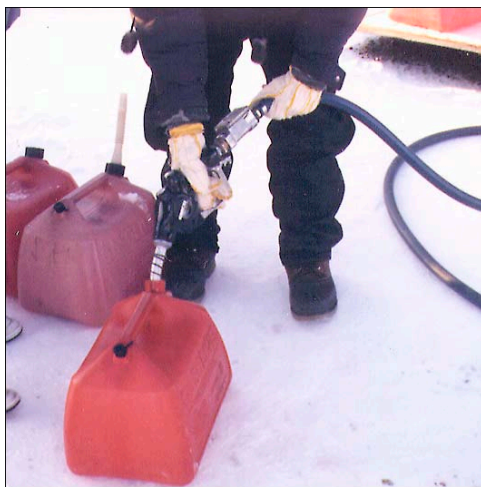
Precautions should be taken when changing the oil in a snowmachine, ATV, boat, or any other motorized vehicle so that no oil spills onto the ground. The oil that spills on the ground does not disappear. It eventually ends up in the groundwater or surface water and can contaminate the subsistence foods that your community relies on. If people in the community are not aware of the importance of preventing fuel spills, it is important to educate them on why fuel spills are harmful to the community and the environment.



79. Yes or No? Is there a village awareness of the importance of preventing fuel oil spills at homes?

Did you know that when you change oil in your ATV or vehicle, the plastic container that you throw away has 1–2 ounces of oil in it? Approximately eleven *Exxon Valdez* tankers are thrown into local dumps in the United States every year!

Determine if oil absorbent pads readily available. Make sure your community has a designated place for oil changes. This would provide a centralized location for collecting and ensuring used oil is not mixed with other contaminants so it can be used in a waste oil burning unit.



Many fuel spills happen when people are filling up gas containers.

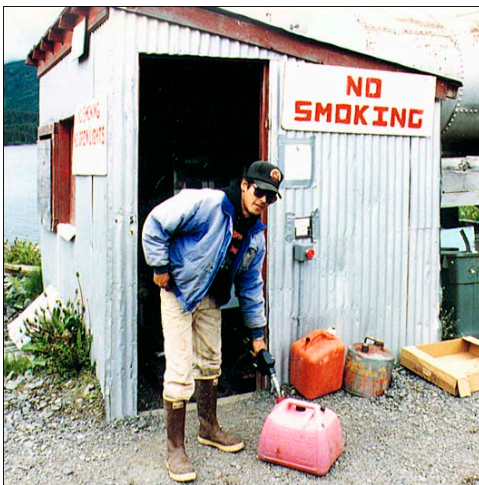


Many fuel spills happen when people are filling up jerry cans or gas cans and do not use anything to collect fuel that spills in the process. This can be avoided by having a steel drum to place the gas can in when filling it up with gas. Any fuel that spills will then be collected in the drum instead of going into the ground or water. Fuel that goes into the ground

may reach the groundwater or surface water where you get drinking water.

80. Yes or No? Do the village “gas stations” have something to put the gas cans in while they are being filled?

Many people in rural villages store “Jerry Jugs” of both in small spaces in or attached to their homes, not realizing the potential risks, including benzene exposure inhalation and absorption. Some people may use gasoline as a hand cleaning agent for tough grease and oil based paint. This is not safe and can increase the risk of cancer.



Pay attention to not overfill fuel containers.

A salvage area is a designated area where people can get rid of items that can be used by others rather than throwing them in the landfill. A salvage area can be a shed, small building or another area. The salvage area should be separate from the landfill and should not create a health or safety hazard. If your community doesn't have a building for a salvage area, you could have a monthly salvage day where people meet at the community hall to exchange or give away old items.

Clothing, furniture, equipment and paint are examples of valuable items that can be reused. Old refrigerators, snowmachines and ATVs can also be separated out from other trash so that people can use the parts.



Old refrigerators can be separated from other garbage at the landfill so that the refrigerant, usually Freon, can be collected.

81. Yes or No? Is there a community salvage area or secondhand store in the village? If yes, where?

Segregation of tires is important; the old tires may have other uses. They should be stored where they won't catch fire.

If your landfill has water in it most of the time, it could pollute the drinking water in your community. For example, when it rains water falls on the garbage in the landfill. The water then passes through the garbage, like water passing through the filter on a coffee machine, and produces a liquid called leachate that enters into the soil. The leachate keeps moving down through the soil until it reaches the groundwater. From there, the leachate can eventually flow until it reaches a well, spring, creek, or river. When hazardous materials are placed in the landfill, the leachate becomes toxic. This may result in unsafe drinking water, the spread of disease, and may harm wildlife.



If your landfill has water in it most of the time, it could potentially pollute the drinking water in your community.

Landfills that have water in them most of the time can also be a problem because access becomes more difficult and garbage is less convenient to dump. Also, the area of the landfill gets spread out further when there is excess water.

If your landfill contains water most of the time, actions should be taken to minimize the amount of water that settles in the area. One way to control this problem is to continuously place soil cover on the dump and to design a system that allows rainwater and snowmelt to better run-off.

82. Yes or No? Is there water in the landfill most of the time? Or, is the landfill in a tundra pond?

Sometimes there are stains or colored liquids that may be found in the soil in and/or around the landfill. This liquid is called leachate and is produced when rain or melted snow passes through the wastes in the landfill. Leachate transports a variety of chemicals into the soil and eventually into the groundwater. Since leachate often contains toxic chemicals, leachate that gets into the groundwater or surface water becomes a potential threat to the environment and to public health.



Leachate flowing from a landfill.

The amount of leachate produced by a landfill is related to the amount of rainfall and snowmelt in and/or around the landfill. In landfills with high amounts of rain and/or snow, the amount of leachate is generally greater. If your landfill is producing a lot of leachates, there is a good chance contaminants are leaving your landfill. This problem can be reduced by designing a system to drain water and snowmelt from the landfill so the water does not have time to pool up and pass through the garbage. Leachate can be reduced from closed landfills by covering the area with a 2 foot soil

layer and planting vegetation on the surface.

83. Yes or No? Is the landfill producing leachate, or runoff, that stains the ground downstream of the landfill?

Animals are problems at many open garbage landfills. Examples of animals that frequent the landfill and cause problems include:

Bears. *Bears are attracted to landfills and can be aggressive and dangerous.*

Foxes. *Foxes that eat from the dump can carry rabies. Dogs that come into contact with the foxes can become infected.*

Dogs. *Dogs that visit the landfill can bring back diseases to homes.*



Dogs that frequent the landfill can bring diseases back home.

Birds. *Birds feeding in landfills that are located near airports may collide with airplanes causing them to crash. Birds also can transport diseases back to the village and contaminate subsistence foods.*

Rodents & flies. *Rodents and flies transport diseases. Rats are an illegal, invasive species that should be reported.*

Animals should be discouraged from foraging in your landfill because of all of the problems they bring. If the landfill is covered with soil periodically and wastes are burned, the number of animals attracted to the landfill will be reduced.

84. Yes or No? Are there animals eating the garbage at the landfill? If yes, what kinds of animals?

It is important to know where all the active and old landfills are located in the village and what types of materials are contained in them. Some landfills may contain hazardous materials that must be removed to protect the environment.

The location of old landfills is important information to have available for future land developments. Permanent markers should be placed at the boundaries of the landfills to help future property owners when locating buildings or facilities near the site.

Closed landfills must be covered with vegetation to prevent erosion caused by rain. Without vegetation, the final soil cover may get washed away, exposing wastes that could



be a health hazard, nuisance or be carried into surface waters.

85. Yes or No? Are there other landfills (including old ones) in and/or around the village?

If yes, who operated them and where are they? Are any still in use?

A Class III municipal solid waste landfill is small, rural and remote. On average, less than five tons of solid waste are dumped into a Class III landfill daily. Most of the landfills in Alaskan villages are Class III. Obtaining a Class III permit for your landfill is one of the best ways to improve the sanitation and safety of your landfill.

The steps required to obtain a Class III permit involve a series of questions to make you aware of what it takes to design and operate a safe landfill. For example, one of the requirements for holding a Class III permit is to develop an operating plan for the landfill.

The operating plan includes information such as how to handle hazardous wastes and dispose of them properly. It is useful to go through the application for a Class III Landfill Permit if only to see what is required to design and safely operate a landfill.

86. Yes or No? Does the village landfill have a DEC Class III Landfill Permit?

See Appendix F (page 200) for a copy of the form used by the Department of Environmental Conservation to inspect Class III Landfills (Class III Landfill Field Inspection Form).

87. Yes or No? Does the village have an annual clean-up program? If yes, are the recyclables separated from the other trash?

Many villages have clean-up programs where the community gathers annually or more often and cleans up the village. Village clean-ups are one positive way to involve the entire community in improving the environmental health conditions and the beauty of the village. A village clean-up can also be a useful time to educate the community on the importance of keeping the village litter-free year-round.



Litter cleanup in Klukwan.

During a village clean-up, it is very important to identify recyclable materials such as aluminum and batteries and separate them from the other trash so that they can be recycled. Hazardous materials, such as batteries and old drums of material, should be identified and tagged until someone is able to remove them with the proper clothing and equipment. A village clean-up is also an excellent opportunity to provide training in solid waste management for members of the

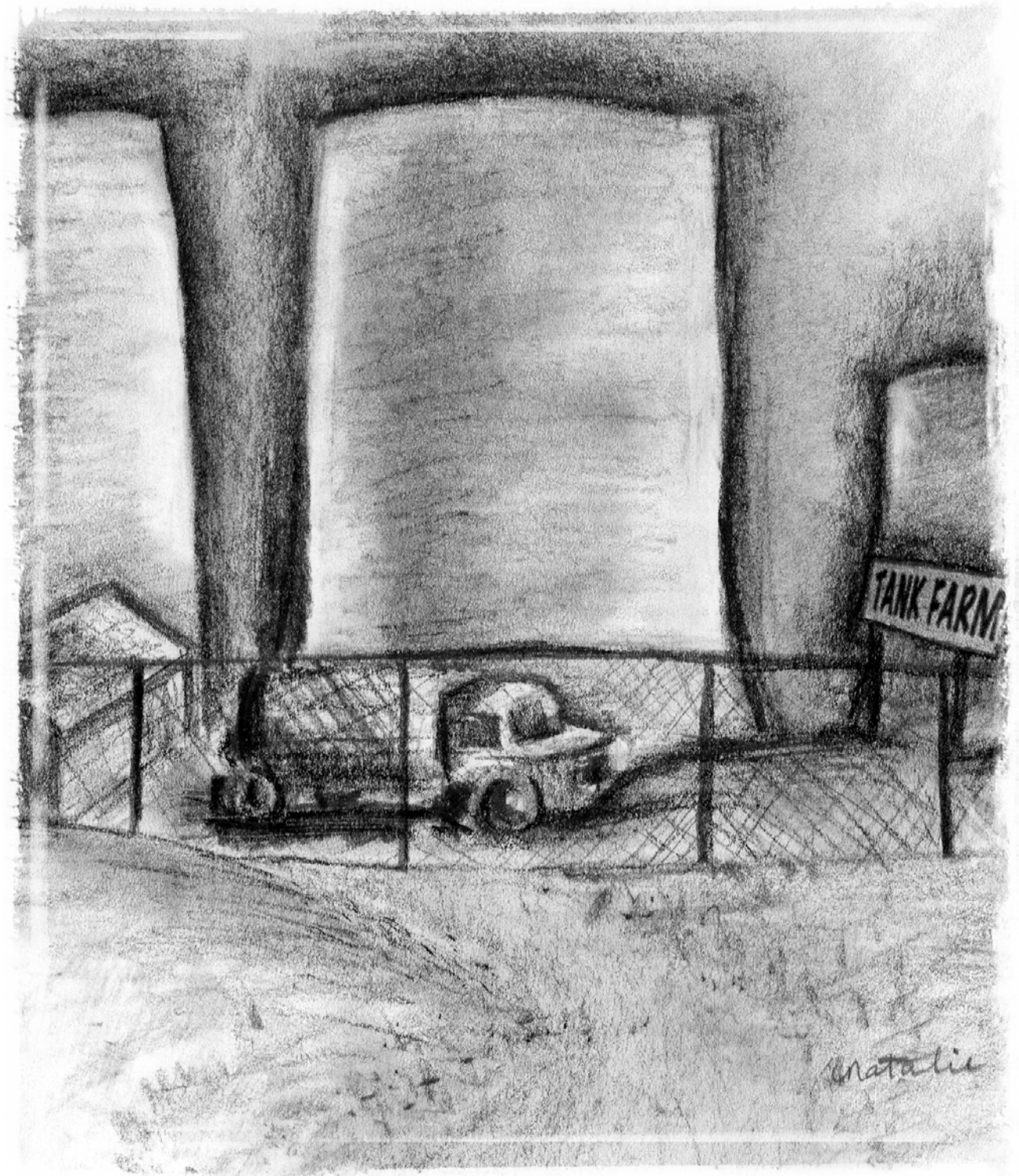
village. A good example of a solid waste management plan is on page 283 (Appendix M).

NATIVE VILLAGE OF VENETIE:

Pamela Sam, the Environmental Technician for Venetie, coordinated a Recycling Workshop for a clean-up project at the dump: “First of all, I planned the workshop with my Administrator and talked with the Council Members about having the workshop. Then, I posted notices saying when, where, and the time. The local councils donated refreshments for the workshop. During the first days of the workshop, there weren’t many people, but as we went on a lot of people and students started attending. I began the presentation with recycling, and throughout the week I presented more on hazardous materials, littering, the dumpsite, and oil and gas spills in and around the community. The workshop lasted a week and when we were done, the students and other community members were pleased with the issues we covered and realized how important these issues are to ourselves and to the environment.”

“I would like to add that this project brought us together, to help make a difference for our community and also make our environment much nicer to look at and to live in. If you have any questions, please feel free to contact me.”

Pamela Sam, Environmental Technician Venetie



Fuel Tank Farms

Fuel Tank Farms

Who to ask: tank farm owners/operators

A tank farm is an area where large tanks containing bulk fuel is stored. All different types of fuel used by people in the village are stored at tank farms such as diesel, oil and unleaded gasoline. There may be several tank farms in your village with different owners such as the city, village council, regional corporation and the school.

It is beneficial to the community and the tank farm owners to have cooperation among the different tank farms in the village. Tank farm owners can benefit from sharing resources and assisting each other with management plans and spill materials.

88. How many tank farms are there in the village and who owns them?

The questions in the remainder of this section should be answered for EVERY tank farm in your village. By going through all of these questions, you will have a better idea of:

- *Where all the tank farms in the village are located.*
- *Who owns them?*
- *Whether the tank farm owners are operating their tank farms in a safe manner that will prevent fuel spills from occurring.*



Fuel tank farm.

Tank farm owners must be able to safely operate their tank farm. This means that the tank farm owner is:

- *Preventing spills from occurring*
- *Monitoring the fuel with an inventory*
- *Preparing for spill clean-up*

These points are described in more detail in the following explanations.

Secondary containment is a way to contain fuel that has spilled or leaked at a tank farm so that it can be cleaned up. The purpose of secondary containment is to prevent fuel from flowing onto the land or in the water if there is a spill from one of the tanks.

To be effective, the containment area must be large enough to hold the contents of the largest tank with at least one additional foot of height for rain or snow. The containment area should be lined with material to prevent fuel from leaking through the walls or seeping into the ground. If there is a liner, check for tears, cracks, and unsealed seams around the pipes going through the liner.



This is an upgraded tank farm with secondary containment.

If there is no secondary containment or the containment area is inadequate, it is important to look at the area and

determine where the fuel would go if a major spill occurs. Knowing where the fuel will flow will allow you to react quicker during a spill. You may want to consider creating a diversion pond to collect the fuel in the event of a major spill. This would channel the fuel into one area and make clean-up easier.

Many tank farms in rural Alaska have no secondary containment and therefore present a potential hazard of fuel contaminating the water source. Giving thought to the path the fuel would take in the event of a spill is a step towards planning and prevention.

89. Which tank farms have secondary containment and which do not?

Each tank farm owner should have a written plan to follow for managing his/her tank farm. Ask to see the plan. The purpose of the plan is to describe the procedures for preventing fuel spills and for cleaning up fuel in the event of a fuel spill. The advantage of having a plan and practicing it means that fuel spills will be better prevented and clean-up of fuel spills will happen faster and be cheaper to carry out. If a fuel spill is not cleaned up, the fuel may eventually reach the surface or ground water and the water will become contaminated.

It is important that the tank farm operator practices the written plan before a spill occurs. By practicing the plan ahead of time, you can make sure the equipment for the spill works, the materials needed are available, and that the plan works.

There are several different types of plans that are required from different agencies depending on the size and location of the tanks. Examples of plans include, but are not limited to:

- *Spill Prevention Control and Countermeasures Plan (SPCC)*
- *United States Coast Guard Operations Manual*
- *Contingency Plan*

90. Yes or No? Do any of the tank farm owners have a written plan to follow in case there is a fuel spill? Who does and does not?



Tank farms with active or ongoing leaks of any size should be repaired immediately. Even small leaks turn into large fuel spills over time.

Fuel Storage and Use for Homes

To ensure that your heating oil tank and fuel lines have a long and trouble-free life, there are some easy steps you can follow. These practices will protect the investment of your home and will help prevent costly spills and cleanups. This section provides general guidelines depending on the type of tank and piping system you have on your property.

Know the condition of your tank. A monthly check is recommended as a preventive maintenance tool. Report any sudden change in product level or any noticeable problems to a heating repair professional or your oil supplier.

Understand your tank system and how it works. You should know the tank size, age, construction material (tank and piping) and who to call if a repair is needed. Keep track of all deliveries and how much fuel you use.

Respond to cleaning up a spill. If obvious signs of a leak are found (such as petroleum vapors, oil on property, etc.), immediately report the leak to the Alaska Department of Environmental Conservation. The sooner you cleanup a spill, the cheaper will be your expenses.



Fuel tank in Nikolski.

Your tank should be:

At least six inches above the ground and supported by solidly attached legs or saddle-braces that are resting upon a well-drained, solid masonry footing, such as a concrete pad or pier blocks set on a gravel pad.

Equipped with a fuel-level gauge that is functioning properly.

Located where snow or ice sliding off the roof will not damage or tip the tank over, or damages the fuel lines.

Checked regularly for signs of rust, wet spots, or excessive dents on the tank's surface.

Checked regularly for signs of drips or leakage around the fuel lines, filters, drain plugs and valves.

Checked regularly for signs of spills around the vent pipe and the tank fill area.

To avoid the liability of a leaking tank, underground heating oil tank systems should be closely examined during the sale of property by the seller, buyer or lending institution. While there are no required standards for assessing the integrity of a heating oil tank system, the following things are sometimes done to address concerns about the tank systems. These options go from least expensive and least precise to most expensive and most precise. Here are several ways to determine if your fuel system is working properly.

Five Ways to Assess Your Heating Oil Tank System

1) Fuel receipts. The easiest way to monitor for a possible release is to examine your fuel receipts and your fuel usage patterns over time. Excessive consumption of heating oil could be due to a leak in the system.

2) Contact the fuel delivery company. Another simple way to check your fuel usage is to contact the company who delivers the fuel, ask them for your history of fuel receipts, and ask them if your usage is customary, based on your tank size, furnace type and size of structure you are heating.



3) Do-it-yourself leak test. If you can afford to not use your furnace for a few days, another method, called Manual Tank Gauging, can be used to test your tank if it is losing fuel. Use a large wooden stick to measure the product level in your tank, wait 48 hours, and measure the product level again. If the levels are different, you may have a problem.

4) Professional Tightness Test. The State of Alaska licenses tank tightness testers to check for leaks at regulated UST systems. If you need conclusive evidence that your tank is not leaking, this method can be beneficial.

Call 1-800-478-4974 for a list of tightness testers or go to <http://www.state.ak.us/dec/dspar/stp/tank3.htm> on the internet.

5) Site Assessment. It is common in commercial property purchases for the buyer or seller to hire an environmental consulting firm to perform a site assessment. The assessment can include a record search, as well as soil and possible groundwater samples to verify the presence or absence of petroleum contamination. The State of Alaska approves individuals to perform environmental sampling and maintains a list on the internet at <http://www.state.ak.us/dec/dspar/stp/qpcmp.htm>.

(From <http://www.dec.state.ak.us/spar/perp/heat/hotguide.pdf>)

Tank farms with active or ongoing leaks of any size should be repaired immediately. Pipes that are covered with snow in the winter and then driven over by ATVs and snowmachines are especially vulnerable to breaking and leaking. The fuel that leaks from the tank or pipe enters into the environment and can be a health hazard.

Storage tanks should be inspected regularly for signs of leaks, rust, or corrosion along the tank bottoms, seams, gaskets, bolts or rivets and at fittings and valves. Regular inspections and repairs reduce the risk of fuel spills.

Fuel spills are an expensive cost to the operator and community if not cleaned up immediately. Even small leaks from pipes can turn into large fuel spills over time. One pint of oil can pollute more drinking water than 15 people drink in a lifetime!

Spilled fuel can also affect humans and wildlife in a variety of ways:

- *Animals in contact with oil can become sick, weaken and die.*
- *Small amounts of oil on a bird's feather can kill the bird.*
- *Oil spilled in water can kill fish and other aquatic wildlife. Fish will not return to a contaminated area for many years.*
- *People eating poisoned animals or drinking contaminated water can become sick. Contact with oil can also cause long term health problems.*

91. Yes or No? Do any of the tank farms have active or ongoing leaks of any size? If yes, which ones? Is the leak from a tank or a pipe?



Active fuel spill at a tank farm.

All tank farms should have materials available to contain and clean up fuel spills safely and efficiently. There should be enough clean up materials on hand to clean up a spill and dispose of the materials used for cleanup. If a tank farm owner does not have the necessary materials to clean up a fuel spill, he/she is putting the entire community at risk. An absorbent boom is used to soak up oil and prevent its movement.



This is a classroom demonstration of an absorbent boom is used to soak up oil and prevent its movement.

Some of the materials that should be available in the event of a spill include:

- A stockpile of about 10 bales of sorbent pads-to soak up the fuel
- A sorbent wringer-allows you to reuse sorbent pads
- 55 gallon storage drums for storing used sorbent pads
- An absorbent boom—used to soak up oil and prevent its movement
- Personal protective gear such as disposable respirators, gloves, rubber boots, rain gear, eye protection and hard hats
- Burner for used sorbent materials

92. Yes or No? Do all of the tank farms have fuel spill clean up materials on hand? If yes, which ones and in general terms, how much?

Many times fuel spills in the village go unnoticed or people are not aware that they have occurred. Knowing which tank farms have had significant spills in the last five years and the cause of the spill may reveal a repeated problem with a tank or pipe. These spills need to be identified for clean-up and any damaged tanks or pipes must be repaired.



Treating contaminated soil.

A fuel spill of 55 gallons or more is costly to the environment and to the owner who purchases the fuel. Oil spills in excess of 55 gallons must be reported immediately to the nearest Department of Environmental Conservation Area Response Team. Emergency contact numbers should be written on a sign at each tank farm in the village.

93. Yes or No? Were there any tank farm fuel spills of more than 55 gallons in the last five years? If yes, which ones and what was the cause of the spill?

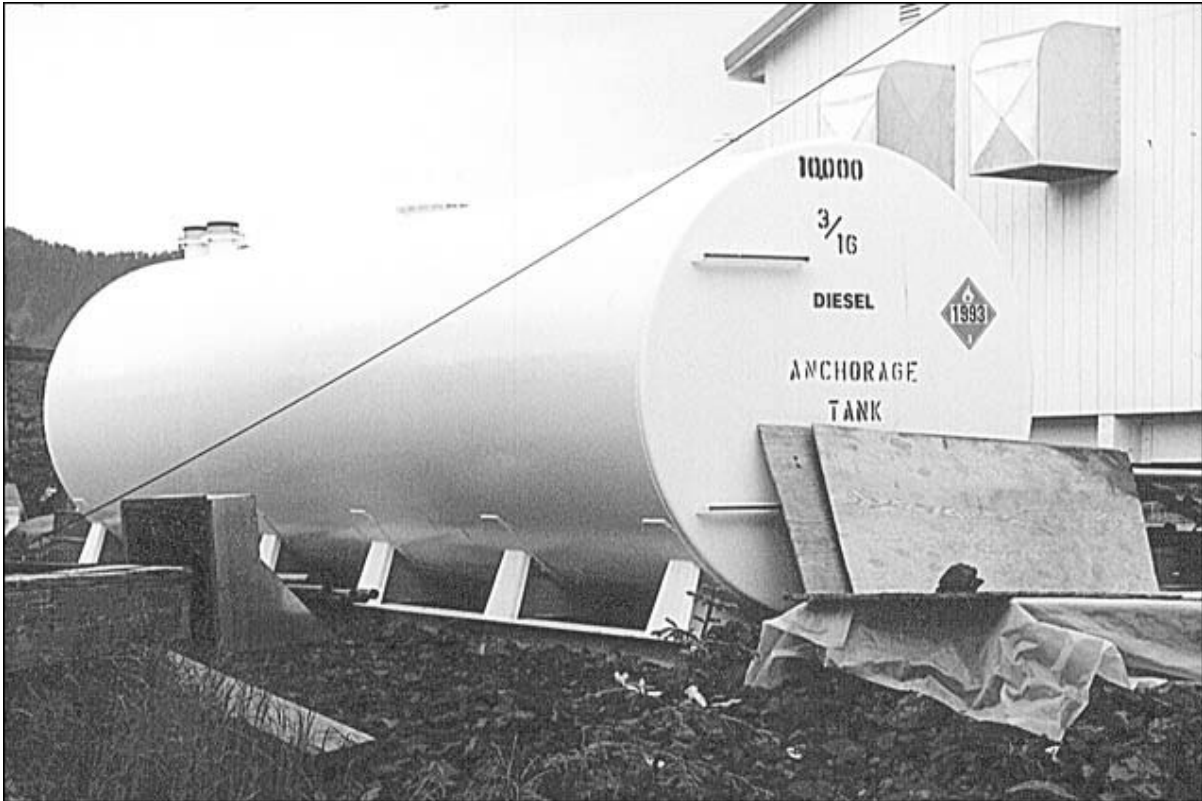
94. Yes or No? Have the pipeline(s) used to fill the tank farms from the barge or aircraft been tested for leaks? If yes, when?

The pipelines used to fill the tanks at the tank farm need to be tested periodically for leaks. Barge operators are required to pressure check fuel lines before filling the tanks. The owner of the tank farm is responsible for making sure that the pipelines are tested and are not leaking. If the pipelines are underground, there is no way to detect a leak unless a pressure test is performed. If the pipeline is above the ground, leaks can be detected just by looking on the ground for spilled fuel. It is important to do these tests periodically to make sure that a fuel leak is not contaminating the ground. Any fuel leaking into the ground has the potential to make it into the water and contaminate the drinking water supply.

All of the tank farms should have tanks with a clear and visible label that identifies the contents inside. A properly labeled tank will eliminate any confusion about what the tanks contain. There have been incidents in rural Alaska where a tank has been refilled with the wrong fuel. In one village along the Yukon River, diesel fuel was mixed with fuel used in snowmachines and vehicles. Mixing different fuels is a costly mistake, which could endanger your life. This problem can easily be prevented with clear labeling on the tanks.

A clearly labeled tank is also important in the event of a fuel spill. If there is a fuel spill, you need to know immediately which type of fuel you are dealing with in order to know how to react.

95. Yes or No? Do all of the tanks have labels on them identifying what is inside? If no, which tanks need labels?



All of the tanks in a tank farm should have clear and visible labels identifying the contents.

Emergency contact signs should be posted either on the fence surrounding the tank farm or on the tanks themselves if no fence exists. The signs should include the name and telephone number of people or agencies to call in the event of a fuel spill. It is very important to have this information available to any person in the event of an emergency. This enables someone who observes a spill to do something about it.

Alaska Department of Environmental Conservation
Division of Spill Prevention and Response

REPORT ALL

OIL AND HAZARDOUS SUBSTANCES SPILLS

During normal business hours
contact the nearest DEC Area Response Team office:

Central Alaska Response Team: ANCHORAGE	269-7500
	FAX 269-7646
Northern Alaska Response Team: FAIRBANKS	451-2121
	FAX 451-2362
Southeast Alaska Response Team: JUNEAU	465-5340
	FAX 465-2237

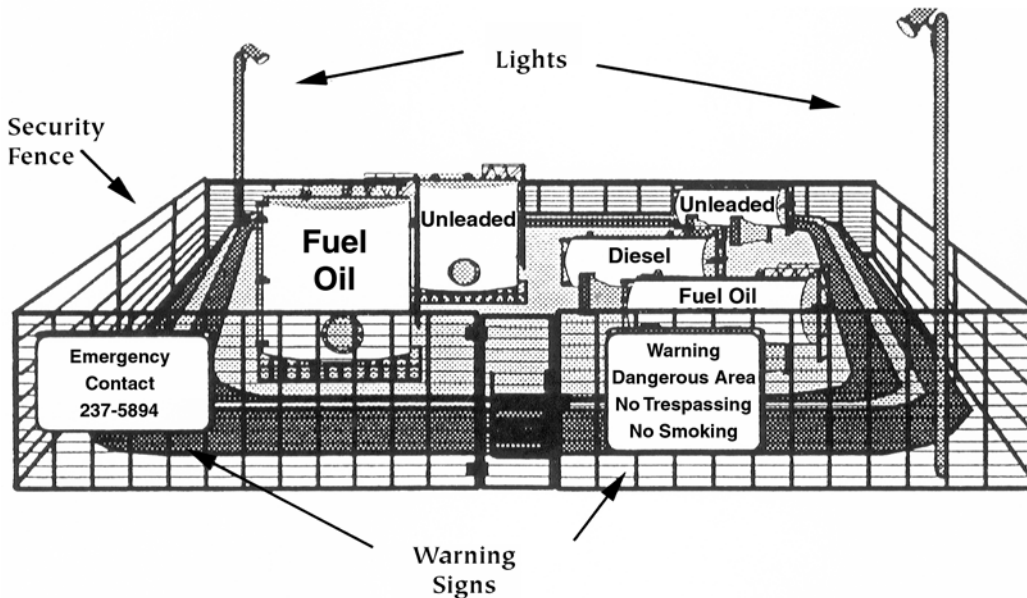
Outside normal business hours, call: 1-800-478-9300

ALASKA LAW REQUIRES REPORTING OF ALL SPILLS

The name and telephone number of the most recent owner of the tank farm should be written on the sign. This person should be contacted immediately if a fuel spill is detected at his/her tank farm. The contact number for the correct office at the State and U.S. Coast Guard should be posted as well. These agencies are able to provide technical advice on how to deal with the fuel spill as well as assistance with clean up if the spill is too big for the village to handle. See the Directory in the back

for contact information.

96. Yes or No? Do all of the tank farms have signs on them with the telephone numbers of people to contact in case of a fuel spill? If no, which tank farms need signs?



Fuel that was spilled in the past and not cleaned up will remain in the environment. These areas are a potential threat to the health of the community and should be identified and prioritized for clean-up. In one village, an oil spill occurred around an abandoned BIA school. The local officials spent five years failing to determine who had the responsibility to clean it up. In the meantime, the site sat as an environmental time bomb. In another village, a fuel tank broke and no one reported it because the fuel sank into the ground and seemed to “disappear.” Months later, the fuel moved underground from the spill area to the village’s drinking water well.

97. Yes or No? Have there been fuel spills in the past that have not been cleaned up that are of concern to village residents? If yes, where?



Fuel spill at an old tank farm.

Remember, the less fuel used in a village the less chance of a fuel spill, need for fuel storage, less exhaust fumes in the air and likely a reduction in energy costs. This can be achieved by implementing energy conservation measures. Read, share and implement the energy tips found in Appendix K on page 234.



Air

Air

Who to ask: village residents

Smoke from burning garbage at the landfill is unhealthy to breathe. While any smoke is not good to breathe, inhaling smoke from burning garbage can have many different health effects on individuals:

- *Short-term effects include: wheezing, watery eyes, “cold” symptoms, pneumonia, and bronchitis.*
- *Long-term effects include: allergies, sinus infections, asthma, emphysema, heart disease and cancer.*



Smoke from burning garbage from the landfill is unhealthy to breathe.

Children are at greater risk for getting sick from inhaling smoke because their lungs are still forming and they take in 50% more air per body weight than adults do. Respiratory problems are the leading cause of chronic illness in children today. Other individuals who are at greater risk from smoke pollution include the elders and people with asthma and heart or respiratory disease.

Before a large amount of garbage is burned at the landfill, a test burn should be done to see where the smoke will go. It should go straight up for about 200 feet and be transported away from the village and residences in order to prevent the smoke from being inhaled by people in the village. If the smoke goes toward the village school or houses, you should wait until the weather changes and there is a better time to burn.

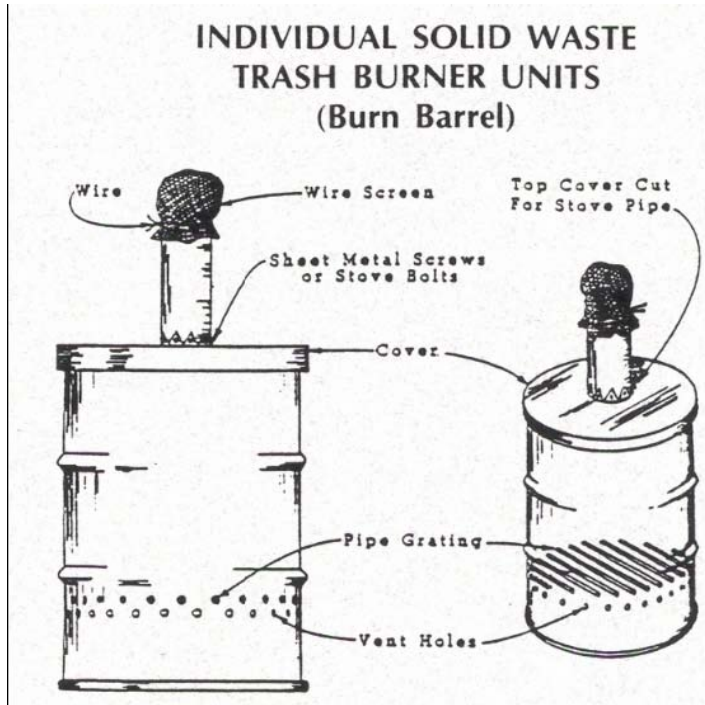


Note the hot fire in the burn barrel.

Alternatives to the open burning of garbage include recycling, composting, burying, incineration, or any combination of these. Separating garbage that is less hazardous from that which is known to release toxic air emissions, such as plastics, batteries, and rubber, prior to burning reduces the harmful emissions released and can reduce the toxics emitted. There are backhaul options that may help remove the most hazardous waste from landfills so that they do not get burned.

Burning trash in contained burn units is much safer for a community, as it ideally will raise the burning temperature to high enough levels to begin to reduce the harmful air toxics that would otherwise be emitted and prevents the trash from being disburshed by wind or animals outside of the landfill where it can deposit on subsistence foods and cause other potential risks to the public and the environment.

98. Yes or No? Can smoke from the burning garbage at the landfill be smelled in the village?



A burn barrel is usually a 55-gallon steel drum that individuals or families use to burn garbage. Burn barrels are one way to reduce the amount of paper/wood products that end up in the landfill. Although burn barrels are convenient and reduce the amount of times that you need to go to the dump, they are harmful if used improperly.

Hazardous wastes and plastics should be removed from other wastes placed in a burn barrel. The smoke produced from burning plastic is dangerous to breathe. When plastic is burned

at home in a burn barrel, you are exposing your family and the rest of the village to toxic substances. Hazardous wastes that are not separated from other garbage may cause a dangerous explosion in the burn barrel and produce toxic fumes as well.

A burn barrel can be built so that it burns hotter and produces less smoke. This type of barrel will more effectively burn garbage and be safer to use.

99. Yes or No? Do village residents use burn barrels?



Inside view.



Remove the ashes regularly.

Burn barrels have been used extensively at Alaska residences. These devices are essentially 55- gallon drums that are modified with passive under-fire draft. Some have a stack and spark arrestor screen. Some do not have a stack. Burn barrels operate at low temperatures (400°F to 500°F) and generally burn wet garbage, resulting in the incomplete combustion of the waste and the production of smoke. Burning materials such as plastics, asphalt, and rubber generates hazardous air pollutants. This may be a health threat and a nuisance for nearby residents. Burn barrels often emit acid vapors, carcinogenic tars, and "heavy metals" as well as unhealthful levels of carbon monoxide and particulates (smoke) when burning non-separated household garbage. For these reasons, the Alaska Department of Environmental Conservation discourages property owners from using burn barrels to burn household garbage.



Cover the burn barrel until ready to incinerate; dry materials better and cleaner.

Generally, the materials that can be burned effectively in a burn barrel include dry leaves, plant clippings, paper, cardboard and clean untreated wood. The closer one stands to the burn barrel, the more harmful chemicals one inhales. Burn barrels should not be used in close proximity to homes or areas where people can be exposed to the smoke. Burn barrels and burn piles can also lead to uncontrolled fires unless the following precautionary steps are taken:

- Clear all combustible materials and vegetation within 10 feet of the burn barrel;
- Place a metal mesh screen (spark arrestor) over the top of the burn barrel. The openings should be 1/2 inch or smaller.
- Place your burn barrel on concrete blocks and drill some small holes in the bottom to allow rainwater to drain.
- Don't start your fire unless you are prepared to monitor it until it is completely out.

(From: <http://www.dec.state.ak.us/eh/sw/Guidance/Burning%20Garbage%20Guidance.pdf>)

Plastic becomes very toxic when burned and can be harmful to both your body and to the environment. Plastic items should be separated from other garbage that is going to be burned. Reducing the amount of plastic used can help prevent plastic from getting into the waste stream in the first place.

100. Yes or No? Is burning plastic the main odor smelled when garbage is burned?



Cigarette smoke and wood stove smoke are serious sources of indoor air pollution.

Cigarette smoke, in particular, is one of the most widespread and harmful indoor air pollutants. The smoke is a mixture of irritating gases and cancer-causing tar particles. It is a known cause of lung cancer and respiratory illness, and has been linked to heart disease. In Alaska, tobacco related lung cancer is the fastest growing form of cancer among the Native population. Children can also become

very sick by inhaling the smoke of others.

Find out the answer to this question by asking a number of people in your community if they think cigarette smoke and wood stove smoke are sources of indoor air pollution. If responses show that most people do not consider these as sources of pollution, this will indicate that educational programs are necessary on these issues.



101. Yes or No? Do village residents consider cigarette smoke and wood stove smoke as sources of indoor air pollution? How many houses have smokers who smoke indoors? How many houses have carbon monoxide detectors?

The smoke produced by wood stoves is a source of indoor air pollution. Smoke from wood stoves is particularly a problem in rural Alaska where many homes have been “weatherized” (highly insulated) and there is little circulation of air. Residents who rely on wood stoves as a source of heat in their homes are at risk for many of the respiratory problems related to inhaling smoke and carbon monoxide. Using only dry wood and not allowing the fire to smolder will reduce the amount of smoke produced and be less of a health hazard. Also, plastics should not be burned in wood stoves. The fumes from burning plastic are poisonous to breathe.



Clean-burning EPA certified woodstove.

If there are many inefficient and old woodstoves in a community, by raising awareness of the potential energy costs reduction, as well as cleaner air both indoors and out, individuals may see the importance of replacing old woodstoves with the more efficient and less polluting, EPA certified woodstoves. Also, regardless of whether the woodstove being used is certified or not, using the best wood burning practices can lead to cleaner air and less wasted energy from wood. You can help others by sharing information on how to

use a woodstove both safely and efficiently on the smallest amount of fuel.

102. Yes or No? Do village residents use wood stoves to heat their homes? If yes, how many houses? How many are EPA approved woodstoves, versus older (pre-1990) uncertified woodstoves or home made stoves?

Dust:

Air quality professionals pay attention to particulate matter because these very small particles can cause health problems when inhaled. Specifically, particles less than 10 micrometers in diameter can pass the nose and throat and enter the lungs. A micrometer is one millionth of a meter.

There are many alternatives to help control dust. Below are some of the more common options for dust control.

Vehicles traveling on unpaved roads stir up dust. Reducing the numbers of vehicles using the roads can reduce dust. This can be done voluntarily, such as encouraging walking, or by the local government imposing restrictions on weight or vehicle type, and limiting access to dirt roads by motorized traffic. For example, the City of Kotzebue prohibits anyone under 14 years old from using a snow machine or all-terrain vehicle unless with an adult on the same machine.

Reducing Vehicle Speed

Fast moving vehicles stir up dust as well. Studies show PM10 emissions go up with vehicle speed. A reduction in speed from 40 miles per hour (mph) to 20 mph reduces dust emissions by 65%. Road postings and enforcement, drainage channels, and speed bumps can reduce speeds. Effectiveness of speed limits depends on the availability of law enforcement and community willingness to abide by the rules. Speed bumps and drainage only reduce dust emissions within a short distance of the road modification.

Correcting Road Design Problems

The long term performance of a roadway dust suppressant depends on the road shedding water and providing a smooth driving surface. Water puddles will form on a road surface without good drainage. Water floats fine particles from the soil beneath the road and distributes it across the roadway surface with passing traffic. Standing water next to a roadway may saturate the road bed, resulting in potholes. When fine particles are washed away larger particles are left unanchored. The larger particles are pushed to the side of the road resulting in loss of material and an eventual need for expensive road resurfacing.

Increasing Moisture Content

Moisture in the surface of dirt roads causes particles to stick together. The moisture content of dirt roads can be increased either through spreading water or application of salts which attract water.

Though water is available in almost all Alaskan communities, methods to move water to unpaved roads is a problem in smaller communities. Larger communities might have water trucks to take advantage of local water supplies. Smaller communities may not have such equipment. When water can be applied, it only provides a short term reduction in dust. Regular, light watering is better than less frequent, heavy watering.

The application of deliquescent salts to road surfaces can control road dust. A deliquescent salt, like calcium or magnesium chloride, absorbs water from the air. Soils treated with these salts have a higher water content than untreated soils. Slippery wet roads and vehicle corrosion are disadvantages of salt application. Also, rainfall eventually removes salts from the roadway. The practical duration of a salt application is no more than one year. Sodium chloride, table salt, also attracts water and has been tested in a number of studies. Sodium chloride is not as effective as calcium or magnesium chloride. Calcium chloride has been tested and used as a dust control palliative in Alaska over several years. Locations include Kotzebue, Teck Cominco's Red Dog Mine, and Haines. Calcium chloride seems to reduce visible generation of dust and remains effective through the summer season without problems or environmental impacts.

Binding Particles Together

This group of dust palliatives includes chemicals which bind fine particles together or onto larger particles. These chemicals fall into several groups, such as petroleum-based, organic non-petroleum, electrochemical stabilizers, and synthetic polymers. Petroleum-based Binders include emulsified asphalts, cutback asphalt, and Bunker C. These agents coat particles with a thin layer of asphalt increasing particle mass and decreasing the chance of becoming airborne. Emulsified asphalt is a mix of asphalt and water which penetrates road surface dirt. This works well when the asphalt is mixed into the top inch or two of road surface with a grader. These products can contaminate waterways due to runoff and are generally not considered any more.



Many of the roads in Bethel are paved.

Organic Non-petroleum Dust Suppressants include lignosulfonates, and resins. Lignosulfonates result from the manufacture of paper when lignin is extracted from wood. Lignin is a natural polymer and can bind soil particles together. Lignin occurs in solution with sodium, calcium, ammonium, or magnesium bisulphate. Resins made

from combining lignosulfonates and additives can neutralize adverse effects. Lignosulfonates are water soluble and can move out of, or deeper into, a roadway surface with rainfall. These products corrode aluminum unless calcium carbonate is present. Lignosulfonates last six months and work best with fine dusts having a high plasticity in dry environments such as clay particles (CPWA, 2005). Glacial tills have low plasticity. Lignosulfonates may be of limited value in controlling dust in Alaska.

Electrochemical Stabilizers include sulphonated petroleum, ionic stabilizers, and bentonite. These products neutralize soils that attract water and allow bonds to form between particles. Electrochemical stabilizers need to be worked into the road surface, requiring equipment that may not be available in remote rural communities.

Synthetic Polymer Products include polyvinyl acrylics and acetates. They bind soil particles and form a semi-rigid film on the road. These products are either liquids or powders that are mixed with water. Products are applied in liquid form and require drying. Temperatures during the curing should not approach freezing. Traffic should be diverted from treated areas until drying which can take 12 to 24 hours. Synthetic polymer products have been used for dust control and improved soil strength on a number of airfields in Northern Canada and Alaska.

Covering Unpaved Road Surface Soils With Gravel

Applying gravel to a dirt road surface can reduce dust. Gravel provides a hard surface protecting soils from vehicle wheels. Gravel does not reduce the strength of airflows behind vehicles and this can blow loose soil particles into the air. Without a road base of crushed aggregate, traffic will push down surface gravel into the road surface, especially when the road is wet. If the road surface does not have enough fine material to cement the surface gravel in place, traffic will push the gravel away from the driving lanes. To be effective over a long period of time, new gravel must be anchored to the road surface. This is done through incorporating gravel with aggregate mixes or soil adhesives. If gravel is lost from being pressed into soils beneath the road, then the use of geotextile fabrics may be necessary. These fabrics are constructed of polymer threads with very high tensile strength, and are available in designs that either form water barriers or allow water, but not fine soil, to migrate through.

Sealing Unpaved Roads with Pavement or Other Impermeable Materials

Paving is the most effective, and expensive, method to control dust from unpaved roads. Asphalt and Portland concrete provide durable and effective surfaces that prevent the break down of soil surfaces. Paving is expensive. Except for roadways carrying more than 250 vehicles per day, the use of paving to control dust emissions may not be cost-effective. In the past few years, roads in Kotzebue carrying more than 500 vehicles per day have been paved (Hadley, 2006). Thin pavements, like chip seals, have been applied to roads in southern Alaska but can fall apart during breakup.

Fiberglass plates, used in cold climate oilfields, provide temporary road surfaces. These interlocking plates are manufactured in 14 feet by 8 feet by 2 inch sections. The plates can carry very heavy loads over short distances without the need to construct structural roadbeds. This is good for areas like northwestern Alaska where the supply of construction aggregate is limited. The plates are expensive at about \$2,000 per plate, but appear to have a very long lifespan.

(From: http://www.dec.state.ak.us/air/anpms/as/pm/pm_bckgrd.htm)

103. Yes or No? Does road/airport dust get on customary foods such as fish, and meat drying racks, berries and medicinal plants that people collect alongside roadways?

If electric power is generated in your community by use of a diesel powered generator, there is potential that the emissions from an inefficiently operated or antiquated generator may be impacting the health of the nearby community. Diesel generators are regulated by EPA and ADEC as large point sources which require permits that will ensure that pollution generated is minimized to the greatest extent possible.

If your community's diesel generator is located near where people live, it may be impacting the residents if there are emissions from the stack can either be seen or smelled by those in the residential area. You may wish to request a copy of the generator's permit to see whether it appears to sufficiently protect human health and the environment, or whether there are ways that the emissions could be reduced through greater efficiency in operation, fuel used, or even the stack height.

104. Yes or No? Does your village use a diesel generator? If yes, can you smell it? Is it located upwind from any structures such as schools , homes and/or clinics?

Indoor air quality can diminish during the winter, when windows and doors are kept closed. Newer and remodeled homes are more air-tight than older, less insulated homes, reducing air exchange. Proper air exchange reduces humidity, lessening the conditions that grow black mold. Household cleaners and other air-borne pollutants can cause difficulties breathing. Here are some ideas to improve indoor air quality.

- Occasionally open a window or door to exchange air.
- Use non-toxic cleaners.
- Have mats to catch dirt and don't wear shoes in the house.
- Use bathroom fans to control household humidity.

105. Yes or No? Are there visible signs or odors from mold or mildew inside the homes, schools or other buildings?

Storing toxic chemicals, such as gasoline, cleaning agents, and household pesticides, can cause volatile organic chemicals (VOCs) and toxic air pollutants to be released in to the indoor air environment, where most of the family's members spend their time. By breathing these chemicals, the risks to their health are significantly increased. Community members need to be made aware of which chemicals are pose the most risk to residents of a home and with alternative storage options or replacements available that pose less risk.

Also, warming up combustion engines, such as snow machines, snow blowers, and all-terrain vehicles (also known as ATVs, 4wheelers or Hondas) such their exhaust is taken into the home, through windows, air vents or doorways will significantly reduce the quality and breathability of the indoor air. It is important that everyone is way of the need to prevent exhaust, including carbon monoxide, from being blown or sucked into

homes and offices. Having a carbon monoxide detector in each home is a simple way to help avoid poisoning and loss of life from carbon monoxide, which can neither be seen or smelled, until it is too late. Help your community to understand the behavior changes that can help prevent disease and loss of life.

106. Do people store gas cans in their homes or arctic entry ways? In winter, do people idle (warm up) vehicles or snow machines near doorways or building air vents? Do residents have carbon monoxide alarms in their homes?



Wildfires and volcano emissions can also be significant sources of air pollution in rural Alaska. While these sources are not typically ones that a community can have much control over, it is important that residents are aware of the potential health risks and precautions that they can take when warning of one of these natural events is received.

By helping a community and its leaders to understand how they should respond to these natural events before they occur, it is more likely that the best actions will be taken in the event an air-impacting disaster occurs.

107. Are there natural hazards such as wildfire or volcanoes that impact the air quality in your village? If so, how frequently?

By being aware of what the industrial activities (such as, mineral extraction, shipping, fish processing) are that have operated, are operating or may begin to operate in or near your community you will be able to better understand what the potential impacts are on your air quality. By working with regulating agencies, such as the State of Alaska DEC or the EPA, you may be able to reduce the hazards posed by these industries.

Your community may wish to conduct a source inventory of all the sources of air pollution in your area and calculate the nature and quantities of pollution being emitted, along with the likely risks to human health and the environment. With this information you can increase the awareness with the tribal community of the risks posed by the industrial source and work with regulators to ensure these are as low as possible or with the source for voluntary reductions that are possible.



108. Are industrial activities (mining, oil and gas development, shipping, transportation, fishing, tourism, etc.) activities that are in or near the village increasing air toxins in the environment, people or subsistence foods?



Part 3

Appendices

Appendix A: Examples of Modified Village Environmental Planning Survey Forms

Appendix A: Examples of Modified Village Environmental Planning Survey Forms

Central Peninsula Environmental Planning Survey

ADEC ver 1.0

There may be very serious problems with environmental pollution in our town. We need your help in ranking, or prioritizing, the environmental problems listed below.

This *survey form* is designed to obtain your opinion and input, to develop our towns environmental protection plan. This survey will help us address serious problems with solid waste, hazardous\toxic pollutants and other environmental problems in our town. Outlined below are environmental health problems or environmental issues that need to be addressed.

Each environmental issue listed below needs to be ranked as to how important you believe that issue is. "1" is the lowest ranking or priority, and "5" is the highest ranking or priority.

1. () Hazardous materials and toxic waste cleanup in dump sites and other areas.
2. () Abandoned vehicles, boats and equipment in and around our community.
3. () Erosion and trash left on our beaches, rivers, and lakes (glass, cans, fish nets).
4. () Maintenance and protection of cities landfill (dumpsites).
5. () Construction materials on project sites that are left behind by contractors.
6. () Sanitation and pollution by canneries, docks, construction sites, fisherman, etc.
7. () Pollution in the community by businesses, independents, government.
8. () More clean-up and green-up projects (beautification, plant-a-tree, etc.)
9. () Indoor air pollution, such as carbon monoxide or secondhand cigarette smoke.
10. () Fueloil contaminated soils in or around our community.
11. () Air pollution problems; caused by generators, heavy equipment, refinery plants, boats, woodstoves\incinerators or vehicles in our community.
12. () Animal\fish carcasses left in or around our community (beaches, rivers, lakes).
13. () Trash left in or around our community.
14. () Environmental pollution contaminating subsistence foods and wildlife habitats.
15. () Improper use\disposal of toxic household cleaning products (bleach, ammonia)
16. () Lack of a city recycling program\recycling pick-up services to homes\businesses.
17. () Lack of education for our community on environmental needs and solutions.
18. () Other environmental issues beyond city control, such as ozone depletion.

Please use the space below for comments or if you feel that there are other environmental health issues you feel that need to be addressed.

This survey information is **very** important to us and we thank-you for taking time to fill out this survey. Our goal is to make your community an environmentally safe place to live and raise families and your participation in this survey will greatly assist us in accomplishing that goal.

If you have any questions regarding this survey or any concerns please feel free to call:
AmeriCorps Member: Rebekah Smith based at Kenaitze Indian Tribe 283-4321.

Signed by: _____ Date: _____



Yakutat Tlingit Tribe
508 Max Italia Dr.
Yakutat Alaska, 99689
(907-784-3238 Fax (907)-784-35

Yakutat Environmental Planning Survey Yakutat Tlingit Tribe

There may be very serious environmental problems in our community of Yakutat. We need your help in ranking, or prioritizing, the environmental problems and solutions listed below.

This survey instrument is designed, to obtain your opinion and input, to help develop our community environmental protection plan. This survey will help us address serious problems with solid waste, hazardous/toxic pollutants and other environmental issues that need to be addressed.

Each environmental issue listed below needs to be ranked as to how important you believe the issue is. "1" is the lowest ranking or priority, and "10" is the highest ranking or priority. If you feel that the statement is not a environmental issue enter "0"

Each potential problem and possible solution needs to have a value marked (1-10 or 0) in the space provided

Determining Potential Problems

- 1.() Hazardous materials and toxic waste dumping in Yakutat Landfill.
- 2.() Residual hazardous materials and toxic waste due to DOD (Department of Defense) activity during WWII.
- 3.() Environmental pollution contaminating subsistence foods.
- 4.() Fish waste released into Monti Bay due to Seafood processing.
- 5.() Raw sewage, petroleum and fish waste released in the Boat Harbor area from local and visiting boats.

- 6.() Raw sewage disposal in and/or around the community of Yakutat.
- 7.() Petroleum products released in local waters from local, visiting or passing vessels.
- 8.() Fuel oil contaminated soils in and/or around the community.
- 9.() Abandoned drums or toxic waste in and/or around the community of Yakutat.
- 10.() Abandoned vehicles, boats and equipment in and/or around the community of Yakutat.
- 11.() Trash left in and/or around the community.
- 12.() The environmental issues surrounding Logging near Icy-bay native allotments.
- 13.() The environmental effects that past Logging projects had on the Yakutat area.
- 14.() The possible environmental effects that future Logging might have on the Yakutat area.
- 15.() The possible effects that the growing tourism industry will have on the Yakutat area.
- 16.() The effects that fresh-water sport fishing has on fish habitat and key spawning areas.
- 17.() The effects salt-water sport fishing has on local fish population.
- 18.() The effects that jet boats have when in use on our smaller rivers such as the Situk River.
- 19.() Erosion to the Situk River banks due to local and visiting traffic.
- 20.() Conflicts on the Situk River Between sport and commercial fishermen.
- 21.() The low water level in ophir creek causing depletion of salmon population.
- 22.() The use of off-road vehicles in sensitive areas such as the Situk & Ahrnklin flats.

- 23.() The declining wildlife population in Yakutat and surrounding areas.
- 24.() The depletion and destruction of wildlife habitat through industry and private property development.
- 25.() The increased and increasing population of the sea otter in Yakutat area.
- 26.() Lack of information about wildlife population for making subsistence and commercial decisions.
- 27.() Lack of information and education to promote environmental awareness among the Community.

Determining Possible Solutions

- 28.() The placement of strict regulations on Yakutat community landfill.
- 29.() The placement of an officer to enforce regulations at Yakutat Community Landfill.
- 30.() The gathering of subsistence foods so tissue samples could be taken.
- 31.() The placement of regulations on local and visiting boats to reduce the amount of waste released in local waters.
- 32.() The placement of strict city regulation to reduce the amount of abandoned hazardous materials in and/or around the community of Yakutat..
- 33.() To educate and gather local opinion on the subject of past and future logging issues.
- 34.() To educate and gather local opinion on setting regulation to help preserve the Situk River.
- 35.() To further our education and our support on programs such as the Salmon Enhancement program.
- 36.() Set more stringent regulations on off-road vehicles in delicate areas.
- 37.() Increase our knowledge and education on local population of specific species.
- 38.() Increase environmental awareness by developing a local and school wide environmental curriculum.



NATIVE VILLAGE OF BARROW INUPIAT TRADITIONAL GOVERNMENT

Native Village of Barrow Environmental Assessment Plan Survey

There are very serious problems with environmental pollution in the Village of Barrow. We need your help in ranking, or prioritizing, the environmental problems listed below.

This survey form is designed to obtain your opinion and input to develop an environmental protection plan. This survey will help us address serious problems with solid waste, hazardous / toxic pollutants and other environmental problems in the Native Village of Barrow service area. Outlined below are visible environmental health problems or environmental issues that need to be addressed.

Each environmental issue listed below needs to be ranked as to how important you believe the issue is. "1" is the lowest ranking or priority, and "5" is the highest ranking or priority.

Each issue needs to have a value marked in the box as to how important you think the issue is.

1. () HAZARDOUS MATERIALS AND TOXIC WASTE CLEANUP IN DUMP SITES AND OTHER DESIGNATED AREAS.

2. () ABANDONED VEHICLES AND EQUIPMENT IN AND AROUND THE CITY OF BARROW.

3. () BEACH EROSION / ABANDONED BOATS

4. () BARROW LANDFILL (DUMP SITE)

5. () COMMERCIAL CONSTRUCTION MATERIALS ON PROJECT SITES THAT ARE LEFT BEHIND BY PRIVATE CONTRACTORS.

6. () ABANDONED DRUMS IN THE OLD VILLAGE DUMP SITES

7. () RAW SEWAGE SPILLS IN THE VILLAGE AND RAW SEWAGE DISPOSED AT THE LAGOON (LOCATED NEXT TO THE DUMP SITE)

8. () PIQNIQ CAMP AREA ANNUAL CLEANUP (SUMMER CAMP SITE)

9.() **MILITARY SITES CLEANUP (NARL & DEWLINE SITES)**

10.() **NATURAL GAS DISTRIBUTION LINES LEFT IN TUNDRA BY NARL FROM THE OLD GAS WELL SITE.**

11.() **AIR POLLUTION , DUST AND EMISSION PROBLEMS CAUSED BY HEAVY EQUIPMENT AND CARS IN BARROW SERVICE AREA.**

12.() **ANIMAL CARCASSES LEFT IN PIQNIQ CAMP SITE AND NIQSIIRUAK AREA THAT NEED TO BE REMOVED TO HELP REDUCE OR MINIMIZE AIRBORNE DISEASE IN A CAMPING AND BOAT DOCKING AREAS.**

13.() **SUBSISTENCE BUTCHERING SITES CLEANUP ESPECIALLY DURING THE FALL WHALING TO PREVENT POLAR BEARS FROM GATHERING IN THE SITES.**

Please use the space below for comments or if you feel that there are other environmental health issues you feel that needs to be addressed.

This survey information is very important to us and we thank you for taking time to fill out this survey. Our goal is to make the Native Village of Barrow an environmentally safe place to live and raise families.

Funding for this survey had been made possible through the United States Department of Environmental Agency and Technical assistance through the State of Alaska Department of Environmental Conservation.

If you have any questions regarding the survey or any concerns please feel free to call **Bill Tegoseak at his office (852-4411).**

Prepared by Wildlife dept
approved by DEC of 1997.

Signed by _____
Date _____

Appendix B:
Samples of compiled Village Environmental
Planning Survey results

**Village Environmental Planning Survey
Birch Creek
Result Narrative
August 1998**

A total of 12 environmental planning surveys were submitted to CATG. Of the twelve surveys, nine ranked all 17 questions as #5 (highest priority). The top five priorities carry equal weight of 5. The top five priorities are as follows:

1. Safe Drinking Water
2. Village dump/Landfill
3. Raw sewage spills in the community and improper sewage disposal at the lagoon.
4. Annual clean-up program.
5. Fuel oil contaminated soils in and/or around the village.

Additional comments included the following:

Wood stove safety/cleaning - 2

Check all personal housing for warm comfort and insulating to keep out the cold air.

Everybody should clean up after themselves when camping out along river or lakes.

Would appreciate receiving grant funding. - 5

Recommendations:

1. We are looking at an EPA nonpoint source pollution grant for looking at Birch Creek. This is a two year grant program which can be utilized for improved stream habitats from erosion and sediment controls, stream restoration, improved vegetation. We will be looking at what can be done to enhance the water quality at Birch Creek.
2. Work with the community to re-survey within 6 months as several surveys were submitted with all 17 questions being weighted as 5 (highest priority). Work with village technician and the community to explain what we are trying to achieve with the submitted information.
3. Scheduled meeting with Delma Bohm on 9/29 or 9/30 for looking at environmental concerns in the village. Prioritize drinking water, landfill, raw sewage, and contaminated soils. Will discuss current clean-up program and look at future requirements.
4. Look at ways to utilize smart ash burner (i.e. landfill, clean-up program).

Village Environmental Planning Survey

Village: Birch Creek

Date Submitted to CATG: Aug-98

Total Surveys: 12

Question	Priority Ranking					Rank	Total Responses	Weighted Totals	Total Weight	
	1	2	3	4	5					
1	0	0	0	0	12	1	12	60	5	Safe drinking water
2	1	0	1	0	10	13	12	54	4.5	Abandoned vehicles/boats/equip.
3	0	0	0	1	11	6	12	59	4.916667	River bank erosion
4	0	0	0	0	12	2	12	60	5	Village dump/landfill
5	1	1	0	0	10	16	12	53	4.416667	Construction materials left
6	1	0	1	0	10	14	12	54	4.5	Abandoned drums
7	0	0	0	0	12	3	12	60	5	Raw sewage spills
8	0	0	0	0	12	4	12	60	5	Annual clean-up program
9	0	0	1	0	11	7	12	58	4.833333	Indoor air pollution
10	0	0	0	0	12	5	12	60	5	Fuel oil contaminated soils
11	0	0	1	0	11	8	12	58	4.833333	Air pollution problems
12	1	0	1	0	10	15	12	54	4.5	Dead animals/fish in village
13	1	0	0	0	11	11	12	56	4.666667	Trash left in or around village
14	0	1	0	0	11	9	12	57	4.75	Contaminated subsistence foods
15	2	0	0	0	10	17	12	52	4.333333	Old military sites
16	0	1	0	1	10	12	12	56	4.666667	Hazardous/toxic materials
17	0	1	0	0	11	10	12	57	4.75	Other issues
18										Other

Residents Requesting Survey Results

Name	Address	City	State	Zip
Lawrence James	Box KBC	Fort Yukon	AK	99740-8999
Louis James	Box KBC	Fort Yukon	AK	99740-8999
Eddie James Sr.	Box KBC	Fort Yukon	AK	99740-8999
Delma Bohm	Box KBC	Fort Yukon	AK	99740-8999
Alvin R. Johnson	Box KBC	Fort Yukon	AK	99740-8999

**Village Environmental Planning Survey
Native Village of Fort Yukon
Result Narrative
August 1998**

A total of 207 environmental planning surveys were submitted to the Native Village of Fort Yukon (NVFY). The results were tabulated by NVFY and submitted to CATG. Upon receipt of the tabulated results some # of response discrepancies were noted, i.e. responses ranging from 153 to 207 for each question. A joint group of Vicki NVFY, John Alexander NVFY/Americorps, and Tricia Waggoner, CATG re-tabulated the results. The top five priorities are as follows:

1. Safe Drinking Water
2. Hazardous or toxic materials left in dump sites and/or other areas around the village.
3. Raw sewage spills in the community and improper sewage disposal at the lagoon.
4. Village dump/Landfill
5. Trash left in or around the village.

Additional comments included the following:

1. Dusty Roads
2. Disposal of plastic material - long-term environmental effects (plastic vs. Paper)
3. Raw sewage on ground - need ordinance
4. Leaking UST's
5. Exhaust from Generators
6. Litter Recycling
7. Fluoride in drinking water
8. Litter at dump - batteries, diesel fuel
9. Noise pollution
10. Trash at camps along the river
11. Drums/barrels around village
12. Loose dogs in the community (three dog limit)
13. Demolition of old buildings Outhouses
14. Move the dump
15. Removal of holding tanks Overflowing tanks
16. Dead animals in community
17. Community education on environmental issues
18. Cancer research projects
19. Greywater disposal
20. Trash burning
21. Grave site near H2O house

Recommendations:

1. Work with NVFY and City of Fort Yukon for the development of a new well. The current well is located within the populated center of Fort Yukon. A possibility exists of trading land between NVFY and the City (the boat landing) for placement of a new well. The current problem exists in that the municipal government is not eligible for tribal funding. The City and NVFY need to work out an agreement regarding the water situation.
2. CATG is assisting NVFY on the RAB board. NVFY has also received funding from EPA for conducting site assessments around Fort Yukon. CATG is providing technical assistance on this grant.
3. CATG is working cooperatively with NVFY and City on the siting of the new landfill and closure of the current sub-standard landfill.
4. CATG is assisting NVFY on developing a comprehensive land use plan and tribal codes and ordinances.

Village Environmental Planning Survey

Village:

Date Submitted to CATG:

Question	Priority Ranking					Rank	Total Responses	Weighted Totals	Total Weight	
	1	2	3	4	5					
1	0	1	6	4	173	1	184	901	4.896739	Safe drinking water
2	13	13	56	33	85	16	200	764	3.82	Abandoned vehicles/boats/equip.
3	20	15	29	34	104	15	202	793	3.925743	River bank erosion
4	7	3	8	19	164	4	201	933	4.641791	Village dump/landfill
5	28	22	37	33	70	17	190	665	3.5	Construction materials left
6	7	6	32	32	124	10	201	863	4.293532	Abandoned drums
7	7	4	8	14	169	3	202	940	4.653465	Raw sewage spills
8	3	5	20	25	149	6	202	918	4.544554	Annual clean-up program
9	14	14	34	29	111	14	202	815	4.034653	Indoor air pollution
10	7	5	29	24	137	9	202	885	4.381188	Fuel oil contaminated soils
11	7	8	33	32	122	12	202	860	4.257426	Air pollution problems
12	15	7	22	28	128	13	200	847	4.235	Dead animals/fish in village
13	1	2	15	33	151	5	202	937	4.638614	Trash left in or around village
14	15	8	19	24	136	11	202	864	4.277228	Contaminated subsistence foods
15	5	8	13	28	138	7	192	862	4.489583	Old military sites
16	3	3	5	23	173	2	207	981	4.73913	Hazardous/toxic materials
17	2	5	16	25	105	8	153	685	4.477124	Other issues
18										Other

7 Generations: Addressing Village Environmental Issues for the Future Generations of Rural Alaska

Comments:	Responses
Dusting Roads	14
Disposal of plastic material - longterm environmental (plastic vs. paper)	2
Raw sewage on ground - need ordinance	3
Leaking UST's	1
Exhaust from Generators	3
Litter	5
Recycling	4
Flouride in drinking water	1
Litter at dump - batteries, diesel fuel,	5
Noise pollution	2
Trash at camps along the river	3
Drums/barrels around village	1
Loose dogs in the community (three dog limit)	2
Demolition of old buildings / Outhouses	4
Move the dump	1
Removal of holding tanks / Overflowing tanks	2
Dead animals in community	2
Community education on environmental issues	2
Cancer research projects	1
Graywater disposal	2
Trash burning	1
grave site near H2O house	1

7 Generations: Addressing Village Environmental Issues for the Future Generations of Rural Alaska

NEW STUYAHOK

Priority	Quest #	Issue	# of Surveys	Total Points
# 1	7	RAW SEWAGE SPILLS in the Community	50	248
# 2	4	VILLAGE DUMP/ LANDFILL	50	247
# 3	1	Safe Drinking Water	50	246
# 4	13	Trash left in the Village	50	243
# 5	10	Fuel Oil Contaminated Soil Spills	50	240
# 6	6	Abandoned drums in and / or around the village	50	235
# 6	16	Hazardous or Toxic Materials left in the Dump	50	235
# 7	8	Annual Clean-up	50	217
# 8	12	Dead Animals/Fish	50	212
# 9	14	Contaminated Subsistence Foods	50	210
# 10	5	Construction Materials left behind by Contractors	50	203
# 11	2	Abandoned Vehicles,Boats & Equip left in Village	50	201
# 12	3	Beach and/or river bank erosion	50	170
# 13	11	Air Pollution caused by village electric generator	50	167
# 14	9	Indoor Air Pollution	50	154
# 15	17	Other Environmental issues beyond Village Control	50	153
# 16	15	Old Military Sites Clean-up	50	45
# 17	18	Other ?		50

VILLAGE ENVIRONMENTAL
PLANNING SURVEY (VEPS) TIPS FOR
ARCTIC VILLAGE
RESULTS

AUGUST 30, 1998

BY S. JAMES
EPA TECH.
FOR ARCTIC VILLAGE (NVVTG)

Village Environmental Survey Results
For Arctic Village August 30, 1998

Priorities	Ques. No.	Issue's	No. Of Survey	Survey Results Total Points	Total Points Possible	Survey %
1.	1	Safe Drinking Water	53	265	265	100%
2.	4	Village Dump	53	265	265	100%
3.	7	Raw Sewage Spill	53	259	265	98%
4.	10	Fuel Oil Contamination Soils	53	255	265	96%
5.	8	Annual Clean Up	53	252	265	95%
6.	16	Hazardous or toxic material left in the village	53	252	265	95%
7.	17	Other Envir.Issues beyond village control	53	246	265	93%
8.	13	Trash left around Village	53	244	265	92%
9.	5	Construction material left behind by contractors	53	224	265	84%
10.	14	Indoor air pollution	53	220	265	83%
11.	14	Contamination of subsistence food	53	218	265	82%
12.	11	Air Pollution	53	216	265	81%
13.	2	Abandoned Vehicles	53	201	265	76%
14.	3	Beach or river bank erosion	53	196	265	74%
15.	15	Old Military Site	53	190	265	72%
16.	18	Others 21 Comments (Attached) 1. Please use the space below for comments of if you feel that there are other Environmental health issues that you feel need to be addressed. 24 comments (attached)2. 33 people wants a copy of the survey.	53	90	265	35%

7 Generations: Addressing Village Environmental Issues for the Future Generations of Rural Alaska

1. Native food vs. Western which ones are good for you.
2. Learn about what are safe and cheaper used in your house environment.
3. Environmental safety enforcement program for our community.
4. Outside toilet need improvement.
5. Our school is too old to needs improvement or new school.
6. Establish ordinance to control unnecessary waste to dump site also toxic chemical use, batteries recycle materials out of our dump site.
7. I feel (that the rural environmental health issue is a extremely important issue and that many of the rural village's have substance equipment for keeping the village clean & need tremendous help in getting the village cleaned up & keeping it that way.
8. Our world is very important so we have to take care of our environment.
9. Honey bucket needs to go, villages needs running water & flushing toilets.
10. Water area or drinking water swimming area water during the summer for safe water for all that.
11. I think we should really worry about the dump behind the airport.
12. Dump site, lagoon, trash around the village.
13. No. 2, 4, 5, 6, 7, is a must, needs to clear the problems
14. Need to clean up the airport old equipment's
15. I feel that we need to pay more attention to our drinking water.
16. If items that can be recycled, they should be collected and sent out to be recycled it would be very helpful here. Trash and raw sewage seem to be the biggest problem here.
17. Oil spills, lagoon & dump site needs to be worked on right away to avoid any further contamination.
18. Although we have tried to keep our area clean & in natural state, we still have sickness that people are dying of and we need to pin point the cause of the death that are occurring in the Yukon Flats area.
19. Mostly the safe water need to be recorded for safety reasons, and the dump site needs to be removed the lade and river is very important the future for our subsistence fish & game.
20. Too much pollution in this poor planet.

1. Trash left in Campsite
2. Loose dogs could carry rabies
3. Recycling and get into alternative energy
4. Village lagoon leaking under the piles
5. Save food and less movies and T.V. watching
6. Clean up old site dump, building ect...
7. Burn mountain, military site needs to be removed
8. Test the water at the creek where they go swimming
9. Powerline poles need replacement
10. Fix up the dumpsite
11. Be open for anything important
12. We need flush toilets or new outhouse's
13. Clean up the dump & move it
14. Oil spill and lagoon needs attention as soon as possible
15. Needs more programs, more grants & Money
16. Burned Mountain
17. Recycling and need to get solar system
18. Clean yards & all for a prettier Village
19. Build new outdoor toilet large ones
20. Tribal enforcement for clean environment
21. Pollution from Diesel around our village.

Native Village of Barrow: Environmental Survey Initial Data Analysis

1. HAZARDOUS MATERIALS AND TOXIC WASTE CLEANUP IN DUMP SITES AND OTHER DESIGNATED AREAS

Total Respondants 893

742	5 Highest Priority	83%
63	4	7%
41	3	5%
19	2	2%
28	1 Lowest Priority	3%

2. ABANDONED VEHICLES AND EQUIPMENT IN AND AROUND THE CITY OF BARROW

Total Respondants 855

473	5 Highest Priority	55%
119	4	14%
152	3	18%
64	2	7%
47	1 Lowest Priority	5%

3. BEACH EROSION/ABANDONED BOATS

Total Respondants 856

370	5 Highest Priority	43%
123	4	14%
157	3	18%
72	2	8%
134	1 Lowest Priority	16%

4. BARROW LANDFILL (DUMP SITE)

Total Respondants 863

624	5 Highest Priority	72%
91	4	11%
79	3	9%
39	2	5%
30	1 Lowest Priority	3%

5. COMMERCIAL CONSTRUCTION MATERIALS ON PROJECT SITES THAT ARE LEFT BEHIND BY PRIVATE CONTRACTORS

Total Respondants 845

442	5 Highest Priority	52%
153	4	18%
133	3	16%
52	2	6%
65	1 Lowest Priority	8%

6. ABANDONED DRUMS IN THE OLD VILLAGE

541	5 Highest Priority	63%
139	4	16%
89	3	10%
38	2	4%
49	1 Lowest Priority	6%

Total Respondants 856

7. RAW SEWAGE SPILLS IN THE VILLAGE AND RAW SEWAGE DESPOSED AT THE LAGOON (LOCATED NEXT TO THE DUMP SITE)

721	5 Highest Priority	84%
69	4	8%
28	3	3%
16	2	2%
27	1 Lowest Priority	3%

Total Respondants 861

8. PIGNIO CAMP AREA ANNUAL CLEANUP (SUMMER CAMP SITE)

451	5 Highest Priority	53%
146	4	17%
130	3	15%
61	2	7%
70	1 Lowest Priority	8%

Total Respondants 858

9. MILITARY SITES CLEANUP (NARL & DEWLINE SITES)

484	5 Highest Priority	56%
140	4	16%
114	3	13%
62	2	7%
57	1 Lowest Priority	7%

Total Respondants 857

10. NATURAL GAS DISTRIBUTION LINES LEFT IN TUNDRA BY NARL FROM THE OLD GAS WELL SITE

495	5 Highest Priority	60%
137	4	17%
113	3	14%
43	2	5%
33	1 Lowest Priority	4%

Total Respondants 821

11. AIR POLLUTION DUST AND EMISSION PROBLEMS CAUSED BY HEAVY EQUIPMENT AND CARS IN BARROW SERVICES AREA

504	5 Highest Priority	59%
114	4	13%
121	3	14%
57	2	7%
60	1 Lowest Priority	7%

Total Respondants 856

12. ANIMAL CARCASSES LEFT IN PIQNIQ CAMP SITE AND NIQSIIRUAK AREA THAT NEED TO BE REMOVED TO HELP REDUCE OR MINIMIZE AIRBORNE DISEASE IN A CAMPING AND BOAT DOCKING AREAS

478	5 Highest Priority	56%
142	4	17%
105	3	12%
48	2	6%
80	1 Lowest Priority	9%

Total Respondants 853

13. SUBSISTENCE BUTCHERING SITES CLEANUP ESPECIALLY DURING THE FALL WHALING TO PREVENT POLAR BEARS FROM GATHERING IN THE SITES

508	5 Highest Priority	60%
112	4	13%
88	3	10%
51	2	6%
92	1 Lowest Priority	11%

Total Respondants 851

Appendix C:

Comparison of surveys: Village Environmental Planning Survey and Technical Environmental Survey

Appendix C:

Some issues covered on the sample Village Environmental Planning Survey (VEPS) are not included in the Village Environmental Survey (VES). Below is a table showing how the issues on the two surveys compare.

Issues on Village Environmental Planning Survey (VEPS)	Section covered in Village Environmental Survey (VES)
Safe drinking water.	DRINKING WATER
Abandoned vehicles, boats or other equipment left in and/or around the village	Not covered on VES
Beach and/or river bank erosion	Not covered on VES
Village dump/landfill	SOLID WASTE
Construction materials that are left behind by contractors	Not covered on VES
Abandoned drums in and/or around the village	Not covered on VES
Raw sewage spills in the community and improper sewage disposal at the lagoon	WASTEWATER
Annual clean-up program	SOLID WASTE
Indoor air pollution, such as cigarette/wood stove smoke	AIR
Fuel oil contaminated soils in and/or around the village	TANK FARMS/SOLID WASTE
Air pollution problems caused by the village electric generator, vehicles or smoke from burn barrels in the village	AIR
Dead animals and dead fish left in or around the village	SOLID WASTE
Trash left in or around the village	SOLID WASTE
Contaminated subsistence foods	Not covered on VES
Old military sites cleanup	Not covered on VES
Hazardous or toxic materials left in dump sites and/or other areas around the village	SOLID WASTE
Other environmental issues beyond village control, such as ozone depletion, polluted oceans and/or rivers	Not covered on VES

Appendix D: Environmental Management Workplan for Chenega Bay

ENVIRONMENTAL MANAGEMENT WORKPLAN
FOR
CHENEGA BAY, ALASKA.

Compiled by

**Pete Kompkoff, Tribal Administrator
Chenega Bay IRA Council
Box 8003
Chenega Bay, Alaska 99574
907-573-5132**

This Environmental Management Work Plan is a product of collaborative effort on the Part of the Chenega IRA Council, Chugachmiut, Alaska Department of Environmental Conservation (ADEC) and the United States Environmental protection Agency (EPA).

The Chenega Bay Council is a member of the Nunagpet/Chugachmiut Environmental Protection Consortium (CEPC). In October of 1995 the CEPC, ADEC and EPA signed a Memorandum of Agreement (MOA). That MOA, among other things, established a partnership and the means for the three parties to work together in addressing environmental issues and problems in our village. In the summer of 1995 ADEC completed a survey of our village and developed a list of recommendations for mitigating problems associated with our drinking water, solid waste landfill, hazardous materials, contaminated sights and waste water system.

That information, along with environmental information that has been gained over the past 5 years in our working with the Chugachmiut Environmental Health Program has/or will be compiled into this workplan. This workplan is a set of strategies for mitigating technical problems and matters of compliance. The workplan is done in a simple, easy to use format. Problems are identified by category, i.e. water, along with specific problem that needs a remedy, the challenges to achievement, who is responsible for carrying out the strategy and in what time frame, i.e. *short, medium or long term*. The workplan offers an easy "check list" method of accomplishing desired results. Additional projects can be added at any time with ease. Hopefully, this simple, easy to use method can be adopted by other villages throughout Alaska so they too may improve their environments.

Community: Chenega Bay

<u>Category (Project)</u>	<u>Challenges</u>	<u>Who</u>	<u>Short-Term</u> 6 mos.	<u>Mid-Term</u> 1 year	<u>Long-Term</u> 1 year+
<p><u>Water Treatment</u></p> <ul style="list-style-type: none"> Repair and/or replace the stairs to the raw water intake, as they are an extreme safety hazard. Implement a critical parts inventory that includes spare chlorine addition pumps. Insure that the water treatment building always has electricity and a reliable heat source. Repair and/or replace the turbidity meter to insure proper treatment of the drinking water. Implement a CDRC (chlorine detention rate curve) standard operating procedure, while making water, to insure that finished water always has a chlorine residual. Implement a SOP (standard operating procedure to make an exact chlorine stock solution. Install a mixer on the chlorine vat to protect operator from chlorine gas. Repair and/or replace the floor of the water treatment building. Encourage water treatment operator to become a State of 	<p><u>Project Completed</u></p> <p>Project completed</p> <p>Additional pumps are not on hand.</p> <p>Water treatment center always has electricity & a Monitor heater has been purchased for the building.</p> <p>Turbidity meter replaced</p> <p>No rate curve established to date however w/ the data recorded chlorine detention rate curve can be determined.</p> <p>SOP developed & implemented.</p> <p>With this I am confused, please advise me of the type of mixer.</p> <p>I have authorization to open the water room grant & order necessary materials for the water room. Suggestions from anyone are welcome</p> <p>We sent two people up for the training . and only one</p>	<p>Tom Sherman, Sean Wilson, Darrell Totemoff & Richard Kompkoff</p> <p>Darrell Totemoff hired to oversee water treatment center.</p> <p>Darrell Totemoff</p> <p>Darrell Totemoff</p> <p>Darrell Totemoff</p> <p>Darrell Totemoff</p> <p>Darrell Totemoff</p> <p>Bill Stokes or Brad Ray</p> <p>IRA Council</p> <p>Reschedule Richard</p>	<p>Monitor & make repairs as needed.</p> <p>Additional schooling required to certify operator.</p> <p>Monitor heater will be installed for proper heating.</p> <p>Daily check on chlorine system.</p> <p>Same as above.</p> <p>Daily tests</p> <p>Repair floor & paint inside of the water room building.</p> <p>Send two others for</p>	<p>Continue to monitor status.</p> <p>Replace floor & paint interior of water treatment building.</p> <p>Same as above</p> <p>Daily check on chlorine system.</p> <p>Same as above</p> <p>Daily tests</p> <p>Project should be complete.</p> <p>Find other interested</p>	<p>Somewhere in future a new system needs to be installed.</p> <p>Install new system of using rock salt to system.</p> <p>Keep daily monitoring.</p> <p>Keep the system ongoing.</p> <p>Same as above</p> <p>Daily tests with monthly water samples.</p> <p>Proper maintenance.</p> <p>Make sure waterroom is</p>

Community: Chenega Bay

Projects completed	Challenges	Who	Short-Term 6 mos.	Mid-Term 1 year	Long-Term 1 year+
Alaska Certified Operator.	attended and Richard Kompkoff failed the test.	Kompkoff and Derrell Toternoff for certification	certification.	people to attend training	trained

Community: Chenega Bay

Projects completed	Challenges	Who	Short-Term 6 mos.	Mid-Term 1 year	Long-Term 1 year+
<ul style="list-style-type: none"> Procure grant funding sources to upgrade water treatment system to insure safety of drinking water. 	<p>A \$25,000.00 grant has been granted to Chenega Bay IRA Council</p>	<p>The Grant was in place by previous council</p>	<p>Get materials list for repair of floor, Paint for the pipes and safety equipment for operator.</p>	<p>Project should be complete with heating system installed and new flooring plus stopping the leak in our watertank.</p>	<p>Monitor ne system.</p>
<ul style="list-style-type: none"> Incorporate a master log to reflect all water treatment plant activities. 	<p>I requested the waterroom operator to present a log and graph of chlorine in daily water system.</p>	<p>Darrell Totemoff</p>	<p>Implement procedure developed</p>	<p>Continued monitoring</p>	<p>Same</p>
<ul style="list-style-type: none"> Develop a written SOP for all water treatment plant operations. 	<p>Standard of Procedures already exists and in use.</p>	<p>Darrell Totemoff</p>	<p>Make sure SOP is followed</p>	<p>Continued monitoring</p>	<p>Same</p>
<ul style="list-style-type: none"> Purchase HTH in 6 pound, or smaller, containers to reduce the potential of a serious HAZMAT incident. 	<p>Already in practice</p>	<p>Administrator</p>	<p>Waterroom operator notified When supplies are getting low.</p>	<p>Follow plan</p>	<p>Same</p>
<ul style="list-style-type: none"> Complete all water quality monitoring to insure safety of drinking water. 	<p>Water quality monitoring in progress</p>	<p>IRA Council/Darrell Totemoff</p>	<p>Look at last six months of monitoring</p>	<p>Continued monitoring</p>	<p>Same</p>
<ul style="list-style-type: none"> Complete all drinking water monitoring waivers to reduce costs of water quality monitoring. 	<p>Monitoring waivers are being questioned</p>	<p>Administrator</p>	<p>wavers should be achieved</p>	<p>follow up on wavers.</p>	<p>Continue follow-up</p>
<ul style="list-style-type: none"> Complete a Total Coliform Rule site sampling plan to insure correct sampling procedures for taking the water bacti samples. 	<p>Total Coliform Rule still followed by waterroom operator</p>	<p>Darrell Totemoff</p>	<p>Monitor rule</p>	<p>Review</p>	<p>Continue Review</p>
<ul style="list-style-type: none"> Insure that there is a chlorine residual in drinking water when bacti samples are taken. 	<p>Chlorine residual in drinking water reviewed on a daily basis</p>	<p>Darrell Totemoff</p>	<p>Monitor Chlorine</p>	<p>Continued monitoring</p>	<p>Same</p>
<ul style="list-style-type: none"> Insure that all monthly water 	<p>Samples taken on a regular basis</p>	<p>IRA Administrator</p>	<p>Review forms</p>	<p>Make sure</p>	<p>Same</p>

Community: Chenega Bay

Projects completed	Challenges	Who	Short-Term 6 mos.	Mid-Term 1 year	Long-Term 1 year+
<ul style="list-style-type: none"> quality monitoring forms are correctly/completely filled out and sent in on time. 	and being sent in.			before they are sent in.	consistency exists
<ul style="list-style-type: none"> Hazardous waste building roof put on. 	This project was not complete	Tom Sherman & Sean Wilson		Project complete in one day	Monitor condition of roof
<ul style="list-style-type: none"> Oyster Project 	This project was given back to The Chenega Bay IRA Council one month ago	Mary F. Kompkoff Supervisor Verna Ward, Vern Ward, Larry Evanoff, Roni Vo, Larry Sherman, Jay Wilson, & Steve Ward Maintenance replacing chain		On going project	Check on condition of building
<ul style="list-style-type: none"> Public Safety Garage 	Metal building here & ready to start foundation and building	Tom Sherman, Jay Wilson, Richard Kompkoff, operator Steve Liferman, Administrator overseeing project until Mickey returns Administrator		Should be complete	none
<ul style="list-style-type: none"> Recreational Center 	Building location needs to be decided and building needs to be ordered			Should be complete	none

Community: Chenega Bay

Category (Project)	Challenges	Who	Short-Term 6 mos.	Mid-Term 1 year	Long-Term 1 year+
<p><u>Solid Waste</u></p> <ul style="list-style-type: none"> Use empty fuel oil drums to create a lane to the working face of the landfill to promote proper disposal of solid waste. 	<p>will we be able to get everyone to dump garbage in proper place. Once the drums are in place this will mark area where garbage should go beyond</p>	<p>Tom Sherman, Jarrod Wilson</p>	<p>Drums will be in place by 4/30/97</p>	<p>Richard Kompkoff will make reports to the council on a weekly basis to show progress on the solid waste site</p>	<p>The Solid waste cite will be maintained 3 days a week year round</p>
<ul style="list-style-type: none"> Develop a source separation policy to insure hazardous materials are not discarded in the landfill. 	<p>The Prince William Sound Economic Development Council has granted Chenega with a 10X40 hazardous waste shed that will have 500 gallon waste oil tank a portable bilge vacuuming device to pump oily bilge's on boats. The unit will be located down by the ferry dock.</p>	<p>Pete Kompkoff will oversee project. Included with the facility will be an incinerator to burn waste oil</p>	<p>Haz Mat trailer will be here by July 1997</p>	<p>With this facility we will be able to keep the oily sheen from appearing in our harbor</p>	<p>Tests holes will be dug to check for leachates.</p>
<ul style="list-style-type: none"> Divert the water tank overflow away from the head of the landfill to reduce the generation of landfill leachates. 	<p>A covert will need to be installed across the existing road to divert the water away from the solid waste cite.</p>	<p>Tom Sherman will be in charge of the operation</p>	<p>Project will begin by 5/2/97</p>	<p>We will monitor the effects of diverting the water.</p>	<p>Meines to cover landfill operator and</p>
<ul style="list-style-type: none"> Develop a schedule to periodically place cover material over the exposed solid 	<p>Our landfill operator will maintain and add fill as</p>	<p>Richard Kompkoff has been the</p>	<p>Fill will be added on</p>	<p>Fill will be added once a month to</p>	<p>Meines to cover landfill operator and</p>

Community: _____

Category (Project)	Challenges	Who	Short-Term 6 mos.	Mid-Term 1 year	Long-Term 1 year+
<p>waste.</p> <ul style="list-style-type: none"> Investigate the process to make this solid waste site a permitted facility. 	<p>needed.</p> <p>I would recommend the the landfill remain at its present location. With everyone burning all paper and cardboard boxes and saving all aluminum cans and eliminating all batteries and other hazards from our landfill. I believe it will be maintainable.</p>	<p>operator since November 1996 .</p> <p>The IRA council members should be responsible.</p>	<p>4/29/97</p> <p>Monitor landfill on daily basis</p>	<p>maintain clean appearance</p> <p>After a year from this date 4/29/97 see the changes</p>	<p>laborers will be applied for by the admin.</p> <p>Put up fencing around solid waste site.</p>

Community: Chasneg Bay

<u>Category (Project)</u>	<u>Challenges</u>	<u>Who</u>	<u>Short-Term</u> 6 mos.	<u>Mid-Term</u> 1 year	<u>Long-Term</u> 1 year+
<p><u>Hazardous Materials</u></p> <ul style="list-style-type: none"> Place spilled latex paint in another container for reuse or thinly spread the waste latex paint on the waste sheet rock in the same building. After the paint has completely dried, it can be disposed of in the landfill. 	<p><u>Hazardous Waste collection.</u></p> <p>A collection was done last year. Paint and Batteries were collected and ready to transport by the Veronica K to Whittier or Valdez</p>	<p><u>Donald P. Kompkoff Sr.</u></p> <p>Don is responsible for removing the Paint and Batteries.</p>		<p>Another Collection</p> <p>Household Hazardous waste will be collected again, along with old paint and batteries</p>	<p>Yearly Collection</p> <p>Should have a yearly event to collect hazardous waste</p>

Community: Chenega Bay

<u>Category (Project)</u>	<u>Challenges</u>	<u>Who</u>	<u>Short-Term</u> 6 mos.	<u>Mid-Term</u> 1 year	<u>Long-Term</u> 1 year+
<p><u>Pollution Prevention</u></p> <ul style="list-style-type: none"> Develop a means to recycle or properly dispose of all waste oil generated by the village. 	<p><u>Making sure the new incinerator will burn the waste oil properly</u></p> <p>With the new incinerator being delivered to Chenega this summer we will find out how well it works.</p>	<p><u>The IRA council will decide.</u></p> <p>Council will make decision who will monitor this project. This will create a new job position.</p>	<p><u>Hazard building</u></p> <p>Should be in place</p>	<p>Record all activities</p> <p>A log of activities will be kept to monitor the amount of oil and oily waste collected.</p>	<p>Success or failure</p> <p>After the first years operation we will determine is the project is a viable one.</p>
<ul style="list-style-type: none"> Develop a permanent lead acid battery recycling program. 	<p>This project was started in 1986. A structure was completed and now has batteries collected in it. When the other batteries are delivered to Whittier or Valdez those in the shed will be</p>	<p>Tom Sherman , Dan Cross and Deryl Totemoff completed the building.</p>	<p>Building and program in place.</p>	<p>Maintain Facility</p>	<p>Recycle Batteries</p>

Community: _____

Category (Project)	Challenges	Who	Short-Term 6 mos.	Mid-Term 1 year	Long-Term 1 year+
<ul style="list-style-type: none"> Encourage and assist the village school students in developing an aluminum recycling program. 	<p>disposed as well.</p> <p>The community started assisting the students in October of 1996. The program helped with the students trip to Montana</p>	<p>Chonaga school students</p>	<p>Continued efforts to keep recycling program on going.</p>	<p>Purchase bailer and crusher for aluminum cans and cardboard boxes.</p>	

Community: Chenega Bay

<u>Category (Project)</u>	<u>Challenges</u>	<u>Who</u>	<u>Short-Term</u> 6 mos.	<u>Mid-Term</u> 1 year	<u>Long-Term</u> 1 year+
<p><u>Contaminated Sites</u></p> <ul style="list-style-type: none"> Take immediate action to identify and stop all fuel oil and gasoline leaks. 	<p>No more fuel oil and gasoline leaks exist to my knowledge</p>	<p>All community members should report any fuel leaks to the council office.</p>	<p>Make sure no leaks exist.</p>	<p>Same</p>	<p>Same/Removed</p>
<ul style="list-style-type: none"> Identify all contaminated sites generated by fuel oil spills and tank farm activities. 	<p>Removed Four 10,000 gallon tanks from old tank farm. The plan is to store the 6000 gallon tanks near the Hazardous waste shed. Then dig up contaminated soil were the tanks were and replace with clean material. Old Generator cite also need to cleaned up in the same manner.</p>	<p>The council Administrator.</p>	<p>Develop a remediation plan with ADEC's assistance</p>	<p>Follow remediation plan and begin clean up</p>	<p>none</p>

Community: Chenega Bay, Alaska_

Category (Project)	Challenges	Who	Short-Term 6 mos.	Mid-Term 1 year	Long-Term 1 year+
<ul style="list-style-type: none"> With ADEC assistance, develop a remediation plan (QAPP) that allows all the tank farm owners to remediate their contaminated sites themselves. To prevent further fuel oil contamination of the soil, require a small containment area at the fuel dispensing station to set all Jerry jugs into while filling. 	<p>Contact ADEC office and find out who in that department would assist us to remediate our own contaminated soil.</p> <p>With the new dispensing units established by Alaska Power Systems further fuel contamination should be eliminated</p>	<p>The Council Administrator</p> <p>IRA Council</p>	<p>Implement plan</p> <p>Follow plan</p>	<p>Should be done.</p> <p>Same</p>	<p>none</p>

Appendix E: Village Safe Water Capital Budget Questionnaire

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
VILLAGE SAFE WATER PROGRAM
SFY 2000 CAPITAL BUDGET QUESTIONNAIRE

GENERAL INFORMATION

1. Date: _____
2. Your Name: _____
3. Phone Number: _____
4. Community Contact: _____

5. Title: _____

6. Municipality Represented: _____
Election District: _____
7. Address: _____
8. City: _____ 9. Zip: _____

GENERAL PROJECT INFORMATION

10. Project Title _____
11. Project Type: Water Sewer Solid Waste
12. Description of Project: Specify exactly what this project will build.

DO NOT INDICATE "SEE ATTACHMENT"

7 Generations: Addressing Village Environmental Issues for the Future Generations of Rural Alaska

1. Why project is needed: If a health and/or pollution hazard exists that the project will correct, describe it, and include a letter or report from a health authority confirming the pollution or health hazard does exist. What would be the consequences of not doing this project? **DO NOT INDICATE ASEE ATTACHMENTS**

(300 Points-Public Health and 200 Points-Pollution).

SPECIFIC PROJECT INFORMATION

14. Please estimate the existing population that will benefit from this project. _____

15. Please describe the planning status of this project by checking one of the following statements:

Y__ N__ A. Engineering plans and specifications have been prepared. (100 points)

Y__ N__ B. A feasibility study which addresses the need for this project has been prepared. (50 points)

Y__ N__ C. Comprehensive study or master plan which addresses the need for this project has been prepared. (25 points)

16. Federal Funds. Yes__ No__

Please list the source and amount of confirmed FEDERAL funding available for project: (100 points)

Source: _____ Amount: \$_____ Year: _____

Source: _____ Amount: \$_____ Year: _____

17. How much do you estimate the total project costs will be? _____

18. Considering other available funds, how much will your grant request to ADEC be for this project?
\$ _____

19. Does your community have a:

- a. Trained Water, Wastewater Operator, or Utility Manager ___ Yes ___ No (75 Points)

Name of Operator: _____

Date of Training: _____

Location of Training: _____

Training Sponsor: _____

- b. 1. State Certified Water or Wastewater Operator ___ Yes ___ No (100 points)

Name of Primary Operator: _____

2. State Certified Water or Wastewater Backup Operator (100 points)

Name of Backup Operator: _____

- c. Rules, Fee Schedules or Utility Ordinances (50 Points) ___ Yes ___ No

Date Adopted: (Attach) _____

- d. Please check the item that best describes the effect this project will have on annual operation and maintenance (O & M) costs.

___ The annual operation and maintenance costs have not been estimated.

___ The annual costs have been estimated as \$ _____

and the source of funding will be _____

(50 points)

- e. Are monthly bacteria and turbidity monitoring samples (75 points)

submitted to the State? Yes ___ No ___

- f. Resolution signed by council quorum **attached** identifying (50 points)

project as number one community priority. Yes ___ No ___

Please attach a CLEAN copy of Resolution on White paper!

20. Your project may be composed of more than one segment or phase. If so, please complete the following statements and explain:

- a. At least one phase of the project has already been constructed and this phase is needed to make the project functional. Explain the relationship of this phase to the whole project.

(100 points)

- b. Excluding temporary construction jobs, describe how this project will promote economic development, such as fish processing or tourism. BE SPECIFIC. (100 points)

c. Explain the benefits of constructing this project in conjunction with other projects and funding sources such as ISTEAs, roads and power generators. (50 points)

d. Will this request result in facilities which will serve both the village and school. (150 points)

___ Y ___ N

21. Project costs funded by ***THIS*** grant request are:

Administration	\$ _____
Engineering and Inspection	\$ _____
Construction	\$ _____
Equipment	\$ _____
Other	\$ _____
Total	\$ _____

22. Cost Estimated by:

Name	_____
Agency	_____
Telephone Number	_____
Date of Estimate	_____

G:\vwl\forms\copy00.doc

Appendix F: Class III Landfill Field Inspection Form

CLASS III LANDFILL FIELD INSPECTION FORM

Date of inspection

NAME OF LANDFILL _____

file no.	nnn.15.nnn
----------	------------

PERMIT NUMBER: _____

facility ID	nnnn
-------------	------

LOCATION,
LANDOWNER _____

LATITUDE/LONGITUDE _____

WEATHER/WIND CONDITIONS DURING INSPECTION, PRIOR WEEK _____

LANDFILL CONTACT PERSON _____

MAILING ADDRESS _____

CITY/STATE/ZIP CODE _____

PHONE NUMBER: _____

Fax number: _____

LEAD INSPECTOR _____

Phone number _____

2ND INSPECTOR _____

Phone number _____

AIRPORT DISTANCE _____

General Notes— operating conditions, types of waste observed, community solid waste issues, etc.

Provide a sketch of the facility, showing roads, gates, buildings or workshops, open disposal cells, closed cells, recycle/salvage areas, and septage/sludge or asbestos disposal areas, if applicable. Also, direction(s) of nearest surface water, prevailing winds.

STANDARDS	<i>possible points</i>	SCORE	COMMENTS
1. PERMIT: Current permit or approved plan Expired or no permit/plan approved	10 0		18 AAC 60.200
2. LIMITED ACCESS: Well controlled, fences and gates Access limited, not fully controlled Inadequate effort to control access No effort to control access	5 3 1 0		60.220
3. ACCESS ROADS: All weather, good shape Moderate conditions, alternatives Good weather only, no alternatives Roads non-existent, not maintained	5 3 1 0		60.220
4. SCAVENGING: Site access limited, not allowed Access not limited, not allowed Scavenging not controlled	2 1 0		60.220
5. BURNING WASTES: Burn boxes or cages used, attendant present; or no burning allowed Controlled burning in designated area, attendant present Burning controlled, no attendant Burning uncontrolled, no attendant	5 3 1 0		60.255
6. DEPTH TO HIGH GROUNDWATER: Base of landfill area more than 2 ft above natural ground surface or more than 10 ft from highest groundwater Less than 10 ft	10 0		60.217
7. PLACEMENT IN SURFACE WATER: No contact with water Intermittent contact (storms/breakup) Frequent contact Wastes placed in surface water	15 10 3 0		60.225
9. ANIMAL/VECTOR CONTROL: Fencing with locked gate, waste covered or incinerated, no odors Fencing inadequate, waste covered, animals rarely attracted, or incineration incomplete Fencing inadequate, wastes uncovered, animal problems	5 3 0		60.230

<i>STANDARDS</i>	<i>possible points</i>	<i>SCORE</i>	<i>COMMENTS</i>
10. PROCEDURES TO EXCLUDE HAZARDOUS WASTES: Sign in place at entrance, lists types of wastes and PCBs prohibited No sign present, no visible regulated waste present at site Regulated hazardous waste present	5 3 0		60.240
11. POLLUTED SOILS: Soils not accepted unless they meet a clean up level allowed by regulation Polluted soils accepted that do not meet clean up levels	5 0	-NA-	60.025
12. SETBACK DISTANCES: Minimum 50-ft setback between property boundary and waste unless permitted Setback distance not maintained, waste at edge of property.	5 0		60.233
13. WELLHEAD PROTECTION DISTANCE: Minimum 500-ft setback from drinking water well Less than 500-ft setback	15 0	-NA-	60.040
14. MEDICAL WASTES: Shipped to approved facility or sterilized, decontaminated or incinerated before disposal Infectious wastes present, uncontrolled	5 0	-NA-	60.030
15. DISPOSAL OF VEHICLES OR EQUIPMENT: Drained of all fluids and batteries removed, doesn't attract disease vectors, not a visual nuisance Batteries, fluids, or petroleum products remain in vehicle at time of disposal, does attract disease vectors, is a nuisance	5 0		60.025
16. LITTER: Litter controlled, site cleaned up regularly Blowing litter contained by fencing, but messy No fences or containment, but some effort at clean up No effort at litter control	5 3 1 0		60.345

<i>STANDARDS</i>	<i>possible points</i>	<i>SCORE</i>	<i>COMMENTS</i>
17. COMPACTING REFUSE: When refuse in <2-ft increments Somewhat or partially compacted (when greater than 2-ft layers) No compaction	5 3 0		60.010
18. SIZE OF WORKING FACE: Size meets requirements of permit or approved plan or as small as practicable Size exceeds permit or plan, but waste still in one designated area More than one trench or designated area open Dumping uncontrolled	5 3 1 0		60.343
19. OPERATIONAL COVER: Minimum 6" depth, frequency adequate Minimum 6" depth, frequency inadequate Inadequate frequency and depth No cover applied	5 3 1 0		60.345
20. NUISANCE CONTROL (ODORS, DUST, NOISE, ETC.): Not necessary or applied as needed Occasionally applied, not effective Needed but not applied	5 3 0		60.333
21. INTERMEDIATE COVER (FORMERLY USED AREAS): Minimum of 12 inches, properly graded improperly graded Inadequate or no cover	5 3 0	-NA-	60.243
22. FINAL COVER (CLOSED AREAS): Compacted, minimum 2-ft depth Uncompacted or inadequate depth No final cover	5 3 0	-NA-	60.380
23. FINAL SURFACE GRADING (CLOSED AREAS): Proper grading without visible erosion or ponding of surface water Ponding or erosion present, grading inadequate, Not graded or serious ponding or erosion	5 3 0	-NA-	60.380

<i>STANDARDS</i>	<i>possible points</i>	<i>SCORE</i>	<i>COMMENTS</i>
24. SITE CLOSURE: Site revegetated, permanent markers established, ADEC notified 5 Site not revegetated, no markers, or ADEC not notified 0		-NA-	00.300
25. LANDS RECORD OFFICE CLOSURE NOTICE FILED: Yes 5 No 0		-NA-	00.300
26. SEWAGE SLUDGE DISPOSAL (IF APPLICABLE): Single separate cell or trench, smaller than 4 ft wide and 12 ft deep 5 AND Separate cell(s) lined and immediately covered (6 inches of soil) 5 AND Separated from groundwater by 6 or more feet 5 (5 total points) Separate cell or cells, lime, no cover 3 Separate cell or cells, not disinfected, no cover 2 Not in separate cells, access uncontrolled 0		-NA-	00.300
28. ASBESTOS DISPOSAL (IF APPLICABLE) Done as required in permit conditions, records kept, waste adequately covered 10 Asbestos inadequately covered and/or records not kept 5 Asbestos disposed without a permit 0		-NA-	00.400
29. IN CASE OF DUMP FIRES, IS THERE A FIRE-FIGHTING PROCEDURE AND EQUIPMENT? Excellent effort, equipment on-hand 3 Moderate effort 2 Minimal protection 1 Open burning on working face 0			
30. RECYCLING EFFORTS Active community program in place 2 Limited effort or not maintained 1 No effort at recycling 0			

29. RECORD KEEPING REQUIREMENTS	SCORE	COMMENTS
Permit application	3	60.235
Copy of permit or solid waste management plan	3	60.235
Operating plans for the site	3	60.235
Closure plan	3	60.210
Site visual inspection records or other monitoring data (e.g. water quality, gas monitoring)	3	60.235
Staff training records (e.g. landfill operations, safety)	3	60.235
Records showing how facility meets the Class III requirements	3	60.300
Airport distance, floodplain, and other location restriction documentation	3	60.360
As-built drawings of the landfill design and use	3	60.235
Site closure records and notices, if applicable	3	-NA- 60.360,360

Any individual records not present will be awarded a zero score.

The facility owner must keep records of each item listed above in an easily accessible area, such as the city or tribal office.

TOTAL POINTS POSSIBLE	TOTAL SCORE	COMPLIANCE RATING
		%

This year the facility rated a xx% compliance with the sanitation and safety standards for Class III landfills in Alaska (xx out of 1xx possible points).

Ratings below 80% are generally regarded as unsatisfactory. (Had the record keeping requirements been met, the facility would rate xx% compliance with standards for safe and sanitary solid waste management.)

Appendix G: Louden Tribal Council Resolution to Ban Plastic Bags

Louden Tribal Council
Resolution 98-27

Banishment
Of
Plastic Retail Bags

WHEREAS, Loudon Tribal Council is the federally recognized Tribal governing body for the Tribal members of the village of Galena; and,

WHEREAS, the Loudon Tribal Council recognizes that a need exists to reduce the amount of material going into our landfill and prevent litter from being blown out of the landfill; and,

WHEREAS, we recognize that the appropriate method of doing this is by reduction of the waste stream and not allowing plastic retail bags from entering the waste stream; and,

WHEREAS, the Tribe sees an opportunity to work with the City of Galena and the local retail outlets to replace (through IGAP and other funds) these public nuisances with reusable canvas bags and making available for a fee biodegradable paper bags through the retailers; and,

WHEREAS, we recognize that the authority for this action lies in our ownership of our landfill and our community; and,

NOW THEREFORE BE IT RESOLVED, that the Loudon Tribal Council hereby authorizes the Chief or his designee to work with the City, retailers, Tribal members and general public to banish white plastic bags from our community as soon as an alternative reusable replacement can be made available (targeting November of 1998), and

BE IT FURTHER RESOLVED, that the Loudon Tribal Council Chief or designee is hereby authorized to allocate funds from the IGAP project as an environmental education initiative to purchase reusable canvas bags for the community.

Certification

We hereby certify that this resolution was duly passed and approved by the Loudon Tribal Council on this 9th day of July, 1998 by a vote of ___ yes, ___ no, ___ abstain.

Peter Captain Sr., First Chief

Lily Evans, Secretary / Treasure

Appendix H: Gwich'in Resolution

RESOLUTION #

WHEREAS: The Gwich'in Nation proposes designation of the watershed of the Yukon River Basin as a "Watershed Protection Area";

WHEREAS: The Gwich'in Nation, having been placed in the Yukon Flats within the Yukon River Watershed, by our Creator, do hereby agree to initiate and continue protection and clean up of the Yukon River for the protection of our and future generations for the protection of our way of life, by ensuring that the Yukon River continues to flow with healthy, clean water for generations to come.

WHEREAS: The Yukon River Watershed provides food and drinking water to many communities throughout the Yukon Territory and Alaska;

WHEREAS: All the Gwich'in People who live and depend on the Yukon River Watershed have a common interest in maintaining the integrity of the Yukon River Watershed;

WHEREAS: If the Yukon River Watershed is not effectively managed and protected the consequences would be severe in both the Yukon Territory and Alaska.

THEREFORE BE IT RESOLVED: That the entire Gwich'in Nation agrees to implement the following changes in each village. As the indigenous/aboriginal Gwich'in Nation with inherent rights to self-determination and self-governance we agree to: 1) To eliminate the use of Styrofoam cups and plates and actively seek and utilize alternative green products instead. 2) To encourage all schools to teach our children about the need to protect the Watershed. 3) To create a battery collection site at each landfill and implement a plan for their proper reuse or disposal. 4) To establish fines for polluting and littering. 5) To ban the use of plastic bags in all places of business and stores.

BE IT FURTHER RESOLVED: That the entire Gwich'in Nation agrees to implement the following changes in each village and to hold community meetings to discuss other ways to protect and enhance the Yukon River Watershed. We will discuss issues including: the need to use outboards engines that minimize pollution, how to eliminate household chemicals, the need to encourage stores to supply bulk packaging to reduce waste, composting possibilities, encourage all people to re-use bags and reusable containers, and explore energy alternatives (such as: solar, wind and hydro-electric possibilities).

Moved By: _____ Seconded By: _____

Passed by consensus, this 25th day of June 1998 in Fort Yukon, Alaska.

Appendix I: Technical Environmental Survey–Survey Form

Technical Environmental Survey

Ver. 2.0

Village _____ Date _____

Surveyor & Title _____

This survey is a list of questions about environmental issues that may be present in your village. To the best of your ability and knowledge, answer each question that applies to your village. Most of the questions can be answered with a YES, NO or ? (unknown) response. Many questions will ask for a specific answer that involves time or amounts. Some of the questions will require that you contact the village council or the person(s) or operator responsible for a particular facility, such as the water treatment plant. As necessary, search out the answer to each question using the response "?" only as a last resort. Please note that an exclamation mark **!** is used to show a response that indicates a problem.

General Community Information

Who to ask: city and/or IRA/Traditional Council, school principal

1. Does your village have a city council, IRA/Traditional Council or both?
Which council is responsible for the sanitation services in your village?
 city council IRA/Traditional Council joint ownership/utility board.

!

2. Yes No ? Do the village council(s) regularly collect fees for village services?
If yes, which services? water sewer landfill.
If yes, how does the village pay for the services? _____

3. Yes No ? Does your village council(s) receive technical help from environmental/public health programs or agencies?
If yes, whom? _____

!

4. Yes No ? Are local pollution problems an issue with the village councils?
If yes, what issues? _____



5. Yes No ? Does the village school have an environmental education curriculum?
If yes, which grade levels? _____

6. Yes No ? Does the community have any environmental programs or groups that meet regularly?
If yes, what are they? _____

Drinking Water

Who to ask: water treatment plant operator

7. Yes No ? Is your water treatment plant attached to a washeteria, clinic, or other facility?

8. Does your water treatment plant get water from a:
 well, spring, pond, river or stream?

9. Yes No ? Do most village residents use the water from the water treatment plant?

10. Yes No ? Do most village residents believe the water from the water treatment plant is safe to drink?

If no, why not and where do they get their drinking water? _____

11. Yes No ? Do the village residents feel that the sewage lagoon, landfill, old military site, or tank farm, has an effect on the drinking water supply?

If yes, how? _____

12. Yes No ? Does your village's water treatment plant ever run out of water?

If yes, how often and when? _____

13. Yes No ? Does your village have private wells?

If yes, how many? _____

14. Yes No ? Does your village have piped water to the houses or other buildings?

If yes, to how many? _____

15. Yes No ? Does your village have a flush-haul water system?

If yes, to how many houses or other buildings? _____

16. Yes No ? Does your village use dip buckets to store drinking water?

If yes, how many houses or other buildings use them? _____

17. Yes No ? Does the water treatment plant have operators?

If yes, how many and who? _____

18. Yes No ? Do the water treatment operators get paid?

If yes, how much and for how many hours a day? _____

19. Yes No ? Are the water treatment plant operators certified by the State of Alaska?

If yes, when do the certifications expire? _____

20. Yes No ? Is the water treatment plant locked and secure when the operator is not there?

21. Yes No ? If chlorine and/or fluoride are added to the drinking water at the water treatment plant, does the operator have the chlorine and/or fluoride test kits and chemicals to monitor the water quality?

If yes, are there enough chemicals to last several months? _____

Are the chemicals still effective? (check expiration date) _____

▼

22. Yes No ? If your water treatment center uses surface water, does your operator measure turbidity?
Is the turbidity meter operational? _____

▼

23. Yes No ? Does operator take a free chlorine residual test every day?
If no, how often? _____
What is the chlorine residual today? _____
How many days _____, weeks _____, or months _____ of chlorine supply
does the operator have on hand for use?

24. Yes No ? Does the operator use HTH (chlorine powder) to disinfect the drinking water?
If no, what form of chlorine is used? _____
Where is the HTH stored? _____

25. Yes No ? Is fluoride added to the drinking water?
If yes, how often does the operator do a fluoride test? _____
What is the fluoride level today? _____

▼

26. Yes No ? Does the operator maintain a daily log of the water testing results?
When was the last date it was filled in? _____

▼

27. Yes No ? Are chlorine warning signs posted on the entrance doors to the water treatment plant?

▼

28.	Yes	No	?	Is there a chlorine respirator available for the water treatment operator?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does he/she use the respirator when handling HTH (chlorine)?
<hr/>				

▼

29.	Yes	No	?	Are there any pieces of equipment in the washeteria and/or water treatment plant broken or not operating?
If yes, what are they? <hr/>				

▼

30.	Yes	No	?	Does the operator have a critical spare parts inventory?
Are all of the parts there? <hr/>				

▼

31.	Yes	No	?	Is the washeteria and/or water treatment plant clean and orderly?
If no, describe: <hr/>				
<hr/>				

▼

32.	Yes	No	?	Does the water treatment plant have a written Standing Operating Procedure (SOP) and master log?
-----	-----	----	---	--

▼

33.	Yes	No	?	Does the washeteria and/or water treatment plant have safety defects (i.e. such as bare electrical wires, split or cracked chemical containers)?
If yes, what are they? <hr/>				

34.	What are your village's main complaints with the washeteria and/or water treatment plant?
<hr/>	
<hr/>	

Wastewater

Who to ask: wastewater operator, health aides, public health nurse

▼

35. Yes No ? Have there ever been outbreaks of sewage-related diseases in your village?

If yes, what diseases and when? _____

▼

36. Yes No ? Are health aides told when there is a sewage spill in the village?

37. Yes No ? Does the village have a sewage lagoon?

If yes, how far is it from the village? _____

▼

38. Yes No ? Does the sewage lagoon ever leak or overflow?

If yes, why and when? _____

39. Yes No ? Does your village have a piped sewer?

If yes, to how many houses or other buildings? _____

40. Yes No ? Does your village have septic tank systems?

If yes, to how many houses? _____

41. Yes No ? Does your village have sewage holding tanks (flush-haul system)?

If yes, to how many houses or other buildings? _____

42. Yes No ? Does your village use privies or outhouses?

If yes, how many houses or other buildings? _____

43. Yes No ? Does your village use honey buckets?

If yes, how many houses or other buildings? _____



44. Yes No ? Does your village have an operating honey bucket haul or flush-haul system?



45. Yes No ? Is any of the equipment for the honey bucket haul or flush-haul system broken?

If yes, for how long? _____



46. Yes No ? Is the honey bucket haul or flush-haul system operated safely so that no sewage is spilled on the ground in the village?



47. Yes No ? Do all village residents properly dispose of their honey buckets?



48. Yes No ? Do the honey bucket haul or flush-haul operators get paid?

If yes, how much and for how many hours per day? _____



49. Yes No ? Do the honey bucket haul or flush-haul operators have a place to clean up and change out of their work clothes before going home?

If yes, where? _____



50. Yes No ? Does the village school actively promote safe sanitation methods and/or have a sanitation curriculum?

If yes, what grades? _____



51. Yes No ? Do the health aides assist the village school with sanitation presentations?

Solid Waste

Who to ask: landfill operator, village store owner, village school principal, power plant operator

52. How far is the landfill from the airstrip?

53. How far is the landfill from the village?

54. Yes No ? Is the landfill accessible all year round?

55. Yes No ? Does the landfill have any type of heavy equipment to compact or cover the solid waste?

If yes, what kind? _____
Does the equipment work? _____

56. Yes No ? Is the trash being covered or buried?

How often? _____
What is the material used to cover the trash? _____

57. Yes No ? Does the village landfill have an operator?

If yes, who? _____
How much and for how many hours a day is the operator paid?

58. Yes No ? Does the village landfill have a fence around it?

If yes, is it in good condition? _____

▼

59.	Yes	No	?	Is access to the landfill controlled?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

▼

60.	Yes	No	?	Is uncontrolled open burning allowed at the landfill?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

61.	Yes	No	?	Is there a burn box at the landfill?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, who operates it? _____

62.	Yes	No	?	Are there other burn boxes in the village (such as the village school or store)?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, who operates them? _____

▼

63.	Yes	No	?	Are the health clinic medical wastes and/or veterinarian wastes disposed of at the landfill?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If no, how and/or where are they disposed? _____

▼

64.	Yes	No	?	Is there windblown litter around the landfill?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, how much and how far does it go? _____

▼

65.	Yes	No	?	Is there a lot of plastic in the windblown litter?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, what is the main color? _____

▼

66.	Yes	No	?	Do the village stores recycle the white plastic shopping bags or offer rebates (money back) for reuse of the white plastic bags?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, which store(s)? _____

▼

67. Yes No ? Do the village stores offer paper or canvas bags as an alternative to plastic bags?
If yes, which stores? _____

▼

68. Yes No ? Does the landfill have uncrushed tin cans from the school lunch program?

▼

69. Yes No ? Does the landfill have a lot of aluminum cans?

▼

70. Yes No ? Are aluminum cans being recycled?
If yes, by whom? _____

▼

71. Yes No ? Does the landfill have cardboard or other paper wastes from the village store?
If yes, in general terms, how much? _____

▼

72. Yes No ? Is there a "No Dumping of Hazardous Materials" warning sign at the landfill entrance?

▼

73. Yes No ? During the inspection of the landfill, were paint cans, used oil containers, lead-acid batteries or other hazardous materials observed?
If yes, in general terms, what and how many? _____

▼

74. Yes No ? Is there a specific place to put lead-acid batteries at the landfill?
If yes, where and how are the batteries contained? _____

7 Generations: Addressing Village Environmental Issues for the Future Generations of Rural Alaska

▼

75. Yes No ? Are lead-acid batteries being recycled?
If yes, by whom? _____

▼

76. Yes No ? Is there a place at the landfill or in the village for residents to put used oil?
If yes, where? _____

▼

77. Yes No ? Is used oil being recycled?
If yes, by whom? _____

▼

78. Yes No ? Is the power plant operator correctly disposing of the used oil produced by the electrical generator?
If yes, how? _____

If no, what is happening to the used oil? _____

▼

79. Yes No ? Is there a village awareness of the importance of preventing fuel oil spills at homes?

▼

80. Yes No ? Do the village "gas stations" have something to put the gas cans in while they are being filled?

▼

81. Yes No ? Is there a community salvage area at the landfill or at some other location in the village?
If yes, where? _____

82. Yes No ? Is there water in the landfill most of the time? Or, is the landfill in a tundra pond?

83. Yes No ? Is the landfill producing leachate, or runoff, that stains the ground downstream of the landfill?

84. Yes No ? Are there animals eating the garbage at the landfill?

If yes, what kinds of animals? _____

85. Yes No ? Are there other landfills (including old ones) in and/or around the village?

If yes, who operated them and where are they?

Are any still in use? _____

86. Yes No ? Does the village landfill have a DEC Class III Landfill Permit?

87. Yes No ? Does the village have an annual clean-up program?

If yes, are the recyclables separated from the other trash? _____

88. How many tank farms are there in the village and who owns them?

89. Which tank farms have secondary containment and which do not?

Fuel Tank Farms

Who to ask: tank farm owners/operators

90. Yes No ? Do any of the tank farm owners have a written plan to follow in case there is a fuel spill?
Who does and does not? _____

91. Yes No ? Do any of the tank farms have active or ongoing leaks of any size?
If yes, which ones? _____

Is the leak from a tank or a pipe? _____

92. Yes No ? Do all of the tank farms have fuel spill clean up materials on hand?
If yes, which ones and in general terms, how much?

93. Yes No ? Were there any tank farm fuel spills of more than 55 gallons in the last five years?
If yes, which ones and what was the cause of the spill?

94. Yes No ? Have the pipeline(s) used to fill the tank farms from the barge or aircraft been tested for leaks?
If yes, when? _____

▼

95. Yes No ? Do all of the tanks have labels on them identifying what is inside?
If no, which tanks need labels? _____

▼

96. Yes No ? Do all of the tank farms have signs on them with the telephone numbers of people to contact in case of a fuel spill?
If no, which tank farms need signs? _____

▼

97. Yes No ? Have there been fuel spills in the past that have not been cleaned up that are of concern to village residents?
If yes, where? _____

Air

Who to ask: village residents

▼

98.	Yes	No	?	Can smoke from the burning garbage at the landfill be smelled in the village?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

▼

99.	Yes	No	?	Do village residents use burn barrels?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

▼

100.	Yes	No	?	Is burning plastic the main odor smelled when garbage is burned?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

▼

101.	Yes	No	?	Do village residents consider cigarette smoke and wood stove smoke as sources of indoor air pollution?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

▼

102.	Yes	No	?	Do village residents use wood stoves to heat their homes?
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, how many houses? _____

Appendix J: Assessment of Management Capacity Indicators

Appendix J:

Assessment of Management Capacity Indicators

Rural Utility Business Advisor (RUBA) Program
Division of Community & Regional Affairs
Commerce, State of Alaska
2008

Introduction

The (community name) report was completed by the Rural Utility Business Advisor Program (your name) as a requirement for a projected grant-funded sanitation project. The report was completed with the voluntary assistance of the utility and based on information utility staff provided to the RUBA program. Specific documents provided by the utility staff are in the regional office for viewing if requested.

The goal of the RUBA Program is to help small communities implement utility management practices that will improve the utility's ability to provide safe drinking water to their communities on a sustainable basis. The RUBA Assessment evaluates essential and sustainable indicators necessary for the managerial and financial health of the utility. These indicators are organized under the following sections:

- Utility Finance
- Accounting Systems
- Tax Problems
- Personnel System
- Organizational Management
- Operation of Utility

Essential Indicators identify policies and practices that are critical to the short-term operation of a utility. *Sustainable Indicators* identify policies and practices that make a utility cost-effective to operate and increase the likelihood of long-term financial success.

The Major Recommendations are limited to those items needed to meet deficient essential indicators. Only the essential indicators are required to be met under the grant conditions.

The (name of operator) operates and manages the following utility services: _____.

Capacity Indicators

On (date), 2008, RUBA staff (names) met with (names) staff to complete a RUBA Assessment of Management. City staff provided documentation supporting the conclusions in this report. Specific documents used in this report will be provided upon request.

Utility Finance

Essential Indicators

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	All revenue and expenses for the utility are listed in the utility budget.
<input type="checkbox"/>	<input type="checkbox"/>	The utility has adopted a balanced realistic budget.
<input type="checkbox"/>	<input type="checkbox"/>	Monthly financial reports are prepared and submitted to the policy making body.
<input type="checkbox"/>	<input type="checkbox"/>	The utility is current paying all water/wastewater electric bills.
<input type="checkbox"/>	<input type="checkbox"/>	The utility has on hand a year's adequate fuel supply or it has a financial plan to purchase an adequate supply.
<input type="checkbox"/>	<input type="checkbox"/>	The utility is receiving revenues (user fees or other sources) sufficient to cover operating expenses.

Sustainable Indicators

<input type="checkbox"/>	<input type="checkbox"/>	The utility is receiving revenues (user fees or other sources) sufficient to cover operating expenses and Repair & Replacement (R&R) costs.
<input type="checkbox"/>	<input type="checkbox"/>	YTD revenues are at a level equal to or above those budgeted.
<input type="checkbox"/>	<input type="checkbox"/>	YTD expenditures are at a level equal to or below those budgeted.
<input type="checkbox"/>	<input type="checkbox"/>	A monthly manager's report is prepared.
<input type="checkbox"/>	<input type="checkbox"/>	Budget amendments are completed and adopted as necessary.

Insert Comments Here:

Accounting Systems

Essential Indicators

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	The utility has adopted a collection policy and actively follows it.
<input type="checkbox"/>	<input type="checkbox"/>	The utility bills customers on a regular basis.
<input type="checkbox"/>	<input type="checkbox"/>	An accounts receivable system is in place which tracks customers and reports past due accounts and amounts.
<input type="checkbox"/>	<input type="checkbox"/>	An accounts payable system is in place.
<input type="checkbox"/>	<input type="checkbox"/>	The payroll system correctly calculates payroll and keeps records.
<input type="checkbox"/>	<input type="checkbox"/>	A cash receipt system is in place that records incoming money and what it was for.
<input type="checkbox"/>	<input type="checkbox"/>	The utility has a cash disbursement system that records how money was spent.

Sustainable Indicators

<input type="checkbox"/>	<input type="checkbox"/>	A chart of accounts is used that identifies categories in a reasonable, usable manner.
<input type="checkbox"/>	<input type="checkbox"/>	Monthly bank reconciliations have been completed for all utility accounts.
<input type="checkbox"/>	<input type="checkbox"/>	The utility has a purchasing system that requires approval prior to purchase, and the approval process compares proposed purchases to budgeted amounts.

Insert Comments Here:

Tax Problems

Essential Indicators

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>		The utility has a system to accurately calculate, track, and report payroll tax liabilities.
<input type="checkbox"/>	<input type="checkbox"/>		The utility is current on filing federal and state tax reports.
<input type="checkbox"/>	<input type="checkbox"/>		The utility is current on making federal and state tax deposits.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If there are any past tax liabilities, a repayment agreement has been signed and repayments are current.

Insert Comments Here:

Personnel System

Essential Indicators

Yes No

The utility has a posted workers compensation insurance policy in effect.

Sustainable Indicators

- The utility has adopted and uses a Personnel Policy, which has been reviewed by an attorney, AML, or DCCED for topics and language.
- The utility has adequate written job descriptions for all positions.
- The utility has adopted and follows a written personnel evaluation process that ties the job description to the evaluation.
- The utility has an adequate written hiring process.
- The utility has personnel folders on every employee that contain at least: I-9, Job Application and Letter of Acceptance.
- The utility has a probationary period for new hires that includes orientation, job-training/oversight, and evaluations.
- The utility provides training opportunities to staff as needed and available.

Insert Comments Here

Organizational Management

Essential Indicators

Yes No

The entity that owns the utility is known and the entity that will operate the utility is set.

The policy making body is active in policy making of the utility.

The policy making body enforces utility policy.

The utility has an adequately trained manager.

The utility has an adequately trained bookkeeper.

The utility has an adequately trained operator(s).

The utility has adopted the necessary ordinances (or rules and regulations) necessary to give it the authority to operate.

Sustainable Indicators

- The utility has adopted an organizational chart that reflects the current structure.
- The policy making body meets as required.
- The utility complies with the open meeting act for all meetings.

Insert Comments Here

Operation of Utility

Essential Indicators

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	The utility operator(s) are actively working towards necessary certification.
<input type="checkbox"/>	<input type="checkbox"/>	The utility has a preventative maintenance plan developed for the existing sanitation facilities.

Sustainable Indicators

<input type="checkbox"/>	<input type="checkbox"/>	The manager receives a monthly O&M report from the utility operator and routinely “spot checks” the facilities to see that the maintenance items are being completed.
<input type="checkbox"/>	<input type="checkbox"/>	The utility has a safety manual and holds safety meetings.
<input type="checkbox"/>	<input type="checkbox"/>	Utility facilities have not suffered any major problems/outages due to management issues that are still unresolved.
<input type="checkbox"/>	<input type="checkbox"/>	The utility is operating at the level of service that was proposed.
<input type="checkbox"/>	<input type="checkbox"/>	The operator provides status reports to the manager on a routine basis.
<input type="checkbox"/>	<input type="checkbox"/>	The utility has completed and distributed its <u>Consumer Confidence Report (CCR)</u> .
<input type="checkbox"/>	<input type="checkbox"/>	The utility meets all required regulations (is not on the <u>Significant Non-Compliance (SNC)</u> list).
<input type="checkbox"/>	<input type="checkbox"/>	The utility maintains an inventory control list.
<input type="checkbox"/>	<input type="checkbox"/>	The utility maintains a critical spare parts list.

Insert Comments Here:

Major Recommendations

The (utility name) has not met all of the essential capacity indicators. In order to meet them, the utility must take the following actions:

- ???

Conclusion and Next Step

In addition to the Major Recommendations, the (utility name) can work to improve Sustainable Indicators in the areas of “Utility Finance,” “Tax Problems,” “Personnel System,” “Organizational Management,” and “Operation of Utility.”

It is recommended that:

- ???

By implementing the above recommendations, the (utility) will put itself into position to better meet unanticipated financial costs and ensure that employees are aware of their conditions of employment. The (names) staff was open and helpful with providing information to complete this assessment. They realize the importance of community health, financial stability, effective utility management practice and sustainability.

RUBA staff is available to provide assistance for any sustainable capacity indicators that are not being met.

Appendix K: Energy Tips

2009

ENERGY SAVERS TIPS FOR RURAL ALASKA



{ Ways to **Save Energy** in your home



SAVING



SAVING ENERGY AT HOME

With increasing energy prices across rural Alaska, we need to focus on what can be done in the short term, and in the long term, to lower energy bills. Long term goals, such as developing sustainable community energy plans and increased investment in renewable resources, are necessary, but we also need to focus on what we can do in the short term.

According to Steve Haagenson, Executive Director of the Alaska Energy Authority, rural Alaskan residents spend up to 60% of their income on energy costs. Within this, 81% of these costs are attributed to home heating and electricity usage. By addressing heating and electricity usage first, we can quickly lower energy costs and save money.

This booklet has been developed specifically for rural Alaska and has tips that can be acted upon now, at little or no cost, to lower energy consumption and thus lower energy bills. However, creating an energy-efficient lifestyle and home is not a change that can be made overnight. First, we need to change behaviors on how we conserve energy. This can be done through a series of small changes made every day and in every part of our homes. The potential for large savings in energy costs is real.

ENERGY EFFICIENCY MEANS:

- Getting the most use out of each unit of energy you purchase
- Using energy wisely
- Eliminating the ways your home wastes energy

MAKING YOUR HOME MORE EFFICIENT WILL:

- Make it more comfortable
- Make it safer
- Save you money



YOUR ENERGY BILL:

WHERE DOES THE MONEY GO?

The average rural Alaskan family's annual energy bill was estimated at \$11,840 in 2008 according to Alaska Energy Authority staff. But energy bills don't come itemized showing you which appliances and systems use the most energy.

ANNUAL RURAL ALASKA HOUSEHOLD ENERGY COSTS %

Space Heating:	38%
Water Heating:	15%
Lighting:	13%
Electronics:	8%
Refrigeration:	7%
Cooking:	7%
Clothes Dryers and Dishwashers:	7%
Computers:	1%
Other:	5%
TOTAL:	100%

Source: Village Appliance Usage Spread Sheet, October 2008. University of Alaska Fairbanks' Cooperative Extension Service (UAF CES).

LIGHTING

For rural Alaskans, about **13%** of energy bills are spent on lighting in a home.

There's an easy way to reduce that: switching to **COMPACT FLORESCENT (CFL) BULBS**. Start by deciding which lights you use most often – and change those first. Any light you use more than two hours per day is a good candidate for a CFL.

INSTEAD OF THIS:



USE THIS:



COMPACT FLORESCENT BULBS:

- **Make more light with less electricity.** A CFL can turn one watt of electricity into 100 lumens of light; regular light bulbs create just 15 lumens of light with one watt of electricity.
- **Last longer.** CFLs can last up to 10,000 hours. That's 10 times as long as an incandescent bulb.
- **Save Money.** CFLs cost more than regular bulbs, but they save so much electricity that you can save \$20 at four hours of use a day per year for every 60-watt bulb you replace with a CFL.



WHAT YOU CAN DO:

TURN OFF THE LIGHTS

Why? One 100-watt bulb left on overnight for 8 hours costs \$87.60 per year.

SWITCH TO COMPACT FLORESCENT BULBS

Why? According to the U.S. Environmental Protection Agency, the typical American household can save \$80 per year by switching to CFLs. In rural Alaska, where costs are nearly three times that of the Lower 48, the savings can really add up.

GET THE RIGHT BULB

Why? Bulbs on dimmer switches, three way sockets, and specialty lamps and fixtures need special CFLs.

BUY ENERGY STAR LIGHT FIXTURES AND LAMPS

Why? They use one quarter of the energy traditional fixtures use.

KEEP LIGHTS CLEAN

Why? Dust can cut a bulb's light output by 25 percent.

DISPOSING CFLS- Like paint, batteries, and thermostats, CFLs should be disposed of properly. **DO NOT THROW AWAY IN YOUR HOUSEHOLD TRASH.** If possible, deposit at a hazardous waste facility in your community.

USE LED CHRISTMAS LIGHTS

Why? They use 90% less energy, and are 10 times brighter than standard Christmas lights. They also last longer. Through the long, dark Alaskan winters, the cost of leaving these lights on can add up.

Source for cost numbers: Village Appliance Usage Spread Sheet, October 2008. UAF CES.

WATER

The water heater is the **2nd** largest energy user in most homes.

The water heater accounts for 15% of your energy bill, second only to your home's space heating system, according to UAF CES.

One reason: you use a lot of water. Another reason: You actually pay twice for water. If on a municipal system, you pay one bill for the cost of the water itself; if you have your own well, you pay for the electrical cost. Then you pay a second bill for the cost of heating that water.

Reducing the amount of hot water you use will save money on both bills.

TURNING DOWN THE TEMPERATURE

Set the thermostat on your water heater to 120°F. It's one of the easiest ways to save. The change:

- **Saves energy.** Water is usually heated to 140°F; turning it back will save between 6 percent and 10 percent on your energy bill, according to the U.S. Department of Energy.
- **Prevents scalding** from hotter water.
- **Slows buildup** of minerals and corrosion in the water heater and in the pipes.

Only leave your water heater thermostat at 140°F if you have an older dishwasher with no booster heater. Consult your owner's manual or call the manufacturer to see if yours has a booster heater.

If you will be on vacation, turn down the thermostat even further. If there is no risk of freezing, you can turn it off completely when you will be away for several days.



WHAT YOU CAN DO:

INSTALL LOW-FLOW SHOWERHEADS

Why? They use one-third to one-half the water that regular showerheads use.

TURN THE WATER HEATER THERMOSTAT DOWN, TO 120°F

Why? You will save money and save yourself from scalding accidents.

BUY A WATER HEATER THAT FITS YOUR NEEDS

Why? If you buy a new water heater that is too big, you will pay to heat up water you don't need. That's a waste of both energy and money.

TAKE SHORT SHOWERS

Why? They use less hot water than baths.

FIX LEAKY WATER FAUCETS

Why? Thirty drops of water per minute can waste up to 19 gallons of water per month.

INSTALL LOW-FLOW AERATORS ON THE FAUCETS

Why? They reduce the amount of water that flows from your faucet, saving both water and energy.

INSULATE YOUR HOT WATER HEATER

Why? If manufacturer recommends it, install an insulating blanket.

LAUNDRY

Washing machines use two types of resources. They need electricity to power their motors and they need water to do their work.

Some machines are far more efficient at using water and electricity. To find the most efficient machines, look for the Energy Star label. Conventional washers can use 40 gallons of water on just one load of laundry. But Energy Star-rated washers can use fewer than 10 gallons of water. They use less energy, too.

Don't look for the same designation with clothes dryers, though. Most dryers use similar amounts of energy, so the program does not certify them.



ENERGY STAR WASHING MACHINES:

- Cut utility bills by an average of \$150 per year. That's a total of \$750 saved over 5 years, less than half the life span of a washing machine (UAF CES).
- Save an average of 7,000 gallons of water each year, according to the Department of Energy. For Alaskans, savings could be twice this amount.
- Come in two designs: front-load washing machines and redesigned top-loading machines. Neither have a central agitator.
- Have a faster spin speed, to remove more water from your clothes. That helps clothes dry faster.

WHAT YOU CAN DO:

Hand Washing Clothes

WASH IN COOL TO WARM WATER

Why? Hot water costs much more

USE WASHING TUBS

Why? This keeps the hot water from running.

RINSE CLOTHES IN FULL SINKS OR TUBS

Why? This also keep the hot water from running.

DRY OUTDOORS IF POSSIBLE

Why? Lowering indoor humidity that may cause mold and other health issues. Sunlight is free!

WRING CLOTHES BEFORE HANGING

Why? This removes as much water as possible for faster drying and lowers the humidity in the house, if drying indoors.

Machine Washing Clothes

WASH AND DRY ONLY FULL LOADS

Why? The machines use roughly the same amount of water and energy to wash one item as they do to wash a full load.

SEPARATE FAST-DRYING CLOTHES FROM SLOW-DRYING ONES

Why? It helps you use the dryer only as long as you need to.

CLEAN THE LINT FILTER

Why? Clogged filters can prevent your dryer from doing its job.

CHOOSE ENERGY STAR WASHING MACHINES AND DRYERS

Why? They use less than half the water and energy of standard machines.

USE HIGH-SPEED SPIN CYCLES IN WASHERS

Why? They extract more water, so your laundry won't need to dry as long.

KITCHEN

In rural areas it costs \$400 a year to run a fridge and \$50 a year to power a coffee maker according to the UAF Cooperative Extension Service. An electric space heater will set you back \$600 a year.

Kitchens are home to appliances that use a lot of electricity, like the fridge, and ones that use a lot of water, like the dishwasher.

The kitchen has many high use appliances, so using them as efficiently as possible will help your savings add up quickly!

REFRIGERATORS: A BIG PART OF YOUR ENERGY BILL

The fridge accounts for almost 7 percent of the average home's utility bill, according to the U.S. Department of Energy.

Older models cost a lot more to run. Fridges made before 1980 cost \$150 more a year to operate than new Energy Star models, according to the Department of Energy. Since this is a National average, the potential for Alaskans to save is much greater.

To save energy:

- Stick to the right temperature. Keep your fridge between 36° and 38°F. Set your freezer between 0° and 5°F.
- Keep the freezer full. It works more efficiently full than empty.
- Defrost manual-defrost models to keep them efficient.
- If you have a second fridge, unplug it. It can cost between \$200 and \$400 a year to operate, according to UAF Cooperative Extension Service.
- When buying a new fridge, choose an Energy Star model. It will be at least 15 percent more efficient than regular models.
- Check door seals, clean regularly, and if they are loose replace them. Check by closing a dollar bill in a door, and if it comes out easily your gasket should be replaced.

WHAT YOU CAN DO:

IF WASHING DISHES BY HAND, DON'T LET THE WATER RUN

Why? You will save money on heating water, and conserve a lot a water.

SCRAPE DISHES INSTEAD OF PRE-RINSING THEM

Why? If doing dishes by hand, this will keep the water cleaner longer, thus saving energy from not having to keep refilling the sink.

USE YOUR DISHWASHER IF YOU HAVE ONE

Why? You can save 5,000 gallons of water each year and \$120 in utility costs by using a dishwasher instead of washing dishes by hand, according to Energy Star.

WASH ONLY FULL LOADS IN DISHWASHERS

Why? It costs exactly the same to wash one dish as it does to wash a full load of dishes.

CHECK YOUR REFRIGERATOR TEMPERATURE

Why? You lose money if you keep it too cold. To check, put one thermometer in a glass of water in the center of the refrigerator and another between packages in the freezer. Read them after 24 hours. Temperature should be between 36 and 38 degrees Fahrenheit.

USE THE AIR-DRY OPTION ON DISHWASHERS

Why? It saves energy and keeps the machine from using a heating element to bake your dishes dry.

USE MICROWAVES AND CROCKPOTS TO COOK SMALL MEALS

Why? They use less energy than the stove or oven.

KEEP THE INSIDE OF YOUR MICROWAVE CLEAN

Why? It improves the efficiency of your microwave.

USE LIDS WHEN COOKING

Why? They keep steam in and help food cook more quickly, which saves energy.

APPLIANCES

Each of your appliances have two price tags. The first is the price you pay for it at the store. The second is the price you pay to run that appliance over its lifetime.

Over time, the cost of running your appliance will add up. Usually, this price is higher than the actual price tag of the appliance at the store.

Choosing the most energy-efficient appliances will help reduce operating costs. A yellow EnergyGuide label on each appliance will show you how much energy a model will use. But also look for the Energy Star symbol. It's only on appliances that meet strict energy efficiency standards.

ENERGY STAR: A LABEL FOR SAVINGS

Products with the Energy Star label meet strict energy-efficiency guidelines set by the U.S. Environmental Protection Agency and the U.S. Department of Energy.

Before you go to the store to buy a new appliance, see if the program certifies the type of machine you need. It certifies products including:

- Clothes Washers
- Humidifiers
- Dishwashers
- Refrigerators
- DVD Players
- Heating Equipment
- Room Air Conditioners
- Home Audio Equipment
- Freezers
- Televisions
- Light Fixtures
- Computers and Printers

WHAT YOU CAN DO:

WHEN POSSIBLE BUY ENERGY STAR APPLIANCES

Why? They are more efficient than other appliances – and they will cost less to operate.

THINK ABOUT SHAPE

Why? It matters. Fridges with freezers on top are most efficient. Front-loading washers are more efficient than top-loading machines.

LOOK AT THE ENERGYGUIDE LABEL WHEN BUYING APPLIANCES

Why? It will show the appliance's second price tag – its operating costs. It will also give comparisons to similar machines.

DON'T JUST LOOK AT ONE APPLIANCE

Why? It's better to compare the differences in how efficient different machines are than to only look at one option.

GET THE RIGHT SIZE

Why? Oversized appliances waste energy. Choose an extra-large dishwasher or fridge only if you have a large family that needs it.

LOOK FOR HIGH-EFFICIENCY FEATURES

Why? Things like soil-sensing detectors on dishwashers and automatic shutoffs on clothes dryers save energy and money.

IF POSSIBLE RECYCLE OLD APPLIANCES

Why? It reduces waste. Fridges and other appliances can be used for scrap metal or other uses.

LIVING ROOM

Alaskans spend more money powering home audio systems and DVD machines when they are off than when they are actually in use.

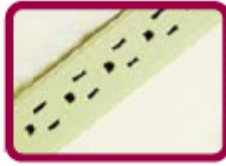
Living rooms are home to most of the electronics in your house. Your family watches TV, turns on computers and picks up the phone in your living area – and these phantom loads add costs because they continue to draw power when electronics are not in use.

The living area is ripe for other energy-saving measures as well, especially if it has multiple windows, a fireplace or several air vents.

POWER STRIPS: A SMART WAY TO SAVE

Your electronics can draw energy even while they are off – and that costs you money. Power strips help prevent that.

- **Plug electronics into a power strip.** Flip the switch on the strip off when you are not using them.
- **If you have many electronics, group them** into several power strips. Put things you use at the same time, like the computer and printer, on the same strip.
- **Put power strips in easy-to-reach places.** They won't save energy if you don't use them regularly!
- **Putting your TV on a power strip.** Though many TVs need to be reprogrammed if they are completely turned off, they still carry the largest phantom loads when left plugged in. Having them on a power strip may be an inconvenience, but it will save you money.



WHAT YOU CAN DO:

TURN OFF THE TV WHEN NO ONE IS WATCHING IT

Why? It's the easiest way to save.

USE THE SLEEP FUNCTION

Why? An average household can cut 60 percent of the energy their electronics use by using the sleep mode.

UNPLUG POWER ADAPTERS AND CHARGERS

Why? When cell phones, digital cameras or laptops are done charging, the charger still draws energy unless you unplug it.

CHECK YOUR HEATING SYSTEM

Why? If they are blocked by furniture or drapes, the air you pay to heat won't reach the rest of the room.

CONSIDER YOUR WINDOW COVERINGS

Why? They should be open during the day in summer to let the heat in and closed during the day in winter to keep heat in. Also, use thermal shades or blinds at night to reduce window heat loss.

SHUT THE FLUE ON YOUR FIREPLACE OR WOOD STOVE

Why? An open flue lets air escape from your home, wasting energy. If you never use the fireplace, have it sealed up permanently.

WEATHER-STRIP WINDOWS AND DOORS

Why? Windows and doors are a common location for air leaks. Seal them up with weather-stripping or caulk for a more efficient home.

HEATING

Heating your home accounts for 38% of a rural Alaskan's home energy bill – the single biggest energy expense in your home.

A number of homes in rural Alaska use a furnace, oil stove or boiler as their primary heating system. These systems are regulated by a thermostat, which tells the system how much energy to produce and controls the temperature of your home.

Set your thermostat between 62°F and 68°F in the winter and turn it off in the summer to save energy.

Also think about replacing old heating systems, especially if yours is older than 15 years. New high-efficiency heating systems are far more efficient than older versions.

PROGRAMMABLE THERMOSTATS

Programmable thermostats automatically adjust your home's temperature to maximize your savings by turning down the heat while you are away during the day and while you sleep at night.

Used properly, they can save up to \$150 a year, according to Energy Star. They can save even more in rural Alaskan households.

When using a programmable thermostat, make a schedule and stick to it. Program it to set back the heat two hours before you go to bed and increase it just before you wake. Set back the heat during the day if no one will be home for four or more hours.

The thermostat will let you change the schedule. But don't do this too frequently or you won't save as much money as you should.

WHAT YOU CAN DO:

TURN DOWN THE THERMOSTAT FIVE DEGREES

Why? Turning it down one degree saves about 2 percent on your heating bill. Turning it down five degrees saves about 10 percent. Install a programmable thermostat and it will do the work for you.

HAVE A PROFESSIONAL TUNE UP YOUR HEATING SYSTEM

Why? Oil-burning stoves should be checked every year. Gas-burning ones should be checked every two years.

USE SPACE HEATERS SPARINGLY

Why? They use a lot of electricity. Depending on the model you have, a space heater running for 5 hours a day can cost anywhere from \$45 to \$67 a month in rural Alaskan households, according to UAF CES. They also can be very dangerous. Make sure to turn them off when you sleep and use them only in open areas.

CHECK FILTERS

Why? Forced-air furnaces and air heat exchangers have filters that need to be cleaned or replaced monthly.

CHECK AIR VENTS, RADIATORS AND REGISTERS

Why? If they are blocked by furniture or drapes, heat won't get into the rest of your home.

CLEAN THE AREA AROUND YOUR HEATING SYSTEM

Why? It decreases the chance of fire and improves airflow.

WEAR A SWEATER INSTEAD OF TURNING UP THE HEAT

Why? Turning your thermostat up decreases your savings.

NEVER USE THE ELECTRIC STOVE TO HEAT YOUR HOME

Why? First, it's very dangerous! Electric ovens are not designed to heat large areas – doing so is a fire hazard. Second, it is not economic in rural Alaska.

USE ENERGY APPROPRIATELY

Why? Elderly people and people with medical conditions can have greater heating needs - and should adjust their thermostat to meet them.

WOOD HEATING

Many Alaskans heat their homes with wood. Though this may be a more economic heat source, there are ways to get the most out of the wood you do burn.

NEVER BURN gasoline, kerosene, charcoal, or liquid starters in home stoves. Also, don't burn garbage, plastics, cardboard, or Styrofoam. Burning treated and painted wood should also be avoided. Burning these, releases poisons.

NEVER BURN wood that has been taken from salt water. Chlorine combines with the smoke to produce dioxins and furans, which are dangerous carcinogens.

NEVER BURN wood that has been treated with varnishes or sealants. Also never burn wood sprayed with pesticides or wood that has been pressure-treated, as they may contain toxic chemicals.

Source:

Burn It Smart and Safety Fact Sheet, 2007. Canadian Renewable Energy Network.

WOOD BURNING SAFETY TIPS

The smell of smoke from your wood stove means that it is not venting properly. It is a fire hazard and releases deadly carbon monoxide.

Alaskan villages have the highest mortality rate from CO poisoning than anywhere in the USA, according to UAF CES.

Maintain proper clearance between your wood stove and your wood, along with other combustible household items, such as drapes, furniture, newspaper and books.

Have carbon monoxide detectors and smoke alarms installed.

Keep a fire extinguisher near the stove, and install a stovepipe thermometer to ensure that the stove is operating at the right temperature.

Source: Getting the Most out of your Wood Stove, 2007. Canadian Renewable Energy Network.



WHAT YOU CAN DO:

USE A HIGH-EFFICIENCY WOOD STOVE

BURN SMALL, HOT FIRES

They produce much less smoke than ones that are left to smolder. A stable fire is always made up of at least three pieces of wood. Also, use smaller pieces rather than fewer pieces per load.

DON'T BURN WET WOOD

It is also not as efficient and it produces significantly more smoke and can lead to the creation of creosote in the stack. Firewood should be seasoned for at least six months.

SPLIT WOOD into pieces that are 10–15 cm (4–6 in) in diameter. Fires burn better with more surface area exposed to the flame.

STORE WOOD outside, off the ground and covered. Bring it into your home as needed to limit moisture.

MAINTAIN your stove and chimney. They should be cleaned at least once a year.

REMOVE ASHES regularly from a stove or fireplace, and put them in a covered metal container and store them outside in a safe area, away from the house. If you burn only wood, add the ashes to your garden to add nutrients.

Source:

Burn It Smart and Safely Fact Sheet, 2007. Canadian Renewable Energy Network.

INSULATE

Sealing and insulating your home can reduce your heating costs by as much as 60%, according to UAF CES.

Heat naturally flows from warm areas to cool ones. If your home isn't well sealed, the air you pay to heat can flow right out of your home.

Several areas are prone to air leaks, including the attic, basement, windows, doors, baseboard moldings, electrical outlets, and dropped ceilings above bathtubs and cabinets.

HOW TO FIND AIR LEAKS

A home's biggest air leaks are usually in big areas, like your basement or attic. But small leaks also add up.

To find air leaks, look for daylight around the frames of windows and doors. If you see light, it means there is an air leak.

You can also light a stick of incense and use it to locate leaks. Hold it in areas you think are drafty. Moving air makes the smoke waver, showing you where there is an air leak. However, be careful not to place lit item near flammable materials. You can also put water on your hand and hold it near potential air leaks; the water will make you more sensitive to cool air.

WHAT YOU CAN DO:

CAULK CRACKS AND GAPS LESS THAN ¼ INCH WIDE

Why? Caulk is flexible and a good way to seal air leaks.

WEATHER-STRIP DOORS AND WINDOWS

Why? It is an easy way to seal leaks. Compression and V-strip weather-stripping are good for windows. For doors, either replace the threshold or attach a door sweep to seal the air gap at the bottom of the door.

USE INSULATING BLINDS, SHADES OR CURTAINS

Why? Windows are a frequent source of air leaks. Interior window cellular shades can reduce the draft and increase the insulation when they are drawn closed.

LOOK INTO APPLYING FOR (AHFC) PROGRAMS

Why? The Alaska Housing and Finance Corporation offers weatherization programs for Alaskans of all income levels. For more information, see next page.

INSULATE YOUR WATER HEATER TANK

Why? If your water heater uses a tank, it can easily lose heat through the walls of the tank.

KNOW HOW MUCH INSULATION YOU HAVE

Why? If you do not have enough, you can add more. If you can see your rafters, you need more insulation.

INSULATE PIPES

Why? Insulating water pipes will conserve heat energy and cost you less from the heat loss in pipes.

REPAIR OR REPLACE WINDOWS

Why? Cracks in windows let cold air into your home. Install weather-stripping if your window has drafts. If windows are older than 1980, consider replacing with energy star windows.

PROGRAMS

ALASKA STATE PROGRAMS

The Alaska Housing Finance Corporation (AHFC) now has three programs to help Alaskans reduce energy bills on their homes.

HOME ENERGY REBATE PROGRAM

homeowners who want to make their own energy-efficiency improvements to their home can receive a rebate for some or all of their expenditures. The Home Energy Rebate Program has no income requirements.

THE EXPANDED WEATHERIZATION PROGRAM

is available to Alaskans who meet certain income guidelines.

THE SECOND MORTGAGE PROGRAM

FOR ENERGY CONSERVATION is where borrowers apply to AHFC for financing to make cost-effective energy improvements on owner-occupied properties.

A full description of each of these programs can be found on the AHFC web site at http://www.ahfc.state.ak.us/energy/weatherization_rebates.cfm

POWER COST EQUALIZATION (PCE)

Most rural households are covered under the PCE program. This program subsidizes and attempts to equalize the cost you are paying for power with that of the Railbelt and Juneau. PCE is only applied to the first 500 kilowatt hours (kWh) you use a month, if you exceed this amount you will have to pay the full cost for electricity (50 to 60 cents a kWh). Keeping your household usage under 500 kWh is an easy way to lower your electric bill.

For more information, or to see if you are covered under the PCE Program, go to <http://www.akenergyauthority.org/programspce.html>

WHAT YOU CAN DO:

MONITORING YOUR USE:

Todd Hoener, *Golden Valley Electric Association*

It is about time...Do you know what your electricity is doing? How can you tell? The meter. Check the meter...

Take pencil and paper and write these down, starting at the bottom of the page or log:

(1) date (2) day (3) time a.m. or time p.m. (4) the current readings (kilowatts) on the meter (5) the major things you did in the house today involving electricity.

Repeat this activity every 24 hours. Graph these numbers associated with dates and activities. Learn why the numbers get larger and smaller and what does and does not affect the increase or decrease. Compare this with the total amount of electricity for which you are billed. That is, how much electricity did your family use in the last month as reported on the bill? Divide the number of billing period days into that read of total kilowatt-hours for the month. This is your average daily kWh number, or what your family averages in using kilowatt-hours over the past so many days. How does that compare to your daily log – sometimes over average, sometimes under average. Now you are getting a sense of what you use.

Remember energy end use management is (1) monitoring energy, (2) energy efficiency, (3) energy conservation (choice or behavior, the way you do things) and (4) energy end-use education – **SPREAD THE WORD.**

Todd Hoener is the Energy Efficiency Specialist at Golden Valley Electric Association in Fairbanks.

SAVE \$\$\$

Limited budget? There are simple projects that can be done with a minimum of time and equipment to reduce your energy use. These low-cost energy conservation techniques can add up to big savings.

COST TO YOU: FREE

- Turn down the thermostat. Lowering the thermostat five degrees at night and 10 degrees during the day when you're out can cut as much as 20 percent off your heating costs.
- Keep radiators, wood stoves, and vents clear of furniture and drapes.
- Turn off the lights when leaving the room.
- Turn down the thermostat on the water heater to 120°F.
- Keep the refrigerator door closed.
- Clean the gaskets on the refrigerator and freezer doors so they shut securely. Vacuum the dust off the coils underneath the refrigerator for efficient operation.
- Check the temperature inside both refrigerator and freezer to make sure it is not too cold.
- Use your dishwasher on normal setting.
- Use the shortest time when washing or drying dishes or clothes in machines.
- Set washer loads for "cold" wash instead of hot.
- Clean the lint trap on your clothes dryer.
- Use heat tape only when necessary. A 50ft strip of heat tape that is left on for 10hrs could cost you \$27 a month (assuming 6 watts per foot at 30¢ a kwh). Put tape on a thermostat or timer, or disconnect when not needed.
- Put vehicle engine block heaters on a timer. Leaving them plugged in all night can significantly increase you electric bill.



WHAT YOU CAN DO:

LESS THAN \$5

- Install foam gaskets under switch plates and outlets on exterior walls.
- Use plastic transparent window film on drafty windows.
- Use power strips to reduce phantom loads for your electronic equipment.
- Stop leaks by replacing washers in sink faucet (especially on hot water faucets).
- Make a draft dodger by filling an old sock or fabric tube with sand or small beans and place against the bottom of exterior doors.

LESS THAN \$10

- Use spray foam insulation around windows and door frames to seal leaks and cracks.
- Replace weather stripping around exterior doors.
- Replace door sweep on the bottom of exterior door.
- Caulk around leaky window to prevent drafts.

LESS THAN \$25

- Install insulating blanket on water heater (if manufacturer recommends one can be used).
- Install new threshold under worn exterior doors.
- Install low-flow shower head.
- Install a digital thermostat that can be programmed to lower the temperature at different times to meet your lifestyle.
- Fix leaky faucets.

Source: Energy Tips: Conserve and Save by: Roxie Rodgers Dinstel,
Professor of Extension, Home, Health and Family Development

Pictured Above, Nancy Gregory-Anderson



SAFETY

Every year in the United States, more than 25,000 residential fires are associated with the use of space heaters, according to the U.S. Consumer Product Safety Commission.

Your home uses energy in many places and with many machines – and you must take care to operate each of these as safely as possible.

Decreasing your energy use means making changes throughout your home. Make each change as safely as possible and install some additional safety features like carbon monoxide alarms to keep your family safe at home.

SPACE HEATERS: SAFETY FIRST!

In the US every year, fires and carbon monoxide poisonings are caused by space heaters. More than 300 people die in these fires. Each year 6,000 people are treated at emergency rooms for burns associated with space heaters, mostly in non-fire situations.

It's important to buy the safest space heater possible and always think about safety while using it.

Make sure your space heater:

- Meets the latest safety standards, as recommended by the manufacturer. These standards are often updated for increased safety measures.
- Is only used in an open area. Air needs to circulate around the space heater. Only use them on level, hard, non-flammable surfaces.
- Is at least three feet away from flammable items. Any closer is a big fire danger!
- Is vented. Unvented gas heaters are very dangerous. If you do have one, always keep the doors open when you use it to keep the pollutants from building up.

WHAT YOU CAN DO:

BUY SMOKE DETECTORS

Why? You should have one on every level of your house and one outside each sleeping area. Replace the batteries twice each year.

GET A CARBON MONOXIDE ALARM

Why? This odorless gas is deadly and can be produced by defective heaters.

KNOW SYMPTOMS OF CARBON MONOXIDE POISONING

Why? It's deadly. Symptoms include dizziness, headache, nausea, irregular breathing and confusion. If you think you have the flu but get better when you leave the house, carbon monoxide could be the cause.

NEVER LEAVE AN ENGINE RUNNING IN AN ATTACHED GARAGE

Why? The fumes can be toxic. Never leave a snow blower, lawn mower, car or anything else running in the garage – even if the door is open!

CLEAR THE AREA AROUND YOUR HEATING SYSTEM

Why? Heating systems need air to do their job. Never store anything flammable near your furnace – it's a fire hazard.

OPEN WINDOWS AND USE FANS AROUND CHEMICALS

Why? If you do not ventilate your home or garage when you are using chemicals, it can cause health problems.

PRACTICE PROPER MAINTENANCE

Why? Following the manufacturer's maintenance schedule will allow for increased efficiency.

HEALTH SHOULD BE THE NUMBER ONE PRIORITY

Do not allow households to be set at temperatures that are too low. Being in good health should take priority over energy bills.

SOURCES

All estimates for energy savings vary by region and for each individual family. We have used typical savings. The following is a list of key sources used in preparing this booklet:

- University of Alaska Fairbanks Cooperative Extension Service www.uaf.edu/ces
- The Southwest Alaska Municipal Conference www.swamc.org
- Alaska Energy Authority www.akenergyauthority.org
- Cold Climate Housing Research Center www.cchrc.org
- Bristol Bay Environmental Science Laboratory www.uaf.edu/bbest
- Canadian Renewable Energy Network www.canren.gc.ca/default_en.asp
- The American Council for an Energy-Efficient Economy www.aceee.org
- The U.S. Department of Energy www.energy.gov
- The U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy www.eere.energy.gov
- Energy Star, a joint program of the U.S. Department of Energy and the U.S. Environmental Protection Agency www.energystar.gov
- Alliance to Save Energy www.ase.org
- Rocky Mountain Institute www.rmi.org
- State of Oregon's Office of Energy www.oregon.gov/energy
- U.S. Consumer Product Safety Commission www.cpsc.gov
- State of California's Flex Your Power campaign www.fypower.org

This book has been specifically customized for the use of rural Alaskans by the Southwest Alaska Municipal Conference's Energy Project Coordinator Rebekah Lithrs. Production of this book would not have been possible without the hard work of the SWAMC Energy Task Force, and Garrison Collette from University of Alaska Fairbanks' Cooperative Extension Service. Production of this booklet was paid for by the Alaska Energy Authority.

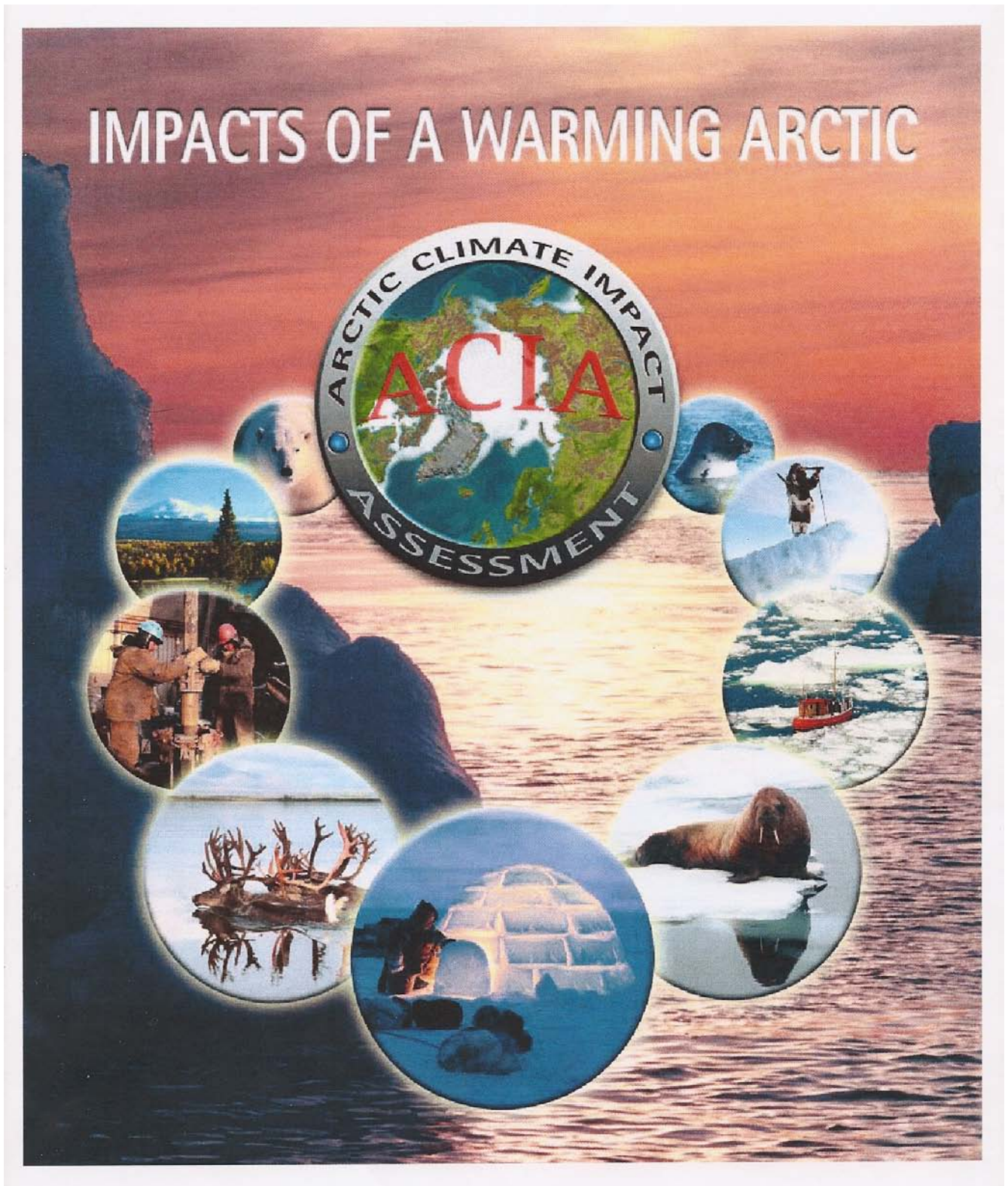
For more information about Project Energy Savers, visit www.projectenergysavers.org

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Appendix L: Climate Change in Alaska

Appendix L: Climate Change in Alaska

Published courtesy of the Arctic Council



Global Climate Change

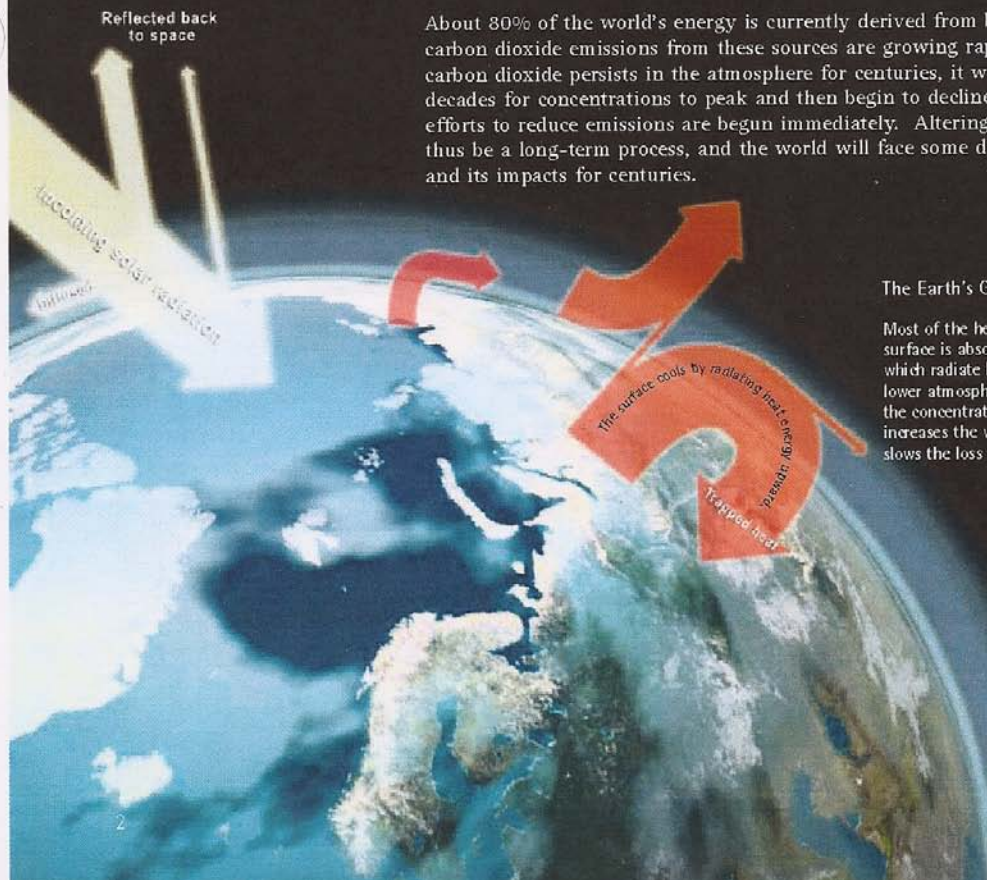
"There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."

Intergovernmental Panel on Climate Change (IPCC), 2001

Ice cores and other evidence of climate conditions in the distant past provide evidence that rising atmospheric carbon dioxide levels are associated with rising global temperatures. Human activities, primarily the burning of fossil fuels (coal, oil, and natural gas), and secondarily the clearing of land, have increased the concentration of carbon dioxide, methane, and other heat-trapping ("greenhouse") gases in the atmosphere. Since the start of the industrial revolution, the atmospheric carbon dioxide concentration has increased by about 35% and the global average temperature has risen by about 0.6°C. There is an international scientific consensus that most of the warming observed over the last 50 years is attributable to human activities.

Continuing to add carbon dioxide and other greenhouse gases to the atmosphere is projected to lead to significant and persistent changes in climate, including an increase in average global temperature of 1.4 to 5.8°C (according to the IPCC) over the course of this century. Climatic changes are projected to include shifts in atmospheric and oceanic circulation patterns, an accelerating rate of sea-level rise, and wider variations in precipitation. Together, these changes are projected to lead to wide-ranging consequences including significant impacts on coastal communities, animal and plant species, water resources, and human health and well-being.

About 80% of the world's energy is currently derived from burning fossil fuels, and carbon dioxide emissions from these sources are growing rapidly. Because excess carbon dioxide persists in the atmosphere for centuries, it will take at least a few decades for concentrations to peak and then begin to decline even if concerted efforts to reduce emissions are begun immediately. Altering the warming trend will thus be a long-term process, and the world will face some degree of climate change and its impacts for centuries.



The Earth's Greenhouse Effect

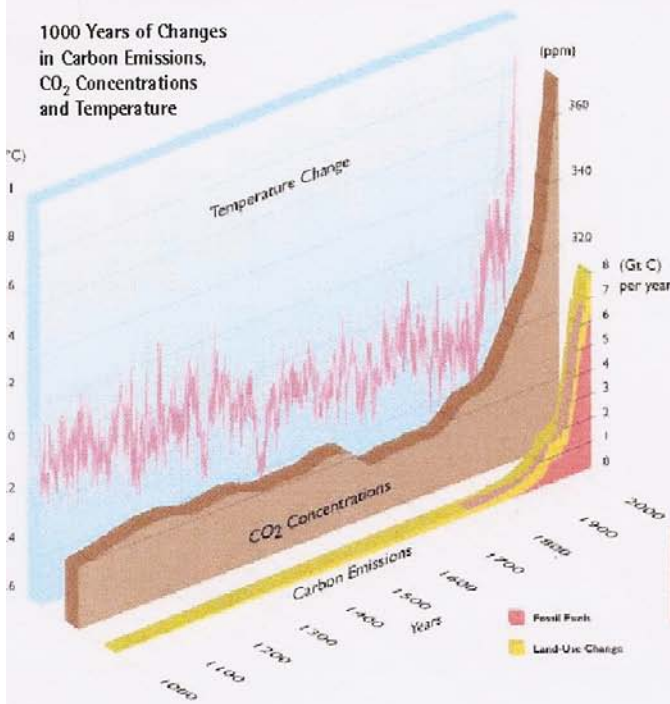
Most of the heat energy emitted from the surface is absorbed by greenhouse gases which radiate heat back down to warm the lower atmosphere and the surface. Increasing the concentrations of greenhouse gases increases the warming of the surface and slows the loss of heat energy to space.

The science suggests that responding to this challenge will require two sets of actions: one, called mitigation, to slow the speed and amount of future climate change by reducing greenhouse gas emissions; and the other, called adaptation, to attempt to limit adverse impacts by becoming more resilient to the climate changes that will occur while society pursues the first set of actions. The scope of this assessment did not include an evaluation of either of these sets of actions. These are being addressed by efforts under the auspices of the United Nations Framework Convention on Climate Change and other bodies.

Stratospheric Ozone Depletion is Another Issue

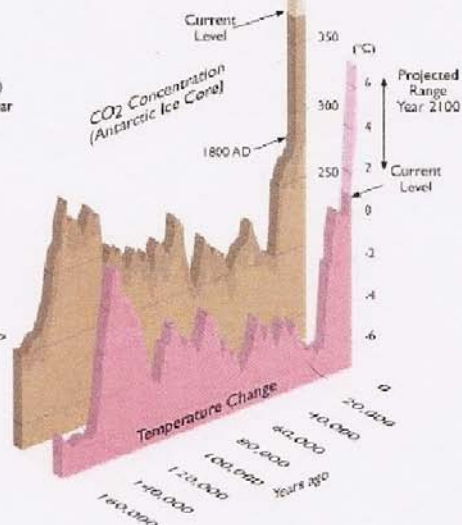
Depletion of the stratospheric ozone layer due to chlorofluorocarbons and other manmade chemicals is a different problem, although there are important connections between ozone depletion and climate change. For example, climate change is projected to delay recovery of stratospheric ozone over the Arctic. This assessment, in addition to its principal focus on climate change impacts, also examined changes in stratospheric ozone, subsequent changes in ultraviolet radiation, and related impacts in the Arctic. A summary of these findings can be found on pages 98-105 of this report.

1000 Years of Changes in Carbon Emissions, CO₂ Concentrations and Temperature



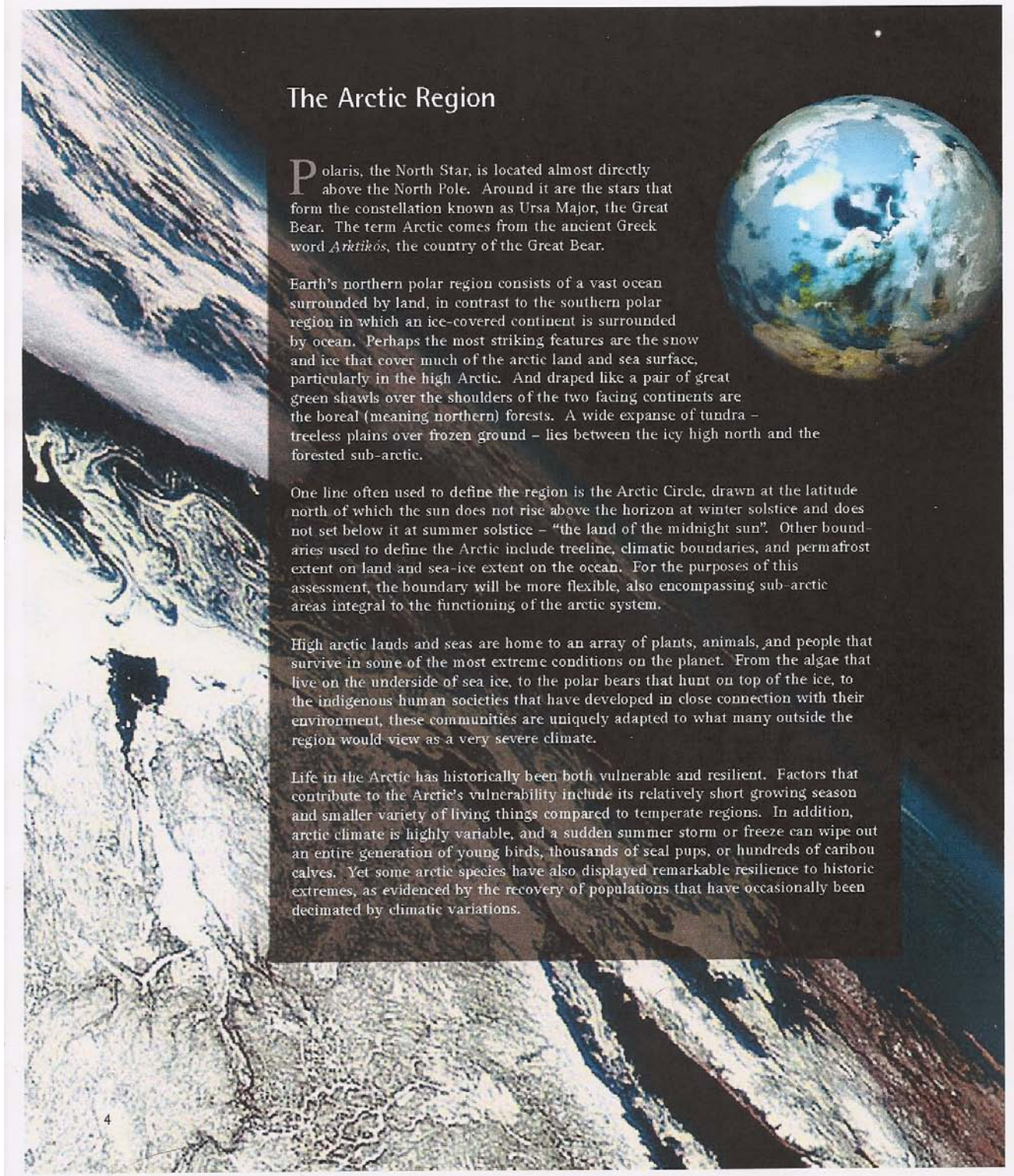
This 1000-year record tracks the rise in carbon emissions due to human activities (fossil fuel burning and land clearing) and the subsequent increase in atmospheric carbon dioxide concentrations, and air temperatures. The earlier parts of this Northern Hemisphere temperature reconstruction are derived from historical data, tree rings, and corals, while the later parts were directly measured. Measurements of carbon dioxide (CO₂) in air bubbles trapped in ice cores form the earlier part of the CO₂ record; direct atmospheric measurements of CO₂ concentration began in 1957.

Atmospheric Carbon Dioxide Concentration and Temperature Change



This record illustrates the relationship between temperature and atmospheric carbon dioxide concentrations over the past 160,000 years and the next 100 years. Historical data are derived from ice cores, recent data were directly measured, and model projections are used for the next 100 years.

Altering the warming trend will be a long-term process, and the world will face some degree of climate change and its impacts for centuries.



The Arctic Region

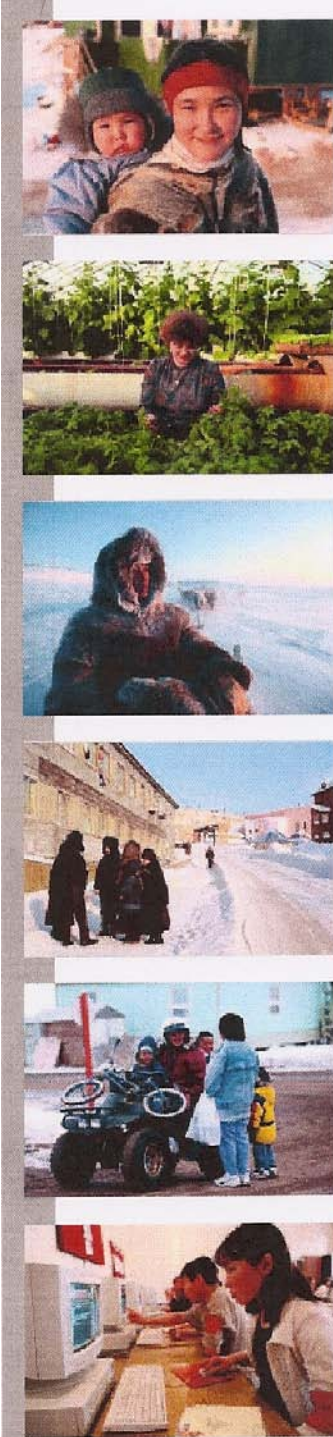
Polaris, the North Star, is located almost directly above the North Pole. Around it are the stars that form the constellation known as Ursa Major, the Great Bear. The term Arctic comes from the ancient Greek word *Arktikós*, the country of the Great Bear.

Earth's northern polar region consists of a vast ocean surrounded by land, in contrast to the southern polar region in which an ice-covered continent is surrounded by ocean. Perhaps the most striking features are the snow and ice that cover much of the arctic land and sea surface, particularly in the high Arctic. And draped like a pair of great green shawls over the shoulders of the two facing continents are the boreal (meaning northern) forests. A wide expanse of tundra – treeless plains over frozen ground – lies between the icy high north and the forested sub-arctic.

One line often used to define the region is the Arctic Circle, drawn at the latitude north of which the sun does not rise above the horizon at winter solstice and does not set below it at summer solstice – “the land of the midnight sun”. Other boundaries used to define the Arctic include treeline, climatic boundaries, and permafrost extent on land and sea-ice extent on the ocean. For the purposes of this assessment, the boundary will be more flexible, also encompassing sub-arctic areas integral to the functioning of the arctic system.

High arctic lands and seas are home to an array of plants, animals, and people that survive in some of the most extreme conditions on the planet. From the algae that live on the underside of sea ice, to the polar bears that hunt on top of the ice, to the indigenous human societies that have developed in close connection with their environment, these communities are uniquely adapted to what many outside the region would view as a very severe climate.

Life in the Arctic has historically been both vulnerable and resilient. Factors that contribute to the Arctic's vulnerability include its relatively short growing season and smaller variety of living things compared to temperate regions. In addition, arctic climate is highly variable, and a sudden summer storm or freeze can wipe out an entire generation of young birds, thousands of seal pups, or hundreds of caribou calves. Yet some arctic species have also displayed remarkable resilience to historic extremes, as evidenced by the recovery of populations that have occasionally been decimated by climatic variations.



People of the Arctic

Almost four million people live in the Arctic today, with the precise number depending on where the boundary is drawn. They include indigenous people and recent arrivals, hunters and herders living on the land, and city dwellers. Many distinct indigenous groups are found only in the Arctic, where they continue traditional activities and adapt to the modern world at the same time. Humans have long been part of the arctic system, shaping and being shaped by the local and regional environment. In the past few centuries, the influx of new arrivals has increased pressure on the arctic environment through rising fish and wildlife harvests and industrial development.

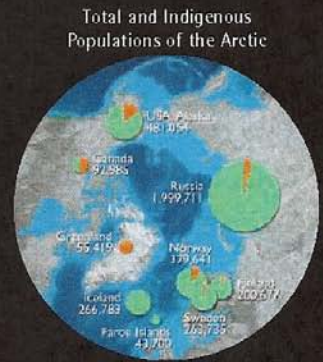
The Arctic includes part or all of the territories of eight nations: Norway, Sweden, Finland, Denmark, Iceland, Canada, Russia, and the United States, as well as the homelands of dozens of indigenous groups that encompass distinct sub-groups and communities. Indigenous people currently make up roughly 10% of the total arctic population, though in Canada, they represent about half the nation's arctic population, and in Greenland they are the majority. Non-indigenous residents also include many different peoples with distinct identities and ways of life.

People have occupied parts of the Arctic since at least the peak of the last ice age, about 20 000 years ago, and recent studies suggest a human presence up to 30 000 years ago. In North America, humans are believed to have spread across the Arctic in several waves, reaching Greenland as many as 4500 years ago before abandoning the island for a millennium or more. Innovations such as the harpoon enabled people to hunt large marine mammals, making it possible to inhabit remote coastal areas in which the land offered scant resources. The development of reindeer husbandry in Eurasia allowed human populations to increase dramatically owing to a reliable food source. In Eurasia and across the North Atlantic, new groups of people moved northward over the past thousand years, colonizing new lands such as the Faroe Islands and Iceland, and encountering indigenous populations already present in West Greenland, and northern Norway, Sweden, Finland, and Russia.

In the 20th century, immigration to the Arctic increased dramatically, to the point where the non-indigenous population currently outnumbers the indigenous population in most regions. Many immigrants have been drawn by the prospect of new opportunities such as developing natural resources. Conflicts over land and resource ownership and access have been exacerbated by the rise in population and the incompatibility of some aspects of traditional and modern ways of life. In North America, the indigenous struggle to re-establish rights to land and resources has been addressed to some extent in land claims agreements, the creation of largely self-governed regions within nation-states, and other political and economic actions. In some areas, conflicts remain, particularly concerning the right to use living and mineral resources. In Eurasia, by contrast, indigenous claims and rights have only begun to be addressed as matters of national policy in recent years.

Populations are changing and northern regions are becoming more tightly related economically, politically, and socially to national mainstreams. Life expectancy has increased greatly across most of the Arctic in recent decades. The prevalence of indigenous language use, however, has decreased in most areas, with several languages in danger of disappearing in coming decades. In some respects, the disparities between northern and southern arctic communities in terms of living standards, income, and education are decreasing, although the gaps remain large in most cases.

The economy of the region is based largely on natural resources, from oil, gas, and metal ores to fish, reindeer, caribou, whales, seals, and birds. In recent decades, tourism has added a growing sector to the economies of many communities and regions of the Arctic. Government services including the military are also a major part of the economy in nearly all areas of the Arctic, responsible in some cases for over half of the available jobs. In addition to the cash economy, traditional subsistence and barter economies make a major contribution to the overall well-being of parts of the region, producing significant value that is not recorded in official statistics.



In the chart above, orange indicates the proportion of indigenous people within the populations of the arctic portions of the countries. The numbers are the total arctic populations of each country in the early 1990s. Indigenous people make up roughly 10% of the current population of the Arctic, though in the Canadian Arctic, they represent about half the population, and in Greenland, they are the majority.



- Saami Council (SC)
- Russian Association of Indigenous Peoples of the North (RAIPON)
- Aleut International Association (AIA)
- Inuit Circumpolar Conference (ICC)
- Gwich'in Council International (GCI)
- Arctic Athabaskan Council (AAC)

Executive Summary

Arctic Climate Change and Its Impacts



"Changes in climate that have already taken place are manifested in the decrease in extent and thickness of Arctic sea ice, permafrost thawing, coastal erosion, changes in ice sheets and ice shelves, and altered distribution and abundance of species."

IPCC, 2001

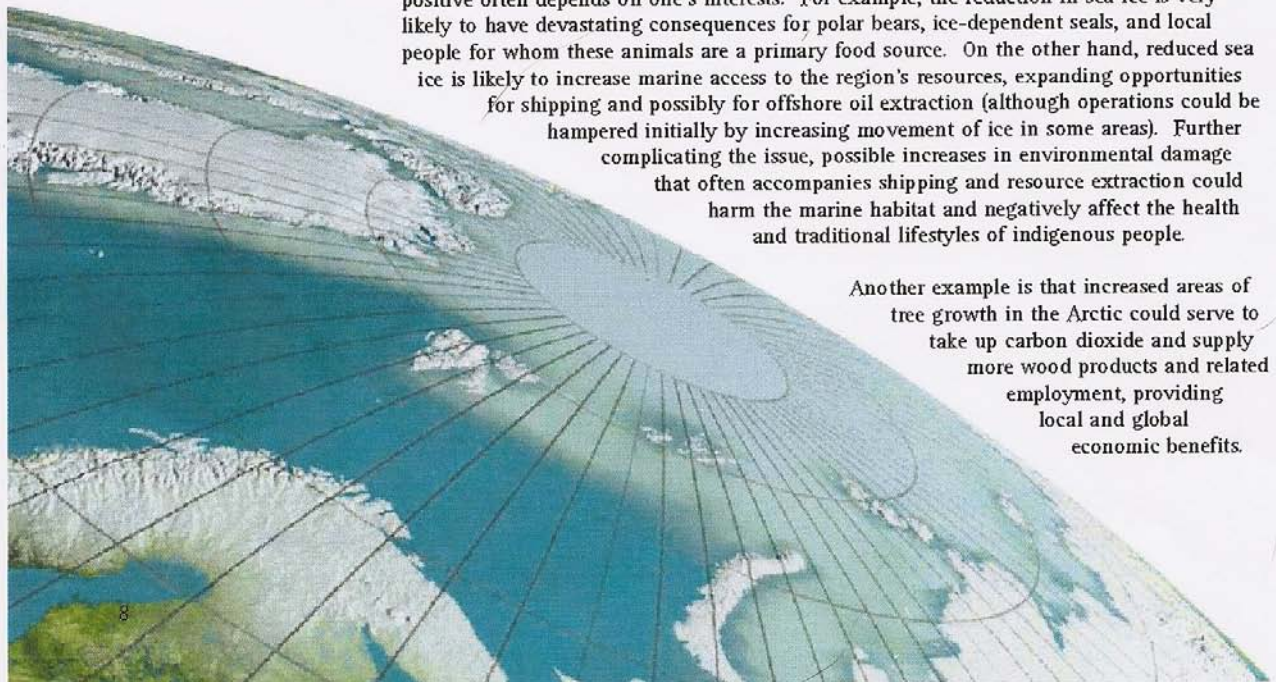
Earth's climate is changing, with the global temperature now rising at a rate unprecedented in the experience of modern human society. While some historical changes in climate have resulted from natural causes and variations, the strength of the trends and the patterns of change that have emerged in recent decades indicate that human influences, resulting primarily from increased emissions of carbon dioxide and other greenhouse gases, have now become the dominant factor.

These climate changes are being experienced particularly intensely in the Arctic. Arctic average temperature has risen at almost twice the rate as the rest of the world in the past few decades. Widespread melting of glaciers and sea ice and rising permafrost temperatures present additional evidence of strong arctic warming. These changes in the Arctic provide an early indication of the environmental and societal significance of global warming.

An acceleration of these climatic trends is projected to occur during this century, due to ongoing increases in concentrations of greenhouse gases in the earth's atmosphere. While greenhouse gas emissions do not primarily originate in the Arctic, they are projected to bring wide-ranging changes and impacts to the Arctic. These arctic changes will, in turn, impact the planet as a whole. For this reason, people outside the Arctic have a great stake in what is happening there. For example, climatic processes unique to the Arctic have significant effects on global and regional climate. The Arctic also provides important natural resources to the rest of the world (such as oil, gas, and fish) that will be affected by climate change. And melting of arctic glaciers is one of the factors contributing to sea-level rise around the globe.

Climate change is also projected to result in major impacts inside the Arctic, some of which are already underway. Whether a particular impact is perceived as negative or positive often depends on one's interests. For example, the reduction in sea ice is very likely to have devastating consequences for polar bears, ice-dependent seals, and local people for whom these animals are a primary food source. On the other hand, reduced sea ice is likely to increase marine access to the region's resources, expanding opportunities for shipping and possibly for offshore oil extraction (although operations could be hampered initially by increasing movement of ice in some areas). Further complicating the issue, possible increases in environmental damage that often accompanies shipping and resource extraction could harm the marine habitat and negatively affect the health and traditional lifestyles of indigenous people.

Another example is that increased areas of tree growth in the Arctic could serve to take up carbon dioxide and supply more wood products and related employment, providing local and global economic benefits.



On the other hand, increased tree growth is likely to add to regional warming and encroach on the habitat for many birds, reindeer/caribou, and other locally beneficial species, thereby adversely affecting local residents. Potential complications include projected increases in forest disturbances such as fires and insect outbreaks that could reduce expected benefits.

Climate change is taking place within the context of many other ongoing changes in the Arctic, including the observed increase in chemical contaminants entering the Arctic from other regions, overfishing, land use changes that result in habitat destruction and fragmentation, rapid growth in the human population, and cultural, governance, and economic changes. Impacts on the environment and society result not from climate change alone, but from the interplay of all of these changes. This assessment has made an initial attempt to reveal some of this complexity, but limitations in current knowledge do not allow for a full analysis of all the interactions and their impacts.

One of the additional stresses in the Arctic that is addressed in this assessment results from increasing levels of ultraviolet radiation reaching the earth's surface due to stratospheric ozone depletion. As with many of the other stresses mentioned, there are important interactions between climate change and ozone depletion. The effects of climate change on the upper atmosphere make continued ozone depletion over the Arctic likely to persist for at least a few more decades. Thus, ultraviolet radiation levels in the Arctic are likely to remain elevated, and this will be most pronounced in the spring, when ecosystems are most sensitive to harmful ultraviolet radiation. The combination of climate change, excess ultraviolet radiation, and other stresses presents a range of potential problems for human health and well-being as well as risks to other arctic species and ecosystems.

The impacts of climate change in the Arctic addressed in this assessment are largely caused from outside the region, and will reverberate back to the global community in a variety of ways. The scientific findings reported here can inform decisions about actions to reduce the risks of climate change. As the pace and extent of climate change and its impacts increase, it will become more and more important for people everywhere to become aware of the changes taking place in the Arctic, and to consider them in evaluating what actions should be taken to respond.

Are These Impacts Inevitable?

Carbon dioxide concentrations in the atmosphere, which have risen rapidly due to human activities, will remain elevated above natural levels for centuries, even if emissions were to cease immediately. Some continued warming is thus inevitable. However, the speed and amount of warming can be reduced if future emissions are limited sufficiently to stabilize the concentrations of greenhouse gases. The scenarios developed by the IPCC assume a variety of different societal developments, resulting in various plausible levels of future emissions. None of these scenarios assume implementation of explicit policies to reduce greenhouse gas emissions. Thus, atmospheric concentrations do not level off in these scenarios, but rather continue to rise, resulting in significant increases in temperature and sea level and widespread changes in precipitation. The costs and difficulties of adapting to such increases are very likely to increase significantly over time.

If, on the other hand, society chooses to reduce emissions substantially, the induced changes in climate would be smaller and would happen more slowly. This would not eliminate all impacts, especially some of the irreversible impacts affecting particular species. However, it would allow ecosystems and human societies as a whole to adapt more readily, reducing overall impacts and costs. The impacts addressed in this assessment assume continued growth in greenhouse gas emissions. Although it will be very difficult to limit near-term consequences resulting from past emissions, many longer-term impacts could be reduced significantly by reducing global emissions over the course of this century. This assessment did not analyze strategies for achieving such reductions, which are the subject of efforts by other bodies.

Unless we change our direction, we are likely to end up where we are headed.

EVALUATING SUBSISTANTIAL CLIMATE CHANGE AND ITS IMPACTS



Key Findings

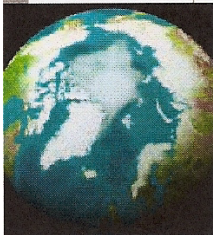
The Arctic is extremely vulnerable to observed and projected climate change and its impacts. The Arctic is now experiencing some of the most rapid and severe climate change on earth. Over the next 100 years, climate change is expected to accelerate, contributing to major physical, ecological, social, and economic changes, many of which have already begun. Changes in arctic climate will also affect the rest of the world through increased global warming and rising sea levels.



1. Arctic climate is now warming rapidly and much larger changes are projected.

- Annual average arctic temperature has increased at almost twice the rate as that of the rest of the world over the past few decades, with some variations across the region.
- Additional evidence of arctic warming comes from widespread melting of glaciers and sea ice, and a shortening of the snow season.

- Increasing global concentrations of carbon dioxide and other greenhouse gases due to human activities, primarily fossil fuel burning, are projected to contribute to additional arctic warming of about 4-7°C over the next 100 years.
- Increasing precipitation, shorter and warmer winters, and substantial decreases in snow cover and ice cover are among the projected changes that are very likely to persist for centuries.
- Unexpected and even larger shifts and fluctuations in climate are also possible.



2. Arctic warming and its consequences have worldwide implications.

- Melting of highly reflective arctic snow and ice reveals darker land and ocean surfaces, increasing absorption of the sun's heat and further warming the planet.
- Increases in glacial melt and river runoff add more freshwater to the ocean, raising global sea level and possibly slowing the ocean circulation that brings

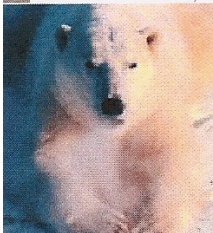
- heat from the tropics to the poles, affecting global and regional climate.
- Warming is very likely to alter the release and uptake of greenhouse gases from soils, vegetation, and coastal oceans.
- Impacts of arctic climate change will have implications for biodiversity around the world because migratory species depend on breeding and feeding grounds in the Arctic.



3. Arctic vegetation zones are very likely to shift, causing wide-ranging impacts.

- Treeline is expected to move northward and to higher elevations, with forests replacing a significant fraction of existing tundra, and tundra vegetation moving into polar deserts.
- More-productive vegetation is likely to increase carbon uptake, although reduced reflectivity of the

- land surface is likely to outweigh this, causing further warming.
- Disturbances such as insect outbreaks and forest fires are very likely to increase in frequency, severity, and duration, facilitating invasions by non-native species.
- Where suitable soils are present, agriculture will have the potential to expand northward due to a longer and warmer growing season.



4. Animal species' diversity, ranges, and distribution will change.

- Reductions in sea ice will drastically shrink marine habitat for polar bears, ice-inhabiting seals, and some seabirds, pushing some species toward extinction.
- Caribou/reindeer and other land animals are likely to be increasingly stressed as climate change alters their access to food sources, breeding grounds, and historic migration routes.

- Species ranges are projected to shift northward on both land and sea, bringing new species into the Arctic while severely limiting some species currently present.
- As new species move in, animal diseases that can be transmitted to humans, such as West Nile virus, are likely to pose increasing health risks.
- Some arctic marine fisheries, which are of global importance as well as providing major contributions to the region's economy, are likely to become more productive. Northern freshwater fisheries that are mainstays of local diets are likely to suffer.



5. Many coastal communities and facilities face increasing exposure to storms.

- Severe coastal erosion will be a growing problem as rising sea level and a reduction in sea ice allow higher waves and storm surges to reach the shore.
- Along some arctic coastlines, thawing permafrost weakens coastal lands, adding to their vulnerability.

- The risk of flooding in coastal wetlands is projected to increase, with impacts on society and natural ecosystems.
- In some cases, communities and industrial facilities in coastal zones are already threatened or being forced to relocate, while others face increasing risks and costs.



6. Reduced sea ice is very likely to increase marine transport and access to resources.

- The continuing reduction of sea ice is very likely to lengthen the navigation season and increase marine access to the Arctic's natural resources.
- Seasonal opening of the Northern Sea Route is likely to make trans-arctic shipping during summer feasible within several decades. Increasing ice movement in

some channels of the Northwest Passage could initially make shipping more difficult.

- Reduced sea ice is likely to allow increased offshore extraction of oil and gas, although increasing ice movement could hinder some operations.
- Sovereignty, security, and safety issues, as well as social, cultural, and environmental concerns are likely to arise as marine access increases.



7. Thawing ground will disrupt transportation, buildings, and other infrastructure.

- Transportation and industry on land, including oil and gas extraction and forestry, will increasingly be disrupted by the shortening of the periods during which ice roads and tundra are frozen sufficiently to permit travel.
- As frozen ground thaws, many existing buildings, roads, pipelines, airports, and industrial facilities are likely to

be destabilized, requiring substantial rebuilding, maintenance, and investment.

- Future development will require new design elements to account for ongoing warming that will add to construction and maintenance costs.
- Permafrost degradation will also impact natural ecosystems through collapsing of the ground surface, draining of lakes, wetland development, and toppling of trees in susceptible areas.



8. Indigenous communities are facing major economic and cultural impacts.

- Many Indigenous Peoples depend on hunting polar bear, walrus, seals, and caribou, herding reindeer, fishing, and gathering, not only for food and to support the local economy, but also as the basis for cultural and social identity.
- Changes in species' ranges and availability, access to these species, a perceived reduction in weather

predictability, and travel safety in changing ice and weather conditions present serious challenges to human health and food security, and possibly even the survival of some cultures.

- Indigenous knowledge and observations provide an important source of information about climate change. This knowledge, consistent with complementary information from scientific research, indicates that substantial changes have already occurred.



9. Elevated ultraviolet radiation levels will affect people, plants, and animals.

- The stratospheric ozone layer over the Arctic is not expected to improve significantly for at least a few decades, largely due to the effect of greenhouse gases on stratospheric temperatures. Ultraviolet radiation (UV) in the Arctic is thus projected to remain elevated in the coming decades.
- As a result, the current generation of arctic young people is likely to receive a lifetime dose of UV that is about

30% higher than any prior generation. Increased UV is known to cause skin cancer, cataracts, and immune system disorders in humans.

- Elevated UV can disrupt photosynthesis in plants and have detrimental effects on the early life stages of fish and amphibians.
- Risks to some arctic ecosystems are likely as the largest increases in UV occur in spring, when sensitive species are most vulnerable, and warming-related declines in snow and ice cover increase exposure for living things normally protected by such cover.



10. Multiple influences interact to cause impacts to people and ecosystems.

- Changes in climate are occurring in the context of many other stresses including chemical pollution, overfishing, land use changes, habitat fragmentation, human population increases, and cultural and economic changes.
- These multiple stresses can combine to amplify impacts on human and ecosystem health and well-being. In

many cases, the total impact is greater than the sum of its parts, such as the combined impacts of contaminants, excess ultraviolet radiation, and climatic warming.

- Unique circumstances in arctic sub-regions determine which are the most important stresses and how they interact.

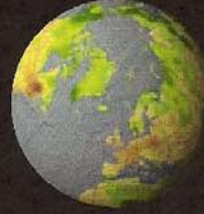
Arctic Climate Trends

Warming in the Arctic is causing changes in nearly every part of the physical climate system. Some of these changes are highlighted below and explored in further detail throughout this report.



Rising Temperatures

Temperatures have increased sharply in recent decades over most of the region, especially in winter. Winter increases in Alaska and western Canada have been around 3-4°C over the past half century. Larger increases are projected this century.



Increasing Precipitation

Arctic precipitation has increased by about 8% on average over the past century. Much of the increase has come as rain, with the largest increases in autumn and winter. Greater increases are projected for the next 100 years.



Rising River Flows

River discharge to the ocean has increased over much of the Arctic during the past few decades and spring peak river flows are occurring earlier. These changes are projected to accelerate.



Thawing Permafrost

Permafrost has warmed by up to 2°C in recent decades, and the depth of the layer that thaws each year is increasing in many areas. Permafrost's southern limit is projected to shift northward by several hundred kilometers during this century.



Declining Snow Cover

Snow cover extent has declined about 10% over the past 30 years. Additional decreases of 10-20% by the 2070s are projected, with the greatest declines in spring.





Diminishing Lake and River Ice

Later freeze-up and earlier break-up of river and lake ice have combined to reduce the ice season by one to three weeks in some areas. The strongest trends are over North America and western Eurasia.



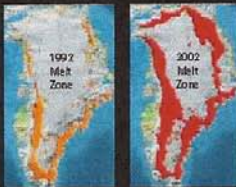
Melting Glaciers

Glaciers throughout the Arctic are melting. The especially rapid retreat of Alaskan glaciers represents about half of the estimated loss of mass by glaciers worldwide, and the largest contribution by glacial melt to rising sea level yet measured.



Retreating Summer Sea Ice

The average extent of sea-ice cover in summer has declined by 15-20% over the past 30 years. This decline is expected to accelerate, with the near total loss of sea ice in summer projected for late this century.



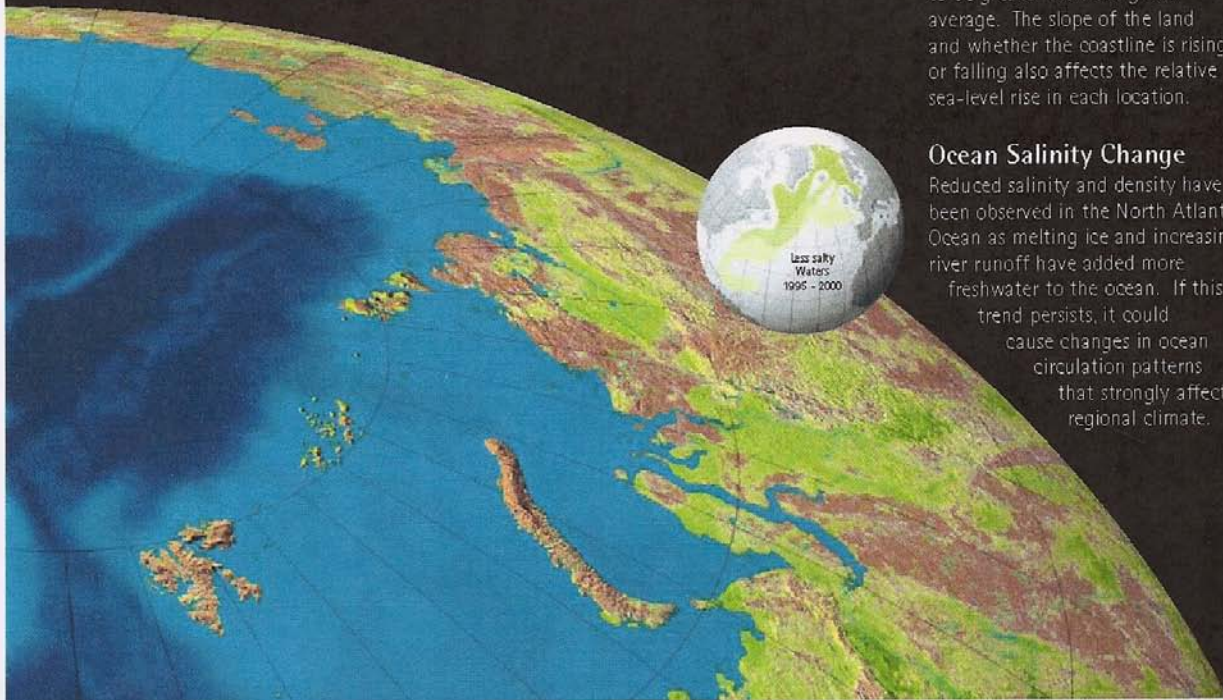
Melting Greenland Ice Sheet

The area of the Greenland Ice Sheet that experiences some melting has increased about 16% from 1979 to 2002. The area of melting in 2002 broke all previous records.



Rising Sea Level

Global and arctic sea level has risen 10-20 centimeters in the past 100 years. About an additional half meter of sea-level rise (with a range of 10 to 90 cm) is projected to occur during this century. The increase in the Arctic is projected to be greater than the global average. The slope of the land and whether the coastline is rising or falling also affects the relative sea-level rise in each location.



"The world can tell us everything we want to know. The only problem for the world is that it doesn't have a voice. But the world's indicators are there. They are always talking to us."

*Quitsuk Torkiusuk
Iqaluit, Canada*

Ocean Salinity Change

Reduced salinity and density have been observed in the North Atlantic Ocean as melting ice and increasing river runoff have added more freshwater to the ocean. If this trend persists, it could cause changes in ocean circulation patterns that strongly affect regional climate.

Impacts on Natural Systems

The climate trends highlighted on the previous pages affect natural ecosystems. Some of these impacts are highlighted below and explored throughout this report.



Wetland Changes

Permafrost thawing will cause lakes and wetlands to drain in some areas, while creating new wetlands in other places. The balance of these changes is not known, but as freshwater habitats are thus modified, major species shifts are likely.



Northward Species Shifts

The ranges of many plant and animal species are projected to shift northward, resulting in an increased number of species in the Arctic. Some currently widespread arctic species are likely to suffer major declines.



Vegetation Shifts

Vegetation zones are projected to shift northward, with forests encroaching on tundra, and tundra encroaching on polar deserts. Limitations in amount and quality of soils are likely to slow this transition in some areas.



Marine Species at Risk

Marine species dependent on sea ice, including polar bears, ice-living seals, walrus, and some marine birds, are very likely to decline, with some species facing extinction.



Increasing Fires and Insects

Forest fires, insect infestations, and other disturbances are projected to increase in frequency and intensity. Such events can subject habitats to invasion by non-native species.



Land Species at Risk

Species quite specifically adapted to the arctic climate are especially at risk including many species of mosses and lichens, lemmings, voles, arctic fox, and snowy owl.



UV Impacts

Increased ultraviolet radiation reaching the earth's surface as a result of stratospheric ozone depletion and the reduction in spring snow and ice cover will impact ecosystems on land and in water.



Old-growth Forest Loss

Old-growth forest is rich in species of lichens, mosses, fungi, insects, woodpeckers, and birds that nest in tree cavities. Climate warming would increase forest fires and insect-caused tree death, further reducing this valuable habitat which is already declining due to other human activities.



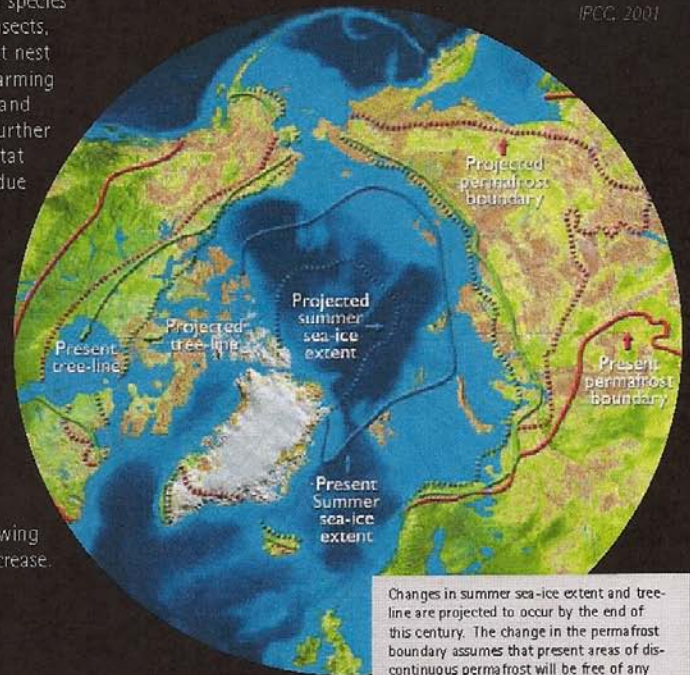
Carbon Cycle Changes

Over time, replacement of arctic vegetation with more productive vegetation from the south is likely to increase carbon dioxide uptake. On the other hand, methane emissions, mainly from warming wetlands and thawing permafrost, are likely to increase.



"Climate change in polar regions is expected to be among the largest and most rapid of any region on the Earth, and will cause major physical, ecological, sociological, and economic impacts, especially in the Arctic..."

IPCC, 2001



Changes in summer sea-ice extent and tree-line are projected to occur by the end of this century. The change in the permafrost boundary assumes that present areas of discontinuous permafrost will be free of any permafrost in the future and this is likely to occur beyond the 21st century.



Impacts on Society

The changes in climate and natural systems highlighted on the previous pages are projected to lead to numerous impacts on society throughout the Arctic.



Loss of Hunting Culture

For Inuit, warming is likely to disrupt or even destroy their hunting and food-sharing culture as reduced sea ice causes the animals on which they depend to decline, become less accessible, and possibly become extinct.



Expanding Marine Shipping

Shipping through key marine routes, including the Northern Sea Route and the Northwest Passage, is likely to increase. The summer navigation season is projected to lengthen considerably as the century progresses, due to the decline of sea ice. Expansion of tourism and marine transport of goods are likely outcomes.



Declining Food Security

Access to traditional foods including seal, polar bear, caribou, and some fish and bird species is likely to be seriously impaired by climate warming. Reduced quality of food sources, such as diseased fish and dried up berries, are already being observed in some locations. Shifting to a more Western diet carries risks of increased diabetes, obesity, and cardiovascular diseases.



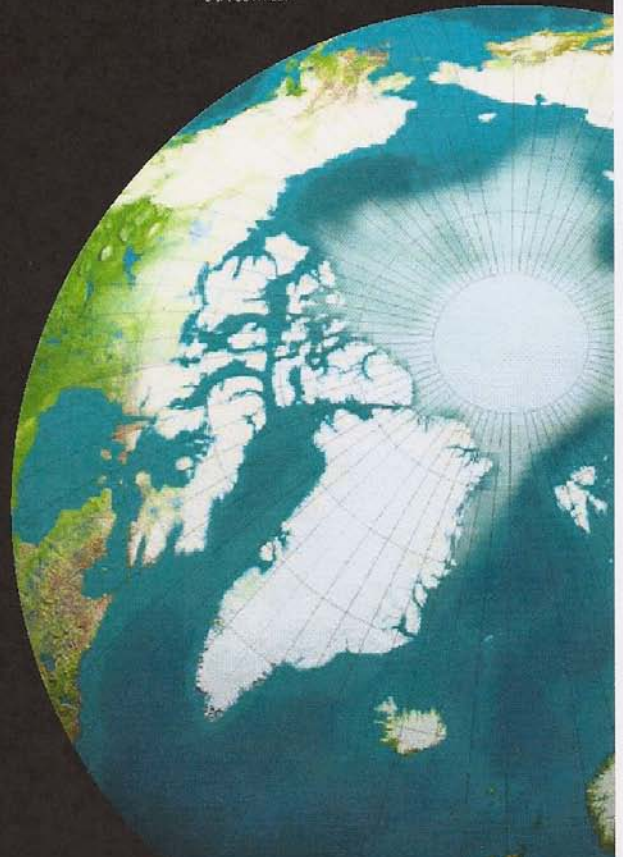
Human Health Concerns

Human health concerns also include increased accident rates due to environmental changes such as sea ice thinning, and health problems caused by adverse impacts on sanitation infrastructure due to thawing permafrost.



Wildlife Herd Impacts

Caribou and reindeer herds will face a variety of climate-related changes in their migration routes, calving grounds, and forage availability as snow and river ice conditions change, thus affecting the people who depend on hunting and herding them.





Increasing Access to Resources

Marine access to some arctic resources, including offshore oil and gas and some minerals, is likely to be enhanced by the reduction in sea ice, bringing new opportunities as well as environmental concerns. Increased ice movement could initially make some operations more difficult.



Enhanced Marine Fisheries

Some major arctic marine fisheries, including those for herring and cod, are likely to become more productive as climate warms. Ranges and migration patterns of many fish species are very likely to change.



Disrupted Transport on Land

Transportation routes and pipelines on land are already being disturbed in some places by thawing ground, and this problem is likely to expand. Oil and gas extraction and forestry will be increasingly disrupted by the shrinking of the period during which ice roads and tundra are sufficiently frozen to allow industrial operations. Northern communities that rely on frozen roadways to truck in supplies are also being affected.



Decline in Northern Freshwater Fisheries

Decreased abundance and local and global extinctions of arctic-adapted fish species are projected for this century. Arctic char, broad whitefish, and Arctic cisco, which are major contributors to the diets of local people, are among the species threatened by a warming climate.



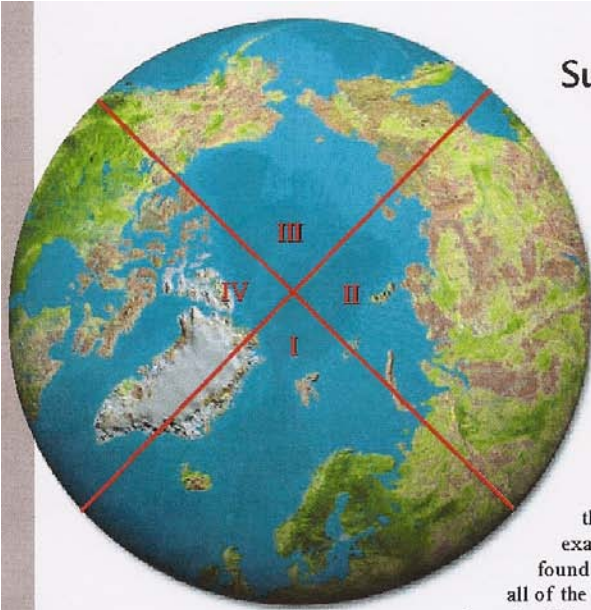
Enhanced Agriculture and Forestry

Agricultural and forestry opportunities are likely to increase as potential areas for food and wood production expand northward due to a longer and warmer growing season and increasing precipitation.

"Nowadays snows melt earlier in the springtime. Lakes, rivers, and bogs freeze much later in the autumn. Reindeer herding becomes more difficult as the ice is weak and may give way... Nowadays the winters are much warmer than they used to be. Occasionally during wintertime it rains. We never expected this; we could not be ready for this. It is very strange... The cycle of the yearly calendar has been disturbed greatly and this affects the reindeer herding negatively for sure."

Larisa Avdeyeva
Lovozero, Russia





Sub-Regional Overview

In a region as large and diverse as the Arctic, there are significant sub-regional variations in climate. Recent warming has been more dramatic in some areas than others. A few places, such as parts of Canada and Greenland surrounding the Labrador Sea, have not yet experienced the widespread warming of the rest of the region, and have actually cooled. Regional variations in future climate change are also projected. Local features of the natural world and societies also create differences in what impacts will occur and which will be most significant in each sub-region.

For this assessment, four sub-regions were identified, and this report highlights selected impacts in each of these sub-regions. This is not a comprehensive evaluation of climate change impacts in these areas, nor an appraisal of which impacts are the most significant. Rather, it is a brief selection of important examples that emerged from this assessment. Further details can be found on pages 114-121 of this report. Some impacts are important in all of the sub-regions, but to avoid repetition, are not specifically discussed in each. Other assessments, some already underway, will examine the impacts of some specific activities, such as oil extraction, in these Arctic sub-regions.

In assessing future impacts in the sub-regions, projected changes in climate were primarily derived from global scale climate models. As regional scale climate models improve and become more widely available, future assessments may be capable of more precisely detailing the local and regional patterns of change. For this assessment, the patterns of climate change and their impacts should be viewed at a fairly broad regional scale, as they become less certain and less specific at smaller scales.



SUB-REGION I

East Greenland, Iceland, Norway, Sweden, Finland, Northwest Russia, and adjacent seas

The Environment Northward shifts in the ranges of plant and animal species are very likely, with some tundra areas disappearing from the mainland. Low-lying coastal areas are increasingly likely to be inundated by storm surges as sea level rises and sea ice retreats.

The Economy Marine access to oil, gas, and mineral resources is likely to improve as sea ice retreats. A general increase in North Atlantic and Arctic fisheries is likely, based on traditional species as well as the influx of more southerly species.

People's Lives Reindeer herding is likely to be adversely affected by reduced snow cover and changing snow conditions. Traditional harvests of animals are likely to become more risky and less predictable. Animal diseases that can be transmitted to humans are likely to emerge.



SUB-REGION II Siberia and adjacent seas

The Environment Forests are likely to change significantly as climate warms, permafrost thaws, and fire and insect disturbances increase. Forests and shrublands are very likely to replace tundra in many areas. Plant and animal species will shift northward. River discharge will increase.

The Economy Sea-ice retreat is very likely to increase the navigation season through the Northern Sea Route, presenting economic opportunities as well as pollution risks. Access to offshore oil and gas is likely to improve but some activities could be hindered by increased wave action.

People's Lives Permafrost thawing is already causing serious damage to buildings and industrial facilities and is projected to continue. A shrinking river ice season and thawing permafrost are likely to hinder reindeer migration routes, affecting traditional livelihoods of indigenous people.



SUB-REGION III Chukotka, Alaska, Western Canadian Arctic, and adjacent seas

The Environment Biological diversity is most at risk from climate change in this sub-region because it is currently home to the highest number of threatened plant and animal species in the Arctic. Increasing forest disturbances due to fires and insects are projected. Low-lying coastal areas will experience more frequent inundation.

The Economy Damage to infrastructure will result from permafrost thawing and coastal erosion. Reduced sea ice will enhance ocean access to northern coastlines. Thawing will hinder land transport in winter.

Traditional local economies based on resources that are vulnerable to climate change (such as polar bears and ringed seals), are very likely to be disrupted by warming.

People's Lives Coastal erosion due to sea-ice decline, sea-level rise, and thawing permafrost is very likely to force the relocation of some villages and create increasing stress on others. Declines in ice-dependent species and increasing risks to hunters threaten the food security and traditional lifestyles of indigenous people.



SUB-REGION IV Central and Eastern Canadian Arctic, West Greenland, and adjacent seas

The Environment The Greenland Ice Sheet is likely to continue to experience record melting, changing the local environment and raising sea levels globally. Low-lying coastal areas will be more frequently inundated due to rising sea levels and storm surges.

The Economy Sea-ice retreat is likely to increase shipping through the Northwest Passage, providing economic opportunities while raising the risks of pollution due to oil spills and other accidents. More southerly marine fish species such as haddock, herring, and blue fin tuna could move into the region. Lake trout and other freshwater fish will decline, with impacts on local food supplies as well as sport fishing and tourism.

People's Lives Some Indigenous Peoples, particularly the Inuit, face major threats to their food security and hunting cultures as reduced sea ice and other warming-related changes hinder availability of and access to traditional food sources. Increases in sea level and storm surges could force the relocation of some low-lying coastal communities, causing substantial social impacts.

Why Does the Arctic Warm Faster than Lower Latitudes?

First, as arctic snow and ice melt, the darker land and ocean surfaces that are revealed absorb more of the sun's energy, increasing arctic warming. Second, in the Arctic, a greater fraction of the extra energy received at the surface due to increasing concentrations of greenhouse gases goes directly into warming the atmosphere, whereas in the tropics, a greater fraction goes into evaporation. Third, the depth of the atmospheric layer that has to warm in order to cause warming of near-surface air is much shallower in the Arctic than in the tropics, resulting in a larger arctic temperature increase. Fourth, as warming reduces the extent of sea ice, solar heat absorbed by the oceans in the summer is more easily transferred to the atmosphere in the winter, making the air temperature warmer than it would be otherwise. Finally, because heat is transported to the Arctic by the atmosphere and oceans, alterations in their circulation patterns can also increase arctic warming.

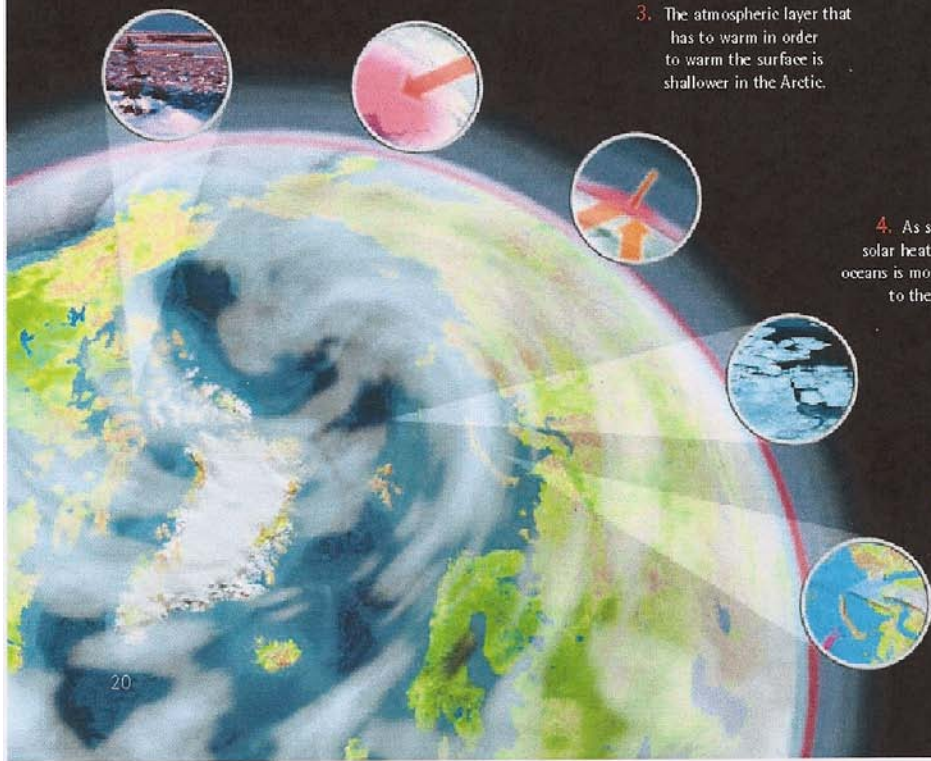
1. As snow and ice melt, darker land and ocean surfaces absorb more solar energy.

2. More of the extra trapped energy goes directly into warming rather than into evaporation.

3. The atmospheric layer that has to warm in order to warm the surface is shallower in the Arctic.

4. As sea ice retreats, solar heat absorbed by the oceans is more easily transferred to the atmosphere.

5. Alterations in atmospheric and oceanic circulation can increase warming.



Appendix M: Solid Waste Management Plan (Integrated Solid Waste Management Plan of the Atmautluak Traditional Council)

INTEGRATED SOLID WASTE
MANAGEMENT PLAN
OF
THE ATMAUTLUAK TRADITIONAL
COUNCIL



Section I: Introduction

Purpose

This plan is intended to be a developing plan that:

- improves the management of solid waste;
- fulfills the State of Alaska ADEC Solid Waste Program's expectation for an approved solid waste management plan;
- changes as knowledge increases and funding becomes available that would pay for the development of a new landfill or solid waste facility and the clean up of the current site.
- will be added to and changed at will by the community as they determine the best management attainable.

Solid Waste Planning Committee

A solid waste planning committee was formed in March, 2002. The planning committee receives a \$25 stipend per meeting provided by fundraising activities. The planning committee members are:

Daniel A. Waska- Council Member
Joseph A. Pavilla-Citizen
Wilson T. Nicholai-Former Trash Hauler
Peter O. Waska, Sr.-Citizen
Harry Nick-Military
Alternate- John Nicholai, Sr.-Citizen

Survey Results

The community was surveyed in 2000 to provide public opinion as to what solution was preferred to improve the management of solid waste. The results were 41 households chose to develop a new solid waste site and 6 head-of-the-households chose to improve the existing solid waste site. Due to the survey results the Atmautluak Traditional Council will develop a new solid waste facility and close the existing tundra pond solid waste site.

Section II: Historical Background

Historical Background of the Area

Atmautluak is part of a region inhabited by Yupik People for thousands of years. Atmautluak was settled in the 1969 by a former resident of Nanvarnarrlagmiut. The residents of Atmautluak are almost entirely Nanvarnarrlagmiut Eskimos, a subgroup of Yupiaq.

Atmautluak is located in the Southwest region of Alaska, 20 miles northwest of Bethel within the Yukon-Kuskokwim Delta at approximately 60°51' N Latitude, 162°16' W Longitude. The Yukon-Kuskokwim Delta is a wetland tundra area that stretches 250 miles from the Norton Sound to Kuskokwim Bay and inland 200 miles to the Kuskokwim Mountains. The delta is characterized by flat terrain with slow-moving, meandering rivers. There are thousands of ponds and lakes, varying in size from less than an acre to thousands of acres. Atmautluak lies on the west bank of the Pitmiktalik River. The Pitmiktalik drains to the Johnson River which in turn drains to the Kuskokwim River approximately 15 miles south southwest.

Atmautluak was incorporated as a City in 1976. On February 6, 1992, the City was dissolved by request of the City government and the Traditional Council. In 1997, the community formally adopted the Traditional Council as the governing body of the federally recognized tribe, the Native Village of Atmautluak.

Section III: Solid Waste Practices at Current Site

The oldest solid waste site located on the south side of the village. The site was used for about ten years when the population was approximately one hundred fifty people. It has been closed since 1971. The vegetation has been growing without any problems. The village closed the old site because it was only ½ a mile away from the village.

Location and Access to Solid Waste Site

The solid waste site is located approximately 1.5 miles from the village on the east bank of the Pitmiktalik River and 1 mile away from the airstrip. The solid waste site is a tundra pond located at 60° 53.179' N Longitude, 162°15.637' W Latitude. The location description is sited exactly in the center of the tundra pond. The pond is approximately 131,250 square feet. From the boat launch area at the solid waste site, the edge of the tundra pond is accessible by a 450 foot long deteriorating boardwalk across the tundra. A wheelbarrow is left at the site for transporting solid waste from the boat launch area to the tundra pond.

During the winter months, access to the solid waste site is by snow machine. Access during the ice-free months is by boat, approximately 2 river miles upstream and on the south bank of the Pitmiktalik River. For a few weeks during the spring and fall, the community can not access to the dump site because of unsafe ice conditions on the river. During these periods, waste is stored near the river for transport as soon as the waste site is accessible.

The Atmautluak Traditional Council Solid Waste Operators transport waste in boats or sleds to the site. The public also has access to the site free of charge if they want to haul their own waste for disposal at the site.

Existing Solid Waste Collection and Disposal

Solid waste is collected from the homes and businesses located in Atmautluak and transported to the solid waste site by snow machine and sled or boat depending on the season. Solid waste is piled on the ice near the center of the tundra pond. With each spring the ice melts and deposits the waste near the center of the pond (See attachment 1). During summer seasons, the side of the tundra pond is used for disposal (see attachments 1, 2, and 3). The site has a trench at the North side of the pond. During high flow season usually spring, the tundra pond likes to leak where the creek is drained to our main river. (See attachment 5)

The pond area is estimated at approximately 4.48 acres with a depth of 14 to 18 feet. A natural channel drains the pond during the high flows of spring for about three weeks. The dump pond is one in a series of ponds that may be acting like a constructed treatment system filtering out some contaminants as the water moves through the system leaving contaminants to settle out, filter out, breakdown to harmless contaminants and evaporate into the air. Further study needs to be done to determine how the pond series is working to filter contaminants. The Council intends to partner with State and Federal Agencies to study the contaminant flow and treatment.

During the winter months, we have uncontrolled open burning to reduce the volume of waste. The solid waste in the center of the tundra pond is also burnt. During the summer months, the operators monitor burn barrels while they are burning trash because of the dry tundra.

Annual Clean Up

The Village of Atmautluak has an annual clean up under the ALPAR Program. The recyclables are separated and shipped out for recycling during the annual clean up. The youth from the community pick up trash in and around the village. When the funding is short, the Atmautluak Traditional Council contributes money to finish off the annual clean up.

Waste Streams

Household Waste

Each person generates.....See below.

Store's Waste

The Store generates about 25 lbs. of paper and cardboard waste. The card board boxes are reused for transporting groceries. Some paper and cardboard waste is being reused but ultimately is burned in steam houses, woodstoves or at the solid waste site.

Bags

The local ANCSA Native Corporation owns the store which uses plastic bags. The store does not provide recycling for plastic bags or other types of plastic products at this time. However, Corporation staff and Council staff have discussed the impacts of plastic bags being blown across the tundra and a suggestion to switch to paper bags or to use cloth reusable grocery bags is being considered.

Medical and Veterinarian Wastes

Certain wastes, such as needles are being safely packed and shipped to the Yukon Kuskokwim Health Corporation for incineration and disposal. Dead dogs are burned at the existing solid waste site.

Aluminum Cans

In 2000, ALPAR sent a flyer notifying our village of the Recycle Cans Program. Aluminum cans are being sent to Bethel to be recycled. The school, store, and the laundromat are collecting cans to be recycled. Hagland Aviation provides the air freight to Bethel.

Disposal of Lead Acid Batteries

The unwanted lead acid batteries are stored by the fire station in a container built of plywood and two by fours. When storing the lead acid batteries, we use cardboard to place between the layers of batteries. The container for lead acid batteries has a cover to keep the rain, snow, and sun out (See attachment 8 for collection bin). The lead acid batteries are collected and recycled by the Natural Resource Specialist. The Specialist hauls the lead acid batteries to NAPA Auto Parts in Bethel for recycling.

Used Oil Disposal/Recycle/Burned

The used oil is reused or burned using oil burner. The unwanted or used oil is disposed of by the power plant. The plant operators use an oil burner to burn the used oil. Sometimes the local residents pick up used oil for fire starter or to reuse for their chain saws. The 55 gallon container is used to collect the used or unwanted oil.

Awareness of Fuel Oil Spill

The residents of the Village of Atmautluak have been educated about the procedures for reporting and cleaning up fuel spills. The community is aware how harmful the fuel oil

spill is to our subsistence foods, health and environment. The dumping of fuel oil or used oil at the solid waste site is prohibited.

Gas Station

The village gas station does not have secondary container to put underneath the gas cans while they are being filled to prevent minor splashing or overfilling spills. There have been discussions between the local Corporation, Atmautluak Ltd., and the Council who want to fix this situation by purchasing a secondary container. Unfortunately, the Council and Corporation have limited funding and have not been able to purchase the secondary container.

Condition of the Solid Waste Site

Open Dump Site

The solid waste site has never been fenced. Because of the poor condition of the boardwalk, it has become difficult to transfer solid waste from the boat launch area to the tundra pond by wheelbarrow. Consequently, solid waste tends to accumulate at the boat launch area. (See attachment 7) The solid waste site does not have any heavy equipment to compact or cover the solid waste. The waste transferred to the dump site is not covered. There are no signs posted prohibiting the dumping of hazardous materials although through education efforts it is believed that within the past five years, there has been little to no dumping of motor oil or fuel oil at the dump site.

Visual Inspection of the Solid Waste Site

A visual inspection of the dump site finds the disposal of harmful household product containers such as disinfectants and bleach. In addition, hazardous substance containers can be seen including diesel fuel tank containers, lead acid batteries, motor oil containers, break fluid containers and Freon inside of discarded refrigerators. (See attachment 6) Many more unknown substance containers are in the center of the tundra pond where the waste is piled during the winter. Animals have been observed feeding from the solid waste site including waterfowl, crows, foxes, birds and rodents.

Wind Blown Litter

Approximately 10% of the waste transferred to the solid waste site is blown away by high winds. The trash that blows away can travel several miles in every direction because there are no natural barriers such as trees or hills for many miles.

To reduce **Household residential trash, wood, paper, and commercial/business burnable trash** will be hauled to the landfill and burned on burn days. An attempt will be made to haul and burn on the same day to keep the waste material dry and enable a fast efficient burn. Based on this volume the burn days expected would be 2 times a week. Volunteer effort may be the base in the beginning but as revenue is generated from landfill users, the current trash haulers could have an increase in pay or perhaps this will allow for additional paid landfill operators, in addition to training and supplies.

Financial Operations

The Native Village of Atmautluak has trash hauler operators that are paid by Atmautluak Traditional Council general fund which is supplemented with gaming funds. Trash hauler operators are paid \$9.00 an hour. The operators work fourteen hours per week. Each household pays \$10.00 a month to have their trash hauled. The Atmautluak Traditional Council Government provides trash hauling to Elders free of charge because they hold a valued and respected position in the Community. Businesses are charged \$100.00 a month for Solid Waste Services.

Section III: Improved Solid Waste Practices

During the fall of 2004, the Atmautluak Traditional Council received a grant to fund the first stage of cleaning up the open dump site in preparation for closure. Waste surrounding the pond was picked up and sorted. A burn box was purchased to reduce the waste volume at the site. Recyclable materials and harmful/hazardous materials have been stored in shipping containers located on a newly constructed platform staging area to be shipped to appropriate facilities for disposal. Waste was no longer piled in the center of the pond during the winter of 2004/2005, but instead was sorted within the designated area near the boat launch area that remains open until a new site is permitted. A feasibility study for cleaning/closing the tundra pond is 95% complete. A Brownsfield Assessment of the site will be conducted this spring. The Council anticipates selecting a method within 90 days of the Brownsfield Assessment results and seeking funding to proceed with the closure.

Funding was also received to fence the new site and provide tundra road mats instead of a boardwalk for transporting waste at the site as well as a bobcat. The new solid waste facility plan is under development as the Council examines methods for handling solid waste in an environmentally sound manner.

Section IV: Closure

Closure of Solid Waste Site (Tundra Pond)

The Atmautluak Solid Waste Site (tundra pond) that needs to be closed is located 1 ½ mile away from the village and 1 mile away from the airstrip. The center of the Solid Waste Site (tundra pond) was plotted with a GPS location at N 60° 53,179', W 162°, 15,637'. Zender Environmental has completed a feasibility study analyzing potential methods for safely closing the tundra pond and the costs associated with each method. However, Zender was not able to determine the level or types of contaminants. An EPA Brownsfield Assessment was requested for the site in 2005 and is scheduled to begin in June 2006. After the Brownsfield assessment has been completed, the Council will select a closure method based on the new information and the methods described in the feasibility study.

Section V: New Solid Waste Facility Plan

The main objective for the new facility is to reduce, reuse and recycle with the goal of having little or no adverse impacts on the wetland environment and watershed of the area. The new solid waste facility will be comprised of a transfer station for storing recyclables, vehicle and household salvage area, a clean burning incinerator and an ash landfill. The facility operations will be supported by a combined labor force of paid positions and community service labor.

Trash and recyclables will be collected and delivered to the Solid Waste Facility. Recyclables will be compacted and stored for back hauling to Bethel. Burnable waste will be stored in a dumpster at the facility and burned in a clean burning incinerator twice weekly. The incinerator has a five year complete component warranty and can be monitored remotely via modem for optimum performance. The ash will be deposited in an ashfill after testing for heavy metals.

Any ash containing heavy metals and all other hazardous household waste will be stored in containers for backhauling to Bethel and Anchorage for processing once per year. The waste oil generated in the community will be burned as the auxiliary fuel for the incinerator.

Increases in trash services and treatment (segregate, salvage, store and ship special wastes) and better management of burns is going to require additional funding and/or volunteer labor to increase overall better management of the trash generated in Atmautluak. This solid waste management plan looks at raising individual household monthly fees as one option to consider. However the plan realizes that a community wide volunteer effort is needed, as well as additional funds for special costs such as training and equipment. The village has not secured funds at this time for these items but is actively seeking them.

Collection bins are currently being priced for the community use. The community is interested in wheeled bins for ease and use but costs and vendors have not been decided upon. *Haul-all* company has a variety of bins for different waste streams made from metal or plastic. The costs range from \$500 to \$2500 according to size and type. An additional \$2,000 to \$10,000 should be budgeted for the costs of these bins including shipping. *Haul-all* (*Haul-all* Whitehorse Motors LTD. 4178-4th Avenue, Whitehorse, Yukon Territory Canada Y1A 1J6 (867-667-7866). Grant funding to start a recycling program are being pursued.

Below are tools for starting the facility: implementation plan, estimated quantity of streams of waste, and basic guidelines to begin developing operational procedures for the facility. These tools should be adapted or changed as more information and ideas are formed to improve the development and operation of the facility.

IMPLEMENTATION PLAN

Step 1: Select location and means of site Control for tribal land, i.e. quit claim deed or long term lease, or 14 C transfer. In-Kind contribution to proposals estimated \$30,000 in leased land, if allowable match. The Council has a lease with Atmautluak Limited for the Solid Waste site until a transfer via 14C.

Step 2: Perform an Environmental Impact Assessment required under NEPA for federally funded projects.

Step 3: Set up a new solid waste facility

The facility will be designed to maximize reusing, recycling, and reducing. The facility will have a salvage area for house hold items, vehicle parts and #3 plastic bottles that may have a useful life. The facility will also have large bins for sorting recyclables and dumpster for storing burnables. The facility will be large enough for three – four workers to disassemble vehicle parts, store recyclables for transport and storing burnable waste. The incinerator may be located nearby or in the facility if it is possible to generate conduction heat for the facility.

The building and incinerator will require a source of electrical power. Due to the location, 1.5 miles from Atmautluak, there are no power lines in the area to hook into. A windmill will be the primary source of power and small generator will be used for back up power in the event of windmill failure. A satellite phone or satellite internet will be used for remote monitoring of the incinerator.

Purchase a building (30 x 80), similar to that supplied by Alaska Structures (www.acs-ac.com), \$150,000 FOB Atmautluak including the building, materials for the floor/foundation and freight; A small windmill for power, \$15,000 FOB Atmautluak; generator for back up power \$6500 FOB Atmautluak; Storage Bins & Shelving \$15,000; Electrical package \$5000; Satellite Phone with modem \$1000 and Incinerator toilet \$2000.

Step 4: Purchase a clean burning incinerator

The incinerator will be clean burning with the potential for use of two types of auxiliary fuel, stove oil (diesel) or waste oil. A second fuel source is required to burn the waste at a temperature high enough to eliminate air pollution. As long as electronics and #3 plastics are not incinerated, the ash from incineration should not contain heavy metals other than silver. The purchase of the incinerator will also include on site training for operating and maintaining the incinerator.

An 375 lb/hr max capacity incinerator is estimated at \$75,013 FOB Bethel, includes weatherization package and roof cables. Operational costs are \$32/hr of auxiliary fuel (~8 gal/hr x \$4.00/gal) or 2 days x 7hrs x \$32 x 4wks/mo=\$1792 or \$21,504 annually for diesel. The waste oil is generated at about 55 gallons a month and will reduce the amount of diesel required.

Ash fill

The Bobcat with drill attachment will be used to drill the ash cells.

Step 5: Purchase and Distribute Recycling Bins

Each home will receive four bins: paper, plastic, and aluminum. At central locations through out Atmaultluak, larger recycling dumpsters will be staged for households and businesses to empty their bins into the dumpsters.

EPA pollution reduction grant funds recycling programs.

Bins \$80 (4 bins) x 60 households = \$4800; \$20 can crushers x 60 households=1200; #? central stations \$1000 each.

Step 6: Operator Training

Solid Waste Operators will be trained in hazardous waste handling (HAZMAT and HAZWOPER). This cost is approximately \$500 for the 40 hour class and \$125 for the 8 hour refresher class, not including lodging or flight costs. The Joint Regional Environmental Training Center 907-428-2242 is one source of training. In addition to HAZMAT/HAZWOPER training the Solid Waste operators will be trained in clean incineration practices when classes become available. Operators will eventually be trained Freon removal as well. BIA Solid Waste Grant funds training; USDA also has training funds.

Operational Procedures for New Facility

The solid waste facility will be where recyclable and burnable materials are sorted and stored until shipped for processing to an appropriate facility.

Reusable parts from discarded snow machines, four wheelers, and boat motors will also be inventoried, stored and made available to the public for a small fee.

Any reusable # 3 plastics will be stored for local use on an as needed and demand basis.

Procedure for sorting and incineration will prevent ash from containing heavy metals and the discharge of pollutants such as dioxins and furans into the air.

Develop: incineration procedures/instructions, Ash fill procedures/instructions and recycling procedures/instructions to ensure that the least possible level of pollution impacts the area of the site, the people of Atmaultluak and surrounding villages.

Limit access to the facility by the public with fencing.

ESTIMATED QUANTITY & WASTE STREAMS

Source

The sources of waste in the Village of Atmautluak that contribute to the landfill are:

Store 1
Store 2
School
Post Office
Health Clinic
Water Plant
Power Plant
Generator
Tank Farms
Electric Coop
60 Homes
25 Cars and Truck
25 ATV
85 Boats
95 Snow machines
Village Admin Office
BIA Shop
New Home & Rehab Construction (1-10 homes annually)
New Clinic Construction (future)

Type of waste generated in the village of Atmautluak:

Cardboard	Computers
Paper	Subsistence Waste
Wood	Honey Bucket Waste
Scrap metals	Fish Waste
Household Trash	Commercial Waste
Glass	Used oil
Bulk metals	
Waste oil	Aluminum Cans
Glycol	Solvents
Construction Debris	Demolition Debris
Fish nets	Paints
Chlorine	Sludge
Lead Acid batteries	Alkaline Batteries
Freon	

Estimated Quantity of Household Trash

Here are three different types of formulas used to obtain an estimate:

- 1) Assume 291 residents x 6 lbs of residential garbage per day = 1746 lbs per day or
 - 637,290 lbs per year (1746 X 365)
 - 318.6 tons per year (637,290/2000)

- 6.12 tons per week (318.6/52)
- .87 tons per day (6.12/7)

2) Assume 6 lbs per trash per day:

- 42 pounds per week per person (6 lbs. x 7 days)
- $42/22 = 1.9$ bags per person per week (22lbs.is average weight of a large full garbage bag)
- 1.9 bags of garbage per week per person
- 1.9 bags of garbage x 3 cf = 5.7 cubic feet per person per week
(one 22 lb. bag of garbage =3 cubic feet)
- 291 persons x 5.7 cubic feet = 16587 cubic feet of garbage per week, for whole community
- $16,587/27 = 61.43$ cubic yards per week for the whole community.

3) 1 large garbage bag = 3 cubic feet or 22 lbs.

- estimate 2 garbage bags each week per household
- $291 \times 2 = 582$ garbage bags each week for entire community
- = 1746 cubic feet of garbage per week (582×3 (cubic feet))
- 64.66 cubic yards ($1746/27$)
- 582 garbage bags per week x 22 lbs = 12,804 lbs. per week
or 6.4 tons per week. ($12,804/2000$)

Waste Streams

Household trash: *Using estimate (3)*

*.9 tons per day
6.4 tons per week
25.6 tons per month
307 tons per year = TOTAL RESIDENTIAL/HOUSEHOLD TRASH*

To be sorted, recycled, reused and reduced through clean burning incineration at the new facility. Ash will be dumped in ash burial cells after being tested for heavy metal contaminants. If harmful heavy metals such as lead or mercury are found, the ash will be handled as hazardous waste and shipped to an appropriate facility for disposal.

Cardboard alone is estimated at 25 pounds per week.

The treatment will be to store the cardboard in the solid waste facility to be reused or until burnt in the incinerator. The ash will be disposed of in the landfill. The volume will be less than a 5 gallon bucket.

Appliances:

*64 households x 2 appliances per year = 128 appliances total over 20 years =
128/20 6.4 appliances discarded per year.*

*5 businesses x 2 appliances per year = 10 appliances total over 20 years =
10/20= 1 appliance every 2 years.*

Appliances will be stored in a salvage area with the bulk metals. Freon removal will be attempted when the local business freezers and air conditioners are serviced for maintenance. Eventually a fund will be set up for regular service as needed, which would be once per year or every other year. Our landfill operator could eventually get trained in refrigerant removal.

Lead Acid Batteries: $64 \text{ household} \times 2.5 \text{ vehicles} = 160$
 $160 \text{ batteries} / 4 = 40 \text{ batteries per year will be disposed.}$

The community purchases over 40 batteries per year, not including businesses. Right now funds are required to ship one pallet per year of batteries out costing approximately \$800.

The Bethel NAPA collects batteries and offers a core charge. The core charge currently is \$4.00-5.50 but the batteries cannot be leaking, broken or missing any caps. A community awareness program will inform residents of the core charge and exchange service as an alternative to recycling them through the Traditional Council Solid Waste Facility. Possible next step deterrent to not participating in the exchange service, the Council may start charging the actual cost to shipping the battery, \$20, to each person disposing of a battery.

Alkaline Batteries: 10 pounds per year generated from businesses and households. Battery buckets are available for reprocessing (\$80.00) for a ten gallon size bucket. The battery bucket will be located at the recycling facility. A community awareness program will inform residents of this service and the hazards associated with not recycling batteries. The community can begin to collecting and delivering batteries to the recycling facility to be shipped. It is estimated that 2 buckets will be needed per year.

Household Hazardous Waste = $291 \times 1.5 = 436.5$ lbs of HHW each year, reuse/swap program will reduce 50%...will need to ship up to 215 lbs. per year of HHW. A storage connex will store corrosive and flammable materials in containers in separated area. The most common hazardous wastes generated by the community will be used oil (waste oil), solvents, glycol, paints, and bleach containers.

Abandoned vehicles = Currently 29 abandoned vehicles
Estimate costs for local labor and removal including fluid removal
\$32,361.00. Yutana Service Bulk Freight rates,

Shipping to Seattle for 20 tons of scrap metal cost is approximately \$5,500 not including labor for loading.

Another option for metal and construction and demolition waste material is a monofill. Requirement and costs for monofill varies from \$700 for the permit to \$3,000 for the permit. A general permit- (\$700) permit from ADEC allows the burial of inert metal, construction and demolition waste material up to 1000 cubic yards.

Factors to be considered are the decrease in land use and dollar value loss in land.

Medical Wastes – Infectious medical wastes are currently shipped to Bethel for proper sterilization and disposal. The office paper and non-medical wastes produced at the clinic will be sorted, reused, recycled or incinerated with other solid waste.

Used Oil is currently burned in the used oil burner. The entire community volume of used oil is about 700 gallons annually. The estimate is based on the number of vehicles in the community and assuming engine maintenance per manufacturer's suggestions. The new collection area will be at the solid waste facility in 55 gallon collection drum or other sized drum marked "Used Oil". Businesses and residents are responsible for self-delivery of used oil. The used oil treatment will be used as an auxiliary fuel for the incinerator.

Glass can be segregated out (at the household level) and clean glass will be stored seasonally. Glass will be incinerated until a recycling program is available in the Bethel area.

Aluminum Cans – Every household and business will have a recycling bin for aluminum cans. The households and businesses will dump cans from bins into collection site dumpsters placed around town. The community will continue to participate in the ALPAR aluminum cans recycling and work on expanding the recycling program.

Honey Bucket Waste, Sludge – Currently these items are not addressed in this plan.

Subsistence Waste, Fish Waste and Carcasses-

Subsistence waste is seasonal and fluctuates. Subsistence waste will be incinerated.

Salvage area- A salvage area will be set up within the new solid waste facility. This area can house furniture, appliances, machine parts, scrap vehicle parts and items that still have useful life left. A yearly event will need to take place to dispose of the items that have accumulated and not been claimed. The expectation is that the majority of these items will be scrap metal and inert waste. They may be backhauled or monofilled and these costs have not been accounted for in this plan.

Construction Wastes- The Atmautluak Traditional Council Housing program generates waste primarily during remodeling project. Waste from new construction is salvaged either for future projects or sold to generate funds for future projects. For remodeling project, home owners wanted to keep the wood salvaged from demolishing walls for use on other projects. Fiberglass insulation waste is burned. For large commercial projects, it is for the community to consider an ordinance that projects develop a special fund for the disposal and backhauling of materials that cannot be reused within the community.

Liquid Waste generated from the power plant, water plant, tank farm, generator, and electric cooperative may be generated due to maintenance and overhauls. A liquid waste management plan will be developed for the safe storage and backhaul of these items.

These items are not allowed for disposal at the landfill, and the signage will clearly state so.

Electronics/Computers Waste generated is recycled by returning to the manufacturer. When the manufacturer does not recycle the waste is being stored until it can be shipped to an appropriate facility.

Old metal debris cleanup:

Estimate of Cost of Hauling and removing of Toxics from Abandoned Vehicles and General scrap metal clean up \$32,361.00.

Yearly Costs for Landfill Operating under this plan ranges between \$18,500 for the basics up to 29,000 for full trash management of all the waste streams generated. The total costs for the 5-7 years expected for this landfill is \$92,500 to \$203,000 (5 x 18,500 = 92,500 low estimate....7 x 29,000 = 203,000 high estimate)

A *fully operational* landfill that manages all the waste streams with burn box use is estimated to operate at over \$75,000 per year for a community with a small population.

Landfill closure to ADEC standards: Estimated at \$105,000 for 2 Acres. This includes gravel, labor, equipment rental locally, administration, seeding, engineering, and the labor involved in the post closure visual monitoring. Closure costs can be much lower if the individual cells are closed as they fill up with ash. Closure costs can be much lower if gravel is used on regular basis for cover material and actively sloped. This estimate does not include the current debris near the site or scrap metal accumulated.

Total Life cycle costs for this management plan that is a small ashfill with basic services and a life span of 5-7 at current location is:

Abandoned Vehicle clean up	32,361
Yearly total costs	150,000
Closure for site	105,000
Total life cycle costs:	287,361.00+

(Landfill closure for ADEC requires properly covered and closed cells, 2 feet of gravel cover sloped to minimize water contact, a topsoil layer-minimum 4 inches- to allow for natural or mechanical seeding (grass) to take place and a minimum of 5 years post monitoring This monitoring is a yearly visual check of the site to look for signs of erosion, settling, water ponding or poor water movement through site and the ability to correct these problems if they should occur. In addition, future land use is limited. Legal documentation includes a deed notation on the property and permanent boundary markers.)

REVIEW COSTS & BREAKDOWN FOR EXISTING AND NEW SITE

Landfill Components Costs Per Year		
Atmautluak		
	Population 291/ 64 Residential Homes	
Operator (1)	\$16/hr (16 hours per week)	13,312
Operator Training		2500
Administrative	\$12/hr (5 hours per week)	3120
Burnbox*	\$10,000 each x 2 20,000/15 years	1350
Safety Gear		350
Equipment (Dozer) rental?	\$450 per day. 4 x year	1,800
Bobcat (Parts)	\$38,000 / 15 years	2600
Fuel, Antifreeze, Oil		600
Parts & Service		1000
Shipping		
Special Waste Shipment		800
Special Costs (fencing)		2500
Final Cover and Closure*	\$105,000/15 years (2 acres)	7,000
Post Closure Care 5 Years	\$1000 per year x 5 /15 years	333
First stage per year		18,582
Second stage per year costs		24,382
Third stage per year costs		28,915
Future Costs not accounted for		105,000 5,000
*Potential Revenue		18,300
64 Homes Utilizing Ashfill	64 homes serviced @\$25 per month	16,000
C&D Waste	\$90 ton (20 tons per year)	1800
Business Waste	5 @ 100 per month	500

Although the tipping fees to use the Bethel landfill are affordable (\$6.00 to 40.00 per ton), the logistics for labor and handling of the trash material make this option unfeasible. The shipping in bulk freight to Seattle is also reasonable (\$6,000 per 18,000 pound conex of bulk freight to Seattle), the local labor, loading and docking issues, storage costs are unacceptable at this time. There are some labor and shipping/backhauling costs that are going to need to be met regardless of logistics. These items include lead-acid batteries to begin with and working up to other items such as alkaline batteries, Freon, household hazardous waste products that can no longer be used and special items such as computers and lights. While aluminum cans are not a hazard to the landfill or water, the infrastructure that is already set up with the *flying cans program* make this an easy waste stream to handle, and the volume of space saved is high. **Due to the local economics and scarcity of funding for solid waste management, the community is proposing this solid waste management plan as the beginning stages to a comprehensive waste management system within the community. This plan will eventually be one that will encompass the safe storage, treatment and disposal of all the waste streams within the community and partially self sustaining.**

Estimate Cost for Hauling and Removing of Toxics from Abandoned or Unwanted Vehicles

Laborers: \$13 x 4 personnel x 7 hours a day x 60 days=	\$21,840.00
Benefit at 15% of the total cost is=	\$3,276.00
The estimate cost of the laborers is calculate at=	\$25,116.00

Heavy Equipment Operator: \$15 x 7 hours a day x 60 days=	\$6,300.00
Benefit at 15% of the total cost is=	\$945.00
The estimate cost of the Heavy Equip. Operator is calculate at	\$7,245.00

The total estimate cost for Laborers and Heavy Equipment Operator is calculated at \$32,361.00.

Old Freezers and Refrigerators

Abandoned or unwanted old freezers and refrigerators will be hauled to the new dumpsite. When at the dumpsite, the laborers will be removing the lids and drain the neon from the old freezers and refrigerators. The neon will then be shipped out for recycle. The location was picked with GPS at N. 60° 53.128', W. 162° 15.546'.

Public Input

The public has been surveyed (see survey results on 1st page). Also, we have planning committee for developing the Solid Waste Management Plan for Native Village of Atmautluak.

Estimate Cost of the Clean up and Closure

7 Generations: Addressing Village Environmental Issues for the Future Generations of Rural Alaska

Supervisor

1 person x 40 hours per week x 16 weeks xx \$18= \$11,520.00
Benefit is calculated at 20% of the wage= \$2,304.00

Heavy Equipment Operator

1 person x 40 hours per week x 16 weeks x \$16= \$10,240.00
Benefit is calculated at 20% of the wage= \$2,048.00

Laborers

4 people x 40 hours per week x 16 weeks x \$14= \$35,840.00
Benefit is calculated at 20% of the wage= \$7,168.00

Clean up crew estimate cost with 20% benefit= \$69,120.00

General Liability Insurance= \$4,000.00

Supplies

55 gallon gas= \$145.00

5 quarts motor oil= \$14.95

Ropes: \$.57 a foot x 1 x 100 feet= \$57.00

2 drums stove oil= \$264.00

15 hydraulic fluid= \$101.94

25 gallon 10W40= \$175.68

Supplies total up to with insurance= \$4,908.56

Containers/Disposal of hazardous materials= \$19,452.00

TOTAL estimate cost of the clean-up project calculate at= \$93,480.56

Indirect Contribution

Boat and Motor= \$5,800.00

Four Wheeler and Trailer= \$5,800.00

Indirect Contribution from A.T.C. is calculated at= \$11,600.00

Total Cost of the clean up and indirect contribution is calculated at \$105,080.56

Appendix N: Grants, Funding and other Resources Directory

Appendix N: Grants, Funding and other Resources Directory

Below is a brief listing of grant and funding opportunities and resources available to Tribes in Alaska for environmental projects or programs. Some of the organization (e.g. Environmental Protection Agency and Alaska Department of Environmental Conservation) are responsible for many relevant programs; a brief description and contact information is provided here but you should investigate web sites and make personal contact to get additional information. This section contains information on the following:

Alaska Area Native Health Service
Alaska Center for the Environment
Alaska Conservation Foundation
Alaska Department of Community and Regional Affairs
Alaska Department of Environmental Conservation
 Community Water Quality Grants
 Village Safe Water
Alaska Department of Health and Social Services
Alaska Inter-Tribal Council
Alaska Native Health Board
Alaska Native Tribal Health Consortium (ANTHC)
Alaska Ombudsman
American Lung Association of Alaska
Bureau of Indian Affairs
Environmental Protection Agency
 Air Pollution Grants
 Environmental Justice Grants
Indian General Assistance Program (IGAP)
Inuit Circumpolar Conference
National Science Foundation
Northern Alaska Environmental Center
Rural Alaska Community Action Program, Inc (RurAL CAP)
Rural Alaska Sanitation Coalition
Solid Waste Alaska Network
Trustees for Alaska
U. S. Department of Agriculture (USDA)
Yukon River Inter-Tribal Watershed Council
Toll-free and emergency numbers

Alaska Area Native Health Service

Office of Environmental Health & Engineering
3925 Tudor Center Dr.
Anchorage, AK 99508
Tele: (907) 729-3500
Fax: (907) 271-4734

Alaska Native Tribal Health Consortium (ANTHC) is responsible for the design and construction of water and wastewater sanitation facilities. The Office of Environmental Health & Engineering reviews sanitation projects and acts as a funding agency.

Alaska Center for the Environment

519 West 8th Ave., #201
Anchorage, AK 99501
Tele: (907) 274-3621
Fax: (907) 274-8733

Email: akcenter@alaska.net

ACE is a non-profit environmental advocacy and education organization dedicated to the conservation of Alaska's natural resources. Since 1971, it has worked to promote sound environmental policy & programs in the southcentral Alaska area and statewide. ACE is at the forefront on environmental education and land use, forestry, recycling, transportation, & quality-of- life issues. <<http://www.akvoice.org/>>

Alaska Conservation Foundation

750 W. 2nd Ave., Suite 104
Anchorage, AK 99501-2167
Tele: (907) 276-1917
Fax: (907) 274-4145
Email: acfinfo@akcf.org

Alaska Conservation Foundation (ACF) makes grants available and receives funds to protect the integrity of Alaska's ecosystems and to promote sustainable livelihoods among Alaska's communities and peoples. ACF makes grants available throughout the year.

Alaska Department of Community and Regional Affairs

Municipal and Regional Assistance Division
333 W. 4th Ave., Suite 220
Anchorage, AK 99501-2341
Tele: (907) 269-4500
Fax: (907) 269-4539

ADCRA assists with planning for land use, solid waste, and other community issues. Rural Utility Business Advisor (RUBA) Program provides management assistance and financial training related to wastewater utilities to cities and villages.

Alaska Department of Environmental Conservation

Alaska Department of Environmental Conservation (ADEC)

Website: <http://www.state.ak.us/dec/home.htm>

Distributes fact sheets, brochures and pamphlets on a variety of topics including: recycling, used oil, open burning, hazardous wastes, drinking water, wastewater, etc.

Anchorage Office

555 Cordova St.
Anchorage, AK 99501-2617
Toll Free: (800) 510-2332
Fax: (907) 269-7600

Juneau Office

410 Willoughby Ave., Suite 105
Juneau, AK 99801-1795
Tele: (907) 465-5355
Fax: (907) 465-5362

Fairbanks Office

610 University Avenue
Fairbanks, AK 99709-3643
Tele: (907) 451-2360
Fax: (907) 451-2188

Other ADEC regional offices include:

Bethel: (907) 543-3215
King Salmon: (907) 246-6636
Cordova: (907) 424-5585
Dutch Harbor: (907) 581-1681
Kodiak: (907) 486-3350
Palmer: (907) 745-3236
Wasilla: (907) 376-5038
Valdez: (907) 835-4698
Ketchikan: (907) 225-6200
Sitka: (907) 747-8614
Tok: (907) 883-4381
Kenai/Soldotna: (907) 262-5210

Programs Include:

Community Assistance and Information
Compliance Assistance
Rural Issues Program
Watershed Development
Water Quality Protection
Village Safe Water
Drinking Water & Wastewater

Division of Air Quality
Governor's Council on Rural Sanitation
Facility Operations Assistance
Municipal Grants
Solid Waste Management
Seafood Processing and Development
Animal Industries
Environmental Sanitation & Food Safety
Laboratory & Pesticide Services
Contaminated Sites
Storage Tank Program
Spill Prevention & Emergency Response

Community Water Quality Grants

Department of Environmental Conservation
Division of Air & Water Quality
410 Willoughby Ave., Suite 105
Juneau, AK 99801-1795
Tele: (907) 465-4158
Fax: (907) 465-5274

Community Water Quality Grants are made available each year to support community-based projects to prevent nonpoint sources of pollution and to restore degradation of water quality and aquatic habitat. There is no limit for the amount of request. There is a 40% non-federal match requirement. Applications are due in March.

Village Safe Water

Alaska Department of Environmental Conservation
410 Willoughby Avenue, Suite 105
Juneau, AK 99801-1795
Tele: (907) 465-5137
Fax: (907) 465-5177

This program provides grants of up to 100% of project costs for sanitation facilities, haul systems, a safe water source at a central location, a place to dispose of human wastes, and in some cases, laundry, sauna and shower facilities. This program also develops proposals and secures federal funding for planning, design and construction of wastewater treatment facilities and landfills in Alaska rural and Native villages.

Alaska Department of Health and Social Services

Office of Epidemiology
3601 C St., Suite 540
Anchorage, AK 99503
Tele: (907) 269-8000
Fax: (907) 562-7802

Can investigate occurrence of diseases related to sewage and provide information on different diseases.

Alaska Inter-Tribal Council

445 East Fifth Avenue

Anchorage, Alaska 99501

Phone: (907) 563-9334

Fax: (907) 563-9337

Toll Free: 1-800-995-9334

Contact email: aitc@aitc.org

Private non-profit Alaska Native organization. One of the most prominent goals of AITC includes development of initiatives which build the capacity of Alaska Tribal Governments to conduct programs in the areas of environmental health and natural resource management.

Alaska Native Health Board

Rural Sanitation Program

4201 Tudor Centre Dr., Suite 105

Anchorage, AK 99508

Toll Free: (800) 478-2426

Tele: (907) 562-6006

Fax: (907) 563-2001

Mission: To promote the spiritual, physical, mental, social and cultural well-being and pride of Native people, and to assist Alaska Natives in pursuing health careers.

Alaska Native Tribal Health Consortium (ANTHC)

Alaska Tribal Multi-Media Demonstration Project Grants

Alaska Native Tribal Health Consortium (ANTHC)

Division of Community Health Services

4000 Ambassador Drive – 4th Floor

Anchorage, AK 99508

Tele: (907) 729-3496

Fax: (907) 729-3652

Alaska Ombudsman

Toll Free: (800) 478-4970 (Anchorage & Juneau)

Toll Free: (800) 478-3257 (Fairbanks)

If you are having a problem with an Alaska state agency, or you think a state agency is violating the law, a call to the ombudsman can open an investigation.

American Lung Association of Alaska

1057 West Fireweed Lane, Suite 210

Anchorage, AK 99503-1736

Tele: (907) 276-5864

Fax: (907) 263-2090

Website: <http://www.lungusa.org>

American Lung Association of Alaska offers a wide variety of lung health services to people of

Alaska. They have many materials available on indoor air pollution. Visit their website to access this information.

Bureau of Indian Affairs

Environmental Management Services

Office of Trust Responsibilities

Division of Environmental and Cultural Resources
Management

Mailstop 4516 MIB

1849 C Street NW

Washington, D.C. 20240

Tele: (202) 208-5696

Financial and technical assistance available to strengthen environmental and natural resource programs. Funds, coordination, and technical assistance are provided by the central office staff for hazardous waste management and hazardous substance remediation, including emergency situations that have the potential to adversely affect trust resources and human health and safety in Indian Country.

Environmental Protection Agency

U.S. Environmental Protection Agency, Region 10,

Public Environmental Resource Center

1200 6th Ave. EXA-124

Seattle, WA 98101

Toll Free: (800) 424-4372

Fax: (206) 553-0149

Email: epa-seattle@epa.gov

EPA distributes environmental publications, videos and posters free of charge. Contact them to get a list of publications and audio-visuals available. The Environmental Education Clearinghouse at the Environmental Protection Agency offers a service to assist educators with searching for environmental publications according to subject area.

Air Pollution Grants

Office of Air Waste and Toxics

EPA Region 10

1200 6th Avenue, Suite 900, Mailstop AWT-107

Seattle, WA. 98101

Tele: (206) 553-1059

Fax: (206) 553-0110

Initial air quality assessment, including baseline monitoring and source inventories, can be funded under the EPA Indian General Assistance Program (IGAP), which is available to all federally recognized tribes in Alaska. A limited amount of Clean Air Act (CAA) tribal grant funding available under CAA §103 for select tribal air pilot and demonstration projects that will provide a potential benefit to many or all tribes in Alaska.

Environmental Justice Grants

Environmental Protection Agency
1200 Sixth Avenue (MD-142)
Seattle, WA 98101
Toll Free: (800) 962-6215
Tele: (206) 553-4029
Fax: (206) 553-8338

To provide financial assistance to eligible community groups, and federally recognized Tribal governments that are working on or plan to carry out projects to address environmental justice issues. Grants are awarded up to \$20,000. Applications are due in March.

Indian General Assistance Program (IGAP)

Environmental Protection Agency-Tribal Program
222 West 7th Avenue, #19
Anchorage, AK 99513-7588
Toll Free: (800) 781-0983
Tele: (907) 271-6558
Fax: (907) 271-3424

Grants available to Tribes for conducting initial assessment of environmental concerns and for planning, developing and establishing capability to implement environmental protection programs, including solid and hazardous waste programs. Grant awards begin at \$75,000. Applications are due in February

Inuit Circumpolar Conference

1577 C Street, Suite 100A
Anchorage, AK 99503
Tele: (907) 274-9058
Fax: (907) 274-3861

The focus of this group is centered on the environmental issues of sustainable development, long range transport of pollutants, and climate change; all of which have potentially serious implications for the Inuit homeland and population.

National Science Foundation

4201 Wilson Blvd.
Arlington, VA 22230
Tele: (703) 306-1234

The National Science Foundation has many research programs that support research on the environment. EPA/National Science Foundation offer grants in environmental statistics.

Northern Alaska Environmental Center

218 Driveway Street
Fairbanks, Alaska 99701-2895
Tel: (907) 452-2806
Fax: (907) 452-3100

Email: naec@mosquitonet.com

Website: <http://www.mosquito.net/~naec>

Mission: To preserve wilderness and natural habitats in interior and northern Alaska; improve the quality of the region's natural and human environment; promote conservation and sustainable use of the region's natural resources; and empower citizens to take an active role in protecting the environment.

Rural Alaska Community Action Program, Inc (RurAL CAP)

731 East 8th Avenue

P.O. Box 200908

Anchorage, Alaska 99520

Tele: 800-478-7227 x 7353 or 907-865-7353

Fax: 800-478-6343

ANTHC and RurAL CAP have partnered with EPA to administer small demonstration grants for through-out Alaska for projects that benefit health and environment. These awards range between \$10,000 and \$30,000.

Rural Alaska Sanitation Coalition

4201 Tudor Centre Dr., Suite 105

Anchorage, AK 99508

Tele: (907) 562-6006

Fax: (907) 563-2001

Email: rasc@anhb.org

The Rural Alaska Sanitation Coalition is a statewide coalition committed to bringing about positive long term change in the substandard water, sewer, solid waste, and related environmental health conditions existing in Alaska villages.

Solid Waste Alaska Network

<http://www.ccthita-swan.org>

This is an online resource with Alaska specific environmental information and even includes a village message board for networking with other environmental staff throughout the State.

Trustees for Alaska

725 Christensen Drive, #4

Anchorage, AK 99501-2101

Tele: (907) 276-4244

Fax: (907) 276-7110

Email: ecolaw@trustees.org

Trustees for Alaska is an Alaska-based nonprofit environmental and natural resources law firm. Since 1974, it has represented conservation groups, Native communities and fishers in cases concerning public lands, marine species protection, logging, mining, oil and gas lease sales, state land disposal, air and water quality, hazardous wastes and related issues.

U. S. Department of Agriculture (USDA)

Rural Development
800 W. Evergreen, Suite 201
Palmer, AK 99645
Tele: (907) 745-2176
Fax: (907) 745-5398

The USDA Rural Development has a water and waste disposal program to aid communities with water and waste disposal assistance. This funding requires a match with funds from state or local sources. These funds can be used to construct, enlarge, or upgrade water and waste disposal systems, including solid waste disposal.

Yukon River Inter-Tribal Watershed Council

308 G Street, Suite 223
Anchorage, AK 99501
Tele: (907) 258-3337
Fax: (907) 258-3339

An organization of Indigenous Tribes/First Nations from the headwaters to the mouth of the Yukon River. Mission is to clean up and preserve the Yukon River for the protection of our own and future generations of our Tribes/First Nations and for the continuation of our traditional Native way of life.

Toll-free and emergency numbers:

Report all oil spills, chemical releases, & terrorist activity at 1(800) 424-8802
Air Quality: (800) 770-8818
Alaska Division of Emergency Services: (800) 478-2337
Anchorage Poison Center: (800) 478-3193
Consumer Product Safety Commission: (800) 638-2772
Department of Environmental Conservation:
General Assistance/Rural Issues: (800) 510-2332
Hazardous waste: (800) 550-7272
Indoor Air Quality Information Clearinghouse: (800) 438-4318
Information Exchange HAZMAT: (800) 752-6367
Marine Toxins Reporting: (800) 731-1312
National Lead Information Center: (800) 532-3394
Northern Alaska Drinking Water Information: (800) 770-2137
Hazardous materials regulations: (800) 550-7272
Radon: (800) 767-7236
Spill Reporting after hours: (800) 478-9300
Underground Storage Tanks: (800) 478-4974
Wetlands information: (800) 832-7828
