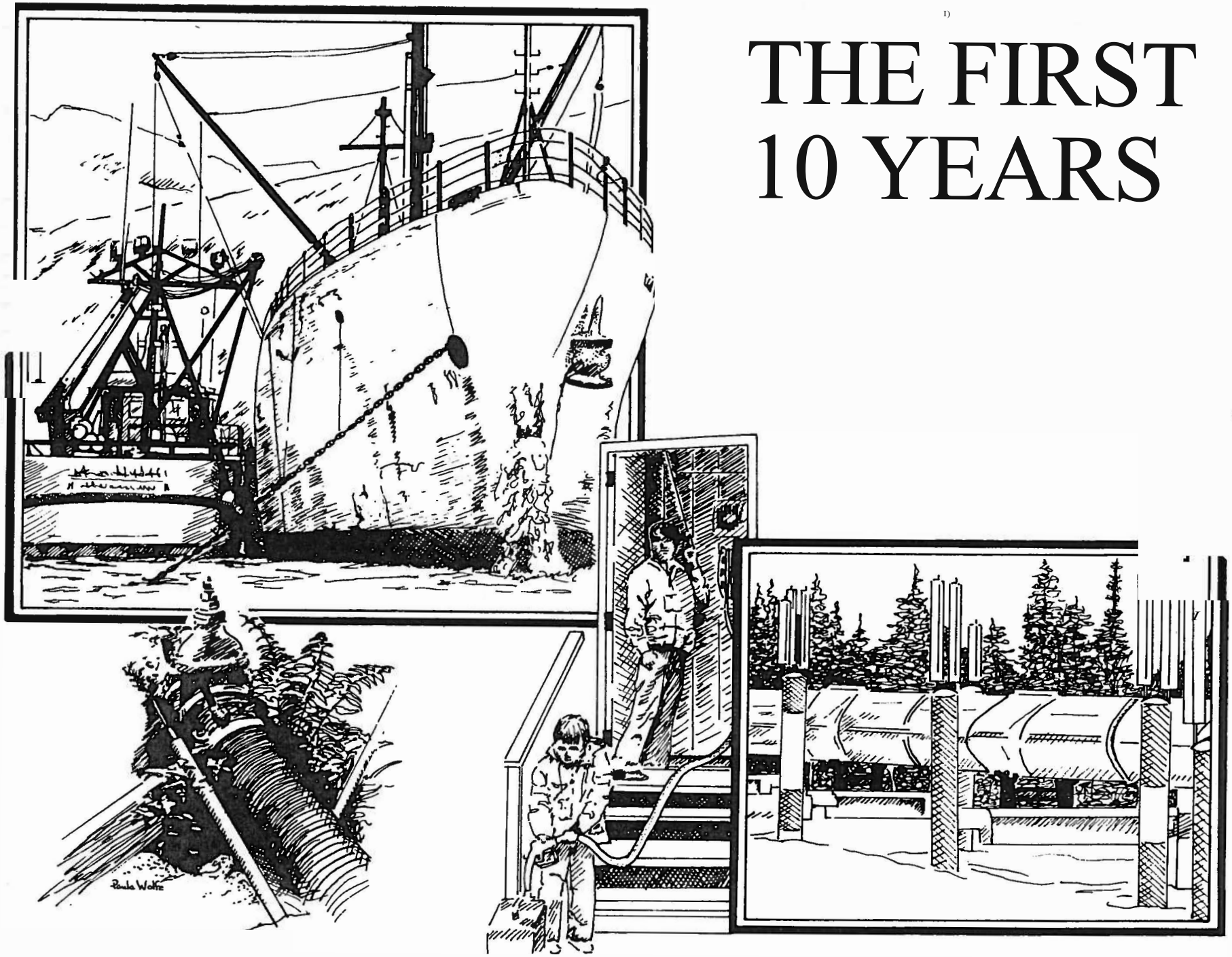
THE FIRST 10 YEARS



Alaska Department of Environmental Conservation

THE FIRST TEN YEARS

written by
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the Alaska Department of Environmental Conservation
Pouch 0
Juneau, Alaska 99811

Jay S. Hammond
Governor

Ernst W. Mueller
Commissioner

Juneau

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INTRODUCTION

Alaska occupies an area of land roughly equivalent to one-third the combined land mass of the lower forty-eight states. A variety of people, cultures, land and climate exists within its vast boundaries. Alaska's coastline, stretching from the southeast panhandle to the Aleutian Islands and north to the Beaufort Sea, is longer than the Atlantic and Pacific Coasts combined.

There is an abundance of natural resources in Alaska. The Beaufort Sea is believed to contain vast quantities of oil and gas. Copper, zinc, gold, nickel and other precious metals are found throughout the state.

Many people living in Alaska make their livelihood by fishing, mining, working in the timber industry or the growing petroleum development industry. The potential environmental damage to the air, land and water which can result as an economic base emerges has been recognized. The irreversible changes brought about by the construction of the oil pipeline and the ones that will come with further development are dealt with by the Department of Environmental Conservation (DEC).

Since statehood in 1959, the protection of the natural environment has been deemed important. Until 1971, protection of Alaska's ecosystems was the function of the Department of Health and Social Services. In that year, the Alaska legislature formed the Alaska Department of Environmental Conservation, transferring authority to the new department.

Enabling legislation forming the department declared that the department would continue . . .

> "to conserve, protect and improve its (Alaska's) natural resources and environment and control water, land and air pollution in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well being."

It was through this legislation that the integral role of land, transportation and public facilities planning in environmental protection was recognized.

Since its conception ten years ago, the department has been protecting Alaska's natural resources. During the past ten years, the growth in the seafood processing and lumber industries, construction of the trans-Alaska oil pipeline and residential development pressures have been among the many responsibilities of the department as it has sought to balance economic growth with environmental protection. Good stewardship of Alaska's air, water and land in an emerging economy will remain the primary responsibility of the department in the years to come.

Photos courtesy of department staff except: p. 29 courtesy of Ron Hauenstein

Special Thanks to:

Marie Beasley, commissioner's secretary since the creation of the department, for both Max C. Brewer and Ernst W. Mueller.

Richard H. Britt, environmental engineer from the Department since 1971, specializing in plan review. Transferred from the Department of Health and Welfare.

Dear Reader:

In the last ten years, Alaska has seen a stronger move for development of its natural resources than any other state. Development of our oil and gas, mineral and timber, fisheries, and land resources has been at an ever more rapid pace. This development has not only supplied rav: material and products to the rest of the nation but it has added to the quality of life throughout Alaska by providing jobs, modem services not fonnerly available, and a stronger economic base.

However, the sword of development has two edges. While on the one hand it has great potential to enhance our enjoyment of life, it can also bring with it the polluted, fishless waters and hazy skies found in many other areas of the nation. The liabilities of careless development are measured by increased illness from poor sanitation, exposure to hannful chemicals, reduction in numbers of fish and wildlife populations, and loss of scenic beauty, to mention only the obvious.

At the beginning of the last decade, the people of Alaska had the foresight to provide protection for the quality of their environment by creating a department charged with maintaining and improving the quality of our water, land, and air resources. I am proud to have been a part of the creation of the Department of Environmental Conservation through my work as Senate President in 1971, and I commend then Governor William Egan for signing that bill into law. Ten years later, we can still say that Alaska's environmental programs are based on prevention, rather than correction. The adversary role that an environmental agency must play as it forces polluters to clean up is avoided most often when, through cooperation and technical help, problems are solved before they occur.

Alaska is not without environmental problems, however. Waste in the near and more distant past is only now being discovered as hazardous to humans, animal and plant life. Air quality is often poor during the winter in Anchorage and Fairbanks. Many of our rural and even urban areas are without adequate water, sewage, and solid waste services. Accidents do occur, spilling oil, contaminated water, and noxious fumes into places where they can threaten lives and cause destruction of the environment. I believe the department has met many of these problems squarely and is able to handle not only crises, but more everyday, complex forms of pollution.

Over the past decade, the state has improved its laws and standards so that we will be prepared for development that may continue throughout the next decade. Continued extraction of oil, gas, and other resources will occur, as well as expansion of industries within the state to make these raw materials into finished products. With new development comes greater need for transportation systems, water, sewer, and solid waste services, and land on which to expand. But I believe Alaskans have the tools: not only the laws, but more importantly the concern to protect the quality of Alaska's lifestyles and the willingness to work together to seek wise solutions to the conflicting pressures of development.

I thank you for your participation in the decisions made about the use and protection of Alaska's environment over the last decade. I hope you will continue to make your thoughts known to those who are charged with protecting and maintaining this important basis of the lifestyle we all love so dearly.

Sincerely,

Jay S. Hammond
Governor

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DEC OLD-TIMERS LOOK BACK OVER 10 YEARS

Interest in creating an Alaskan agency to deal with environmental issues pre-dated the 1971 enactment of legislation to form the Department of Environmental Conservation. In 1969 a bill was introduced to create an "Alaska Conservation Commission." That bill did not pass. In 1970 a resolution was proposed to amend the state constitution to establish an environmental and natural resource policy. This amendment also went nowhere, but apparently the sentiment was not lost. Gubernatorial hopeful William Egan made a campaign promise in 1970 to create the new department, and it was created in 1971, the first year of his administration.

The new department began with a staff of 27 and a budget of about a half million dollars. It now has a staff of approximately 194, an operating budget of $15.4 million and a capital budget of $3.1 million. For some insight into the controversies, the first problems, and a list of the decade's accomplishments, interviews were conducted with many of the original staff as well as employees who have been with the department for many years. Here is what they had to say:

There must have been a significant amount of interest in environmental issues to create a whole new department to deal with them. Why did people feel it was important to create a Department of Environmental Conservation?

Brewer:
The Health and Welfare department dealt with public health, which was largely water pollution control activities. New requirements were being placed on the state in excess of the old Water Pollution Control Act, and new air pollution requirements were being made as well. Of course the pipeline controversy was brewing and the environmental ethic moved into the forefront. Alaska was actively trying to promote the pipeline, and it wasn't helpful for Alaska to be a laggard in environmental matters. During the Democratic primary in 1970, there was discussion of a need for the department. William Egan was elected Governor, he introduced a bill, and it was passed in April of 1971.

Mueller:
The state was facing the construction of the trans-Alaska pipeline and associated industrial development and needed to have an agency that could handle the environmental quality aspects of it rather than leave it in the hands of the Department of Health and Welfare, which had many other missions to accomplish. Its priorities were set differently. When you're faced every day with prison problems, welfare problems, food stamp abuse, and everything else, you just don't have the time to give environmental issues their just due. So the legislature and the governor supported the transference of those funds out of the Department of Health and Social Services, then Health and Welfare.

Dr. Jllax C. Brewer: firs/ commruioner of D E C from 1971 to 1974, duri11g /he i.ga11 admi11istratio11. He is curre11tly employed hy the U.S. Geological Sun•ey as chief of operatio11s for the Natio11al Petroleum Resen•e of Alaska.

Ernst W. Mueller: commissioner of DEC si11ce 1974, the begbu1i11g of the Hammond Adm1i1istralion. 1/e hos guided the deportment through two reorganizations and the place• mml within DEC of new authority and staff from two other departmmts.

Bob Palmer: formerstole senator from the Ke11oi Peninsula, he introduced SPVerol pollulio11 control bills ill the /ate 60's 011d early ?O's a11d was a strong supporter of the crrolio11 of DEC. 1/e is curm,tly special projects coordi11otor for Go1•er-11or l/ommo11d.

Was the creation of the department due largely to the groundswell of sentiment within Alaska, or was it more from a wave of nationwide concem for the environment?

Mueller:
The first Earth Day was April 22, 1970. There was a subslantial environmental movement, even in Alaska, at that time, and I think many groups were looking to having some organization to deal with these growing problems, particularly when industrial development was going to grow. So we formed a separate agency rather than add to an existing agency. In some states they took these functions which traditionally were in the public health area, and put them in other agencies.

Who, other than the Govemor, was especially interested in seeing DEC come about?

Palmer:
I was quite interested in seeing enabling legislation passed, as was Jay Hammond, then Senate President. Other legislators were Lowell Thomas, Jr., Chancy Croft, and John Rader.

Mueller:
Environmental organizations were very interested in seeing this change. The primary environmental issue in Alaska has traditionally been resource allocation. That's why environmental organizations spend so much of their time with f deral kinds of problems rather than state problems. Even with state problems, they've been concerned about the formation of state parks, land disposal, protection, critical habitat, and allocation of traditional wildlife resources rather than the environmental quality issues because the environmental quality issues were not that great. The threat was not there, except for certain areas like placer mining, even early oil development in Cook Inlet. But they saw, with the increasing development, that there were going to be problems, and they supported the new department, too.

What opposition was there to creating it?

Brewer:
The vote was 32 to 6 in the House, I believe. The controversy, rather than over its creation, was what should the department's authority be? Some suggested a super-department, with veto authority over the Departments of Highways, Fish and Game, Public Works, and Natural Resources. A big controversy concerned whether the new department would interfere too much with the pipeline.

Do you think the early department had enough authority, staff, and budget to do its job?

Brewer:
When we went about setting up the new department we first took a look at the resources-we had an appropriation of a half million dollars and 27 people transferred from Health and Social Services. A bond

was passed in 1972 for $8-10 million for construction grants to municipalities for water and sewage facilities. Some people thought the bill creating the department was toothless, but it wasn't all that toothless. It listed some very stiff penalties. We didn't have the manpower, nor did the Department of Law, to take many cases to court. But we felt if we didn't make it costly to pollute, business would go on as usual, so we started a pretty rigorous enforcement program. Violators were charged for pollution under civil suits, in which case you can negotiate out-of-court settlements. Generally the minimum settlement was $500. The largest was with Collier Chemical for $429,000. Of course many new regulations had to be written at the beginning.

Henkins:
We've always had, even though we've amended it a number of times, a fairly good statute from the start. We had an extremely small staff, though. And we lost the sanitarians, who were part of the staff at Health and Social Services, which in some cases were the field staff. In fact, they were almost all the field staff except for maybe an engineer in Anchorage and an engineer or two in Fairbanks.

Kelton:
I think we were effective: our presence was known even though it was small. In fact, things were in a lot of ways simpler than now, with fewer people and less paperwork. But we acted more by reaction than by planning. For authority we had water quality standards but none of the other standards. We could always fall back on the statutes.

The federal government created similar environmental protection programs around the same time. Many of these programs are now administered by DEC. What was the department's relationship to federal programs in the early 1970's?

Mueller:
Each one of the federal programs was set up differently, depending upon the mood and theory of Congress at the time as well as what the states were doing in terms of administering programs. For example, the air pollution control program was, and is, largely a state program. The Clean Air Act mandates that there be national ambient air quality standards, but at that time the Clean Air Act said, we'll obtain these air quality standards through a state implementation plan put together by the state, sent out for public hearing, and then approved by EPA. EPA has guidelines on what kinds of elements are supposed to be in those state implementation plans. The state did not put together a transportation control strategy that EPA accepted. EPA promulgated their own, and the state filed suit against EPA in the Ninth Circuit Court of Appeals. The transportation control plan that EPA promulgated was overturned.

Henkins:
At first, we concentrated almost exclusively on water pollution, and until the 1972 amendments to the Federal Water Pollution Control Act, we centered pretty much around getting federally approved water

Deena Henkins: began working as an environmental engineer for Alaska Department of Health and Welfare in 1970, was transferred lo DEC in 1971 and continued as a water quality engineer unlit 1975 when she became regional supervisor of DEC's Southeast regional office. Curren/lg she is director of the division of environmental quality operalions.

Keith Kelton: began work in July of 1970 wilh the departme11l of flea/th and Welfare and was tra11sferred lo DEC when ii was created. fie worked r,rst as the Southeast regional e11gi11eer, then ra11 the solid waste program until he was appointed chief of the facilities construclio11 and operalion section soon lo become a division.

Jerry Reinwand: came lo the department in 1971 as special assistant lo Commissioner Brewer. He was appointed deputy commissioner in 1973 and served until 1978. He's now executive assistant lo Governor Hammond.

Al Eagle: former director of management services for the department from 1971 lo 1979. He is now head of his own consulting firm.

Tom Hanna: was transferred lo the new department from Health and Welfare in 1971,and served as head of the air quality program and later chief of the air and land managemenl section until his resignation in Nay of 1981.

Dale Wallington:joi11ed the department in 1973 as director of the division of terrestrial prograins, where he remained until 1978 when he was appointed administrative officer for the department.

Jon Scribner: started work in July of 1969 with Health and Welfare, working first in Fairbanks. His position was transferred with the creation of DEC lo Juneau, where he became chief of general engineering. in 1975 he was made director of the division of water prograins.1111979 he moved 011 lo s as assisla11l depu,ty commissioner of design and construd/011 for the Departme11l of Tra11sportalio11.

quality standards. The '72 Act, of course, shifted the emphasis to permits and effluent limitations. Around the time the department was formed, we were getting into pesticides, air and solid waste. The air program was in response to the Clean Air Act. But our activities were, even then in the air program, in response to the federal law, even though the state law had a good air quality section. In pestie,ides we got into the applicator certification-training business at least partly in response to the federal pesticide law.

Reinwand:
Many of the early environmental laws had a strong federal role and a less important one for the states. This bias was tilted further in favor of the federal government by EPA officials, who were given substantial policy flexibility by Congress to implement the laws. In some programs, EPA's bureaucrats assumed nearly dictatorial authority. I think generally that EPA officials at all levels did not trust the states and viewed state pollution control officials as "tools" of industry and the special interests. This situation was aggravated by unrealistic deadlines which were established in the environmental acts. For example, in the Clean Air Act, the 1975-1977 target deadlines for even the heavily polluted cities to meet ambient standards were simply unattainable. However, EPA had to implement the law as though the deadlines were achievable, which resulted in a rash of federally-promulgated transportation control plans being forced on the states across the nation.
This situation changed as the federal laws were amended and federal and state roles were better defined by Congress. Generally, the state/federal relationship is now working well, to the benefit of the people and the environment.

What were the major environmental problems facing the fledgling department?

Mueller:
Air quality and the pipeline were major problems from the standpoint of setting stipulations and developing a strategy for controlling the environmental impact, and even relating to the federal agencies that were regulating the pipeline from the standpoint of environmental issues. Many municipalities had inadequate sewage treatment and we were providing state grant fund money for improving that situation.

Eagle:
The biggest problem was not knowing what Alaska's environment is like, not knowing what the real problems were. Because of that we've ended up, instead of measuring water quality, measuring numbers of permits.

Hanna:
A major one was having virtually no data on what the state of the environment was. I know in air quality, there was no data, and one of our major pushes was to develop a good ambient monitoring network to give us that. The other problem was having federal legislation which mandated a lot of control actions and did not allow us to have our own definition of the problem and develop ways that the problem could be solved.

Scribner:
I think one of the biggest problems then and now is individual waste disposal. People in Alaska have difficulty dealing with disposal of their waste because of adverse climate and soil conditions. On-lot disposal is a serious problem in Alaska. Collection of the waste is also difficult. These problems are particularly severe in many of Alaska's villages where there are extremely poor sanitation conditions and permafrost. These problems have been around for many years, and they're still with us. There has been much improvement, but many of the villages are still in need of safe water and sewage disposal systems.

Wallington:
A major problem was the smoke from the pulp mills, from their tepee burners. Those were cleaned up, and water discharge was cleaned up later. Also, the oil companies drilling on the North Slope and in Cook Inlet were disposing of their drilling muds, containing oil, in the water. We put restrictions on their operations through the Army Corps of Engineers permits and got the dumping stopped.

Do you feel that changes in public attitudes !,ave made the department'sjob any more or less dif. ficult?

Hanna:
I think there's been a change in the department's attitude. I would say in our early years, we were more regulatory and more inclined to set up criteria and make people adhere to them rather than being a public assistance department in which we would set criteria, work with the people who had to comply with them, and find ways to help get them into compliance. It's an attitude which still needs to be fully developed with the department, but that perception is starting to take hold.

Mueller:
I think Alaskans are concerned about the quality of their environment, and I think that they're very reactive people too. The D-2 business was blown up to become a threat to the lifestyle of Alaskans. That turned many people in Alaska away from supporting environmental issues. But, we have found that when people are thoughtful and when they understand the issues, they're usually pretty sympathetic.

Eagle:
No, I don't think so. I think there's been a good balance. The department is always in an adversary role and always has to maintain a bureaucratic posture, but when the department has attacked the real problems, it has been supported.

Wallington:
Over the years public attitude has made the department's job easier because attitudes have changed. People are gradually more aware of environmental concerns and are acting on their own to protect it.

What were the department's biggest accomplishments in the last ten years?

Mueller:
It's pretty hard to say that we are responsible for a particular thing, in many cases. Usually when there is a success story to tell it's because a lot of people got together and did something and ended up with an improvement in the quality of the environment. The air quality in Fairbanks is better now than it has been. It's slowly improving for many reasons, one of which is our work, one of which is the Fairbanks North Star Borough's work, along with the federal motor vehicle emission standards and the Department of Transportation designs for highways and mass transit systems.

In Sitka, close to the pulp mill, certain biological effects have occurred that have increased the population of clams and fish. It's pretty subjective as yet. But it's partly due to the work the department did years ago and partly the work EPA did more recently. In Fairbanks, they put in a new secondary sewage treatment plant and moved the outflow out of the middle of town into the hinte.rlands a little bit, so we no longer have running right through the middle of town a river that has violated the water quality standards by three orders of magnitude. That was a pretty substantial accomplishment in water pollution. And we've got drinking water systems substantially upgraded from the way they were. Cordova's for example, where once a large part of the population was ill from the drinking water. And Switzer Creek and lots of other places.

The solid waste management practices have improved substantially, and I think it's the impetus that gets people going. At one time, DEC was really after the Fairbanks Borough to upgrade their landfill management practices. As a result the Borough did two studies, put into effect a whole different landfill management policy and bought a giant trash compactor. They're operating that landfill a lot better than they did eight years ago. In Juneau, they're doing the same thing. And Anchorage and Sitka have shredder operations.

I also think that one of the things that DEC can be proud of is one of the best programs in all the states for oil pollution control.

Reinwand;
I think a major one was our initiative to have language put into the Resource Conservation and Recovery Act of 1976 requiring that all federal facilities comply with state and local controls on solid waste. This was the first time ever that federal facilities were forced to obtain state permits for any type of operation. Up until passage of the Act, some federal agencies had merely winked at the state's environmental laws and regulations, operating as though they were independent baronies, answerable only to some faceless bureaucrat in far-away Washington, D.C.

Another effort which had a major effect on the way federal programs are administered in Alaska was our work on the Clean Air Act Amendments of 1977 through the National Governors' Association and Alaska's Congressional delegation. Through our work, an amendment was made to allow governors, rather than federal bureaucrats, to have the final say in designating air quality standards for certain federal

lands within their states. Our success was due in part to the fact that Congress recognized the states must play a larger role in implementing pollution control laws.

(Ed. Note: When the Clean Air Act was being amended, Governor Hammond served as chairman of the National Governors' Association subcommittee on clean air. Reinwand served as chairman of a staff advisory task force made up of policy advisors to the governors and air quality technical experts from the various states.)

Scribner:
Some of our biggest problems were with industries that were in place fifteen years ago: pulp mills, placer mining, and the early oil industry, particularly those activities on the North Slope. In the early days on the North Slope there were real problems of indiscriminate garbage and sewage disposal. Industry didn't care where they threw their waste. But because of national focus on that area and on environmental concerns the industry made a concerted effort to clean up their act in the early 1970's. Industry on the North Slope and, for that matter, in the rest of Alaska, has been really responsible since.

Hanna:
One of the landmark things we have done is to establish a good working relationship with Fairbanks and Anchorage and establish a means by which local transportation control plans (to improve air quality) were written, with local governments responsible for writing and implementing them. Aside from the importance to public health, the reason I say that's important is that it took a concerted, cooperative effort from two local governments, and two state governments, plus a strong supportive rather than punitive role by EPA to succeed. This type of cooperative effort is needed in most, if not all, the environmental fields because of their complexity and difficulty of solutions. Establishment of this comprehensive management philosophy, where everyone is involved who has a stake in the outcome, is the real challenge before the department.

Denkins:
I think it would be beginning to get enough people out in the field to deal with a lot of the day-to-day problems that have always existed and that we've kind of had to ignore in the past. Sewage disposal and water problems, solid waste disposal-all the classical things-we're finally seeming to get them under control, to actually see some progress on some of them. The problems have always existed; we've just had to ignore or give pretty low priority to many of them, such as solid waste. I'm proud of the department. I feel like we're still either small enough or non-bureaucratic enough to actually have most of the people in jobs where they can actually see that they're accomplishing something. That's really great!

There are over three million lakes, twenty acres in size or larger, in Alaska. Throughout the state are found wild rivers and pristine streams. These waters are important to all Alaskans, whether for fishing and recreation, hunting and trapping, or as supplies for urban and village water systems.

Because water is vital for so many reasons, it is important to maintain the high quality of fresh water bodies that exists throughout the state. Water bodies must be protected from the potential harmful effects of industrial and municipal waste, urban runoff, and a variety of other sources of pollutants if Alaska is to continue to enjoy the high water quality presently found throughout the state.

Realizing the need for Alaska to develop an economic base through its natural resources, as well as the importance of protection of the environment, the legislature gave authority to the Department of Environmental Conservation to develop water quality standards in the state, and to see that these standards are not violated. The department's authority has been expanded over the years so that there are now comprehensive programs for safe drinking water, construction of municipal and rural sanitation facilities, oil spill control, industrial waste, and water quality management planning.

SECTION· I: WATER

SAFE DRINKING WATER

by Gary Hayden

Most people would like the assurance that water available from public sources is safe to drink, but few realize that producing safe drinking water requires ever increasing amounts of effort and money. Because of population growth coupled with natural resource development, an increased effort by the Department of Environmental Conservation has been required to maintain good quality drinking water throughout the state.

During the past ten years there has been a large increase in the number of small water systems constructed in the state, particularly in remote areas. Due to a lack of proper operation and maintenance, many of these systems experience malfunctions or conditions which can lead to water contamination. Also, pressures from increasing population and development have, in some instances, resulted in contamination of fresh water sources, which pass untreated to the consumers utilizing poorly operated water systems. Another problem area is poorly maintained older water systems in which components of the system deteriorate.

The consequences of not maintaining safe public water supplies can be catastrophic. Outbreaks of waterborne diseases have occurred in Alaska within the past ten years; shigellosis in 1971 and 1976, dysentery in 1972 and 1977, salmonellosis in 1974, and giardiasis in 1979 and 1980. These diseases can result in extreme discomfort, hospitalization and sometimes death.

Besides the visible consequences of waterborne disease outbreaks, contaminated water from chemicals can cause frequently undetected health problems. Thus, water supplies must not only be protected from microbiological contamination, but from chemical contamination as well. Examples of waterborne chemicals causing harmful effects are arsenic, mercury and lead. There is frequently no visible evidence of contamination from these chemicals, but they can cause health problems varying from minor irritations to traumatic death.

The State of Alaska has supervised public water supplies since mid-1959. Initially, the Department of Health and Social Services administered the state water supply program until 1971, when it was transferred to the newly created Department of Environmental Conservation.

In 1974 the federal government passed the Safe Drinking Water Act which established minimum national standards for public water supplies. The act gave individual states authority to administer their own water supply programs as long as those programs had standards as stringent as the national requirements. Alaska elected to administer its own program and updated its regulations in 1978 to conform to the requirements of the national Safe Drinking Water Act.

A primary objective of DEC's drinking water program is to ensure that all public water supplies provide safe drinking water. Toward this end, several methods of supervising public water systems are employed, ranging from strict enforcement of legal requirements to financial assistance for water suppliers. The department has chosen a balanced program, the major features of which are:

- Continuing public education programs
- Technical assistance in solving water supply problems
- Formal regulations that set minimum standards for water supplies

Boom is stretched across a creek to stop oil from a pipeline spill.

The consequences of not maintaining safe public water supplies can be catastrophic. Outbreaks of waterborne diseases have occurred in Alaska within the past ten years; shigellosis in 1971 and 1976, dysentery in 1972 and 1977, salmonellosis in 1974, and giardiasis in 1979 and 1980. These diseases can result in extreme discomfort, hospitalization and sometimes death.

- Plan review for additions to existing water systems and construction of new facilities
- Training and certification of water system operators
- Inspection of water systems
- Waterborne disease surveillance and investigation
- A construction grants program

In addition to the protection afforded water systems by plan review, facility inspection and regulatory elements of the department's safe drinking water program, technical and financial assistance to evaluate and correct problems is a major thrust of the program. Cities ranging in size and location from Angoon and Unalaska in the southern part of the state to Cordova and Fairbanks farther north have taken advantage of this resource.

In the spring of 1979 and again in 1981, the underwater transmission line for the Angoon water system ruptured, resulting in a water shortage crisis for the residents. Through technical assistance from the department's staff and equipment purchased with emergency funds, the department was able to rectify the situation.

In October 1980 an outbreak of giardiasis occurred among workers on the seafood processing ship UNISEA anchored in Dutch Harbor, Unalaska. Many visits by the department's staff were made subsequent to the outbreak to survey the city's and vessel's water systems to determine the source of contamination and provide solutions for corrective action. An extensive sampling program of the city's watershed was also conducted by department staff in an attempt to locate the source of contamination.

In Cordova, contamination from septic tanks surrounding the lake used as the city water source caused an outbreak of dysentery in 1972. Action and funding by the department resulted in construction of a sewer collection system, which removed the source of contamination from the lake. The department also contributed partial funding for a drinking water treatment plant currently being designed which will provide additional protection from contamination through modern disinfection and filtration methods.

Attempts to alleviate arsenic contamination of wells serving single family residences in Fairbanks is another example of the department's efforts to improve drinking water safety. Pilot studies using experimental arsenic removal units are being carried out at some of the residences affected.

Since its beginning the Alaska Drinking Water Program has consistently progressed toward the goal of safe drinking water for all Alaskans. Probably the best measure of success, though, is intangible: the fact that a majority of Alaska's population has remained free from waterborne disease and related adverse health effects for decades.

MUNICIPAL WASTEWATER AND SEWER

by Keith Kelton

Municipal wastewater management in Alaska has progressed significantly in the past decade. In 1970 there were no municipal secondary sewage treatment plants operating in the state. Disposal of sanitary waste was generally handled by septic tank systems or by discharges of raw waste into local water bodies or, in some cases, on land. These practices presented potentially severe health hazards and in several cases resulted in widespread outbreaks of disease. In fact, during the winter of 1971, nearly half of the City of Cordova contracted gastro-intestinal illness when Eyak Lake water was used as an emergency water supply.

In the past, most new residential growth was developed using septic tanks and drainfields. Often, these systems were sited in soils too "tight" (i.e., clay, hardpan, etc.) to allow adequate percolation. As a result, homeowners were faced with the expensive decision to install a second drainfield or form a local assessment district to build a collector sewer system. When these alternatives proved too expensive, raw sewage often surfaced and collected in road ditches and back yards. As Alaska's population grew and areas with less desirable soil conditions began to be developed, unsanitary sewage disposal became an increasing problem.

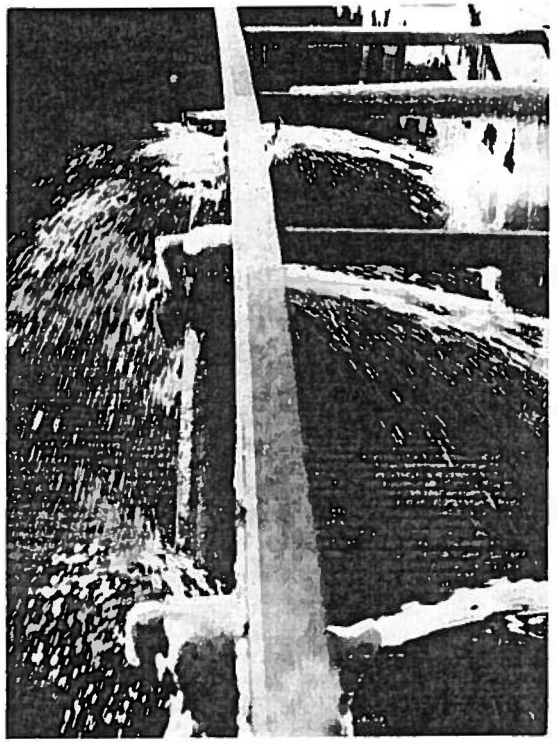
This problem was recognized by the Alaska Legislature when the department was created and given authority to award grants to municipalities for construction of water and sewer projects. These grants were originally to provide twenty-five percent of all eligible costs or one-half of non-federally financed project costs, whichever was least. The department's statutes were amended in 1976 to increase the state's participation to fifty percent of total funding costs.

Today, this grants program, administered in conjunction with the U.S. Environmental Protection Agency's clean water grant program, provided up to eighty-seven and one-half percent of the funding for eligible sewerage projects. The state and federal programs have assisted in construction of nineteen municipal sewage treatment plants, with more under construction or in the planning stage. In addition, these programs have enabled many miles of sewer lines, serving thousands of offices and residences, to exist.

Although the primary emphasis of EPA's program has been directed toward environmental improvements, the major benefit has been in the area of protecting public health. Removal of sewage from road ditches and back yards combined with treatment before discharge has had significant health benefits for many Alaskans.

Collector sewers are also eligible for assistance under the state grant program. These sewers convey sewage from the point of generation to larger interceptor lines. Historically, subdivisions were developed using septic tank systems, with the cost passed on to the home buyer. The homeowner was often eventually faced with the cost of replacing these systems when they failed. The department now encourages municipal governments to sponsor grants to install collector sewers at the time a subdivision is developed. This nradice helm; to oromote more orderlv development with reduced costs to the consumer.

The grants program nas been well received by local governments. Grant obligation rates have increased yearly, with 1980 figures showing over $8 million in state funds allocated to projects. Since the inception of the program, 206 state grants totalling over $52 million have been awarded. In addition, over $100 million in federal funds have been used for construction of sewerage facilities in Alaska.



This activiated bio-filtration tower is one of many techniques used for secondary treatment of sewage.

SEWERAGE PROJECTS

Grantee	Number or Projecb	Total Amount Granted
Municipality of Anchorage	68	S 21,919,326
Bethel	J	599,444
Bristol Bay Borough (Naknek)	1	3,665
Cordova	7	645,694
Craig	2	77,482
Dillingham	2	63,348
Fairbanks (City)	6	4,799,167
Fairbanks North SIM Borough	2	84,363
Haines	13	277,848
Homer	11	808,656
Juneau	12	5,004,367
Kenai	9	1,316,073
Ketchikan	4	2,028,113
Kmg Salmon	1	5,820
Kodiak	7	1,455,448
Kodiak Island Borough	I	6,186
Kotzebue	I	456,230
Nenana	I	110,389
Nome	6	349,452
North Pole	2	824,957
North Slope Borough	7	3,919,350
Palmer	5	404,238
Pelican	I	3,125
Petersburg	J	1,188,884
Sand Point	2	56,073
Saxman	I	7,500
Seldovia	2	34,432
Seward	J	1,019,616
Sitka	I	602,442
Skagway	I	502,961
Soldotna	10	1,160,076
Tanana	1	37,357
Unalaska	1	4,350
Valdez	5	1.516,981
Whittier	I	166,599
Wrangell	2	813,723
Yakutat	1	166,834
		S 52,440,569

Positive health benefits have resulted through improved municipal sanitation facilities and practices. Although these benefits are difficult to quantify, they are perceived to be significant by many municipalities as evidenced in continuing interest and support of the state grants program. Incidences of waterborne disease outbreaks also appear to have decreased substantially since inception of the program a decade ago.

SANITATION IN RURAL AREAS

by Tim Bergin

Rural Alaskan communities are often located in isolated and climatically hostile areas. In many cases these communities lack an economic base sufficient to support public services. When public facilities do exist, extreme weather conditions combined with high energy costs make operation and maintenance difficult for many communities. A dependable source of safe drinking water or a safe method of waste disposal are still needed in many villages. Other amenities taken for granted in urban areas such as water for showers and washing clothes are often non-existent in such areas.

Until 1970, the only active program for providing sanitation services in rural Alaska was the U.S. Public Health Service, Indian Health Service Office of Environmental Health. A few years before, in the 1960's, Senators Ted Kennedy and Ted Stevens had toured rural Alaska and were appalled at the lack of sanitation services in bush villages. Their reaction was the promotion of a combined federal and state program which would answer the need for rural sanitation services.

The federal program was named the Alaska Village Demonstration Project (AVDP) and the state program was dubbed the Village Safe Water Program (VSW). The two programs were designed to work in tandem, AVDP constructing two projects which would demonstrate the best way to supply rural sanitation services and the state program to follow up with construction of sanitation systems developed in the demonstration projects.

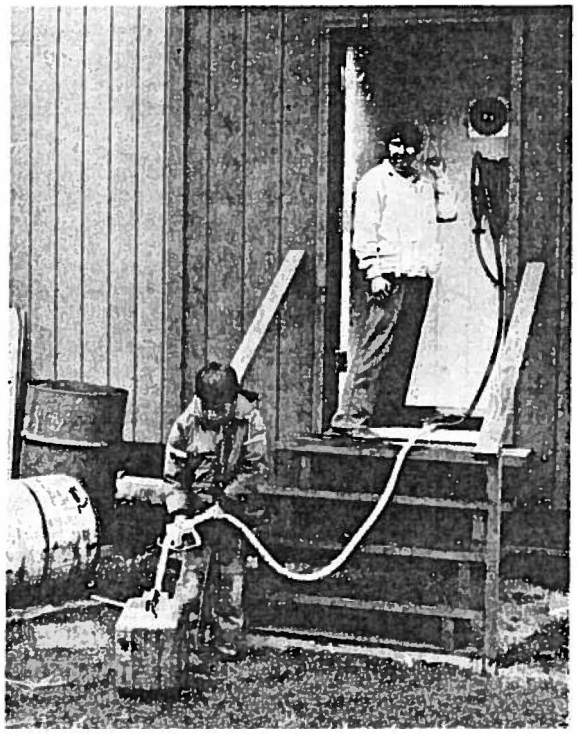
Prior to the Village Safe Water Program, many rural Alaskan communities lacked safe water facilities because of lack of money and trained expertise to maintain facilities in working condition. The VSW program is unusual in that the commissioner of the Department of Environmental Conservation has authority to directly assist VSW facilities with financial, technical, and management assistance if it is determined that the community does not have sufficient resources to continue operation and maintenance itself.

Initially, VSW projects were all central sanitation facilities. Each facility would have showers, a laundromat, a place to dump sewage, and a place to get water for home use. Because of a lack of knowledge concerning the operation and maintenance costs of these facilities, coupled with the need to work closely with the communities, only one or two projects were funded per year. The communities which received VSW projects were selected by DEC and the regional health corporations.

In 1978, this situation changed dramatically when the legislature passed and voters approved funding for eleven communities to receive VSW facilities. Again, in 1980, the voters approved funding for twenty additional communities to receive similar projects. These actions by the legislature and voters of the state broadened the scope of the Village Safe Water Program from construction of centralized facilities to include a broader range of sanitation solutions.

The basic justification for any sanitation facility is an improvement in public health. Unfortunately, rural Alaska has often had too small a population with a limited ability to report thoroughly on disease outbreaks to develop a substantial body of statistical data. However, the VSW Program has demonstrated that facilities once installed are intensively used. Public Health nurses have reported dramatically lower incidences of skin and other diseases following installation of such facilities.

All of the VSW facilities which have been built are currently in operation. Given the difficulties just outlined, this is a major accomplishment.



Carl Takak fills a water jug at Shaktoolik's water dispensing point while his friend operates the valve.

OIL SPILLS
by David Knuth

Many people visualize an oil spill as a large cat.astrophy, such as when a tanker ruptures at sea, spilling millions of barrels of oil into the ocean. This may be the case occasionally, but it is certainly not the most common type of oil spill experienced. Although a very real problem, most oil spills are small spills consisting of less than 10,000 gallons of oil. For example, between the months of July and September of 1980, there were a total of 180 reported oil spills in Alaska. Of these, only eight were larger than 10,000 gallons, 37 were between 1,000 and 10,000 gallons and 135 were less than 1,000 gallons. Also, it is not uncommon for spills to go unreported for various reasons, including the small amount of oil spilled per incidenl However. even a series of small spills may cause serious long-term damage to the environment.

Construction related to population growth increases the potential of a spill occurring. The potential problem, fortunately not the actual problem, has been demonstrated during the past ten years with the start of oil production on the North Slope, the trans-Alaska pipeline and the oil terminal at Valdez. Prior to these developments, the problem was limited mainly to the occasional sinking of a small boat, fueling activities conducted by military bases, fledgling drilling and production activities in the Cook Inlet and the continuous or intermittent spills of miscellaneous sources. Though there has not been a catastrophic oil spill in the state to date, the probability of a major spill will increase as the state's oil and gas resources continue to be developed.

A noteworthy example of a near disastrous spill was the fate of the *TN* PRINCE WILLIAM SOUND on the evening of January 17, 1980. Shortly before the vessel was to exit Prince William Sound, the ship's propulsion and electrical systems failed. With 831,000 barrels of crude oil aboard, the ship drifted for sixteen and a half hours, coming within a mile and a half of shallow water. Fortunately, the engines and electrical systems restarted and the ship moved out of danger under its own power, thus averting what would have been the largest recorded oil spill in the state in some of its most biologically productive waters.

Another example of a potentially dangerous situation is the daily operation of the trans-Alaska pipeline. Publicity from the early planning stages through construction and early operation often pointed out the dangers the pipeline posed in the sensitive arctic environment. In recognition of this, there are several sophisticated alarm systems built into the pipeline to warn of oil spills. As good as these alarms appear to be, they have not yet given the first warning of a spill. For example, some time before June 15, 1979, approximately 300 barrels of oil spilled through a small crack in the 48-inch line. It was only after the oil seeped up onto the ground that it was detected. Fortunately, quick response, rapid containment and repair prevented a much larger spill and subsequent clean-up operation.

Presently the Department of Environmental Conservation does not have a statistical system to determine exactly how the oil spill problem is changing with time and to pinpoint areas in which attention might be focused. It appears that small and medium sized spills continue to occur at a higher rate than in the past. The department hopes to develop a statistical system which will help.

In 1976, the Alaska Legislature passed its first major legislation addressing the problem of oil spills. It required oil spill contingency plans, proof of financial responsibility for clean-up efforts and liability as well as provisions for charges against terminal users and oil tankers based on the degree of spill risk their

Though there has not been a catastrophic oil spill in the state to date, the probability of a major spill will increase as the slate's oil and gas resources continue lo be developed.

equipment and operations presented. Funds collected from the program were to be used to develop a contingency fund to meet clean-up costs in the event of a major spill. The fund was struck down by the courts, leaving the other two provisions intact In 1980, the Alaska Legislature passed its second major legislation extending contingency plans and financial responsibility to offshore exploration and production facilities and oil barges. Very recently, the governor signed into law a $1 million fund to cover oil spill containment and clean-up, particularly when the cause of the spill is unknown or the individual or group cannot provide the clean-up themselves.

Fortunately, there have been few dramatic news stories about oil spills. This in itself is enough success for the department's oil spill control program. Even though the state has witnessed several medium sized spills, the damage has been kept to a minimum. The department has a good start on developing oil spill contingency plans for coastal communities. In addition, oil spill clean-up equipment is now being stationed in one of the coastal communities as well as at various other key locations throughout the state. These efforts can be expected to reduce the danger of potential oil spills and preserve the natural beauty and resources of the state.

Oil spill cleanup equipment like this could be used in the event of a spill. The- oil is contained by a floating boom and skimmed off the surface. ·

WATER QUALITY IMPACTS OF SEAFOOD PROCESSING

by Gregg Malinky

Seafood processing has been steadily increasing in Alaska over the past ten years. Alaskan processors handle five species of salmon, two species of king crab, tanner crab, halibut, herring, shrimp and several types of bottom fish. In some locations of the state, processors are able to operate nearly year round. During the past decade, Dutch Harbor surpassed Kodiak as the seafood processing capital of the world. In 1979, commercial fishing landings in Dutch Harbor totaled 136.8 million pounds equalling $92.7 million in value.

Waste production is variable during processing, ranging from forty to eighty percent of live weight depending on the species and type of product produced. Kodiak, Seward and Petersburg recover waste as a by-product to market as fish, chicken, cat food, and fertilizer. However, recovery of waste is the exception to the rule as high energy and transportation costs, slow markets and remote processing locations keep investors from trying waste recovery. The result is that most waste is discharged into the waters of the state.

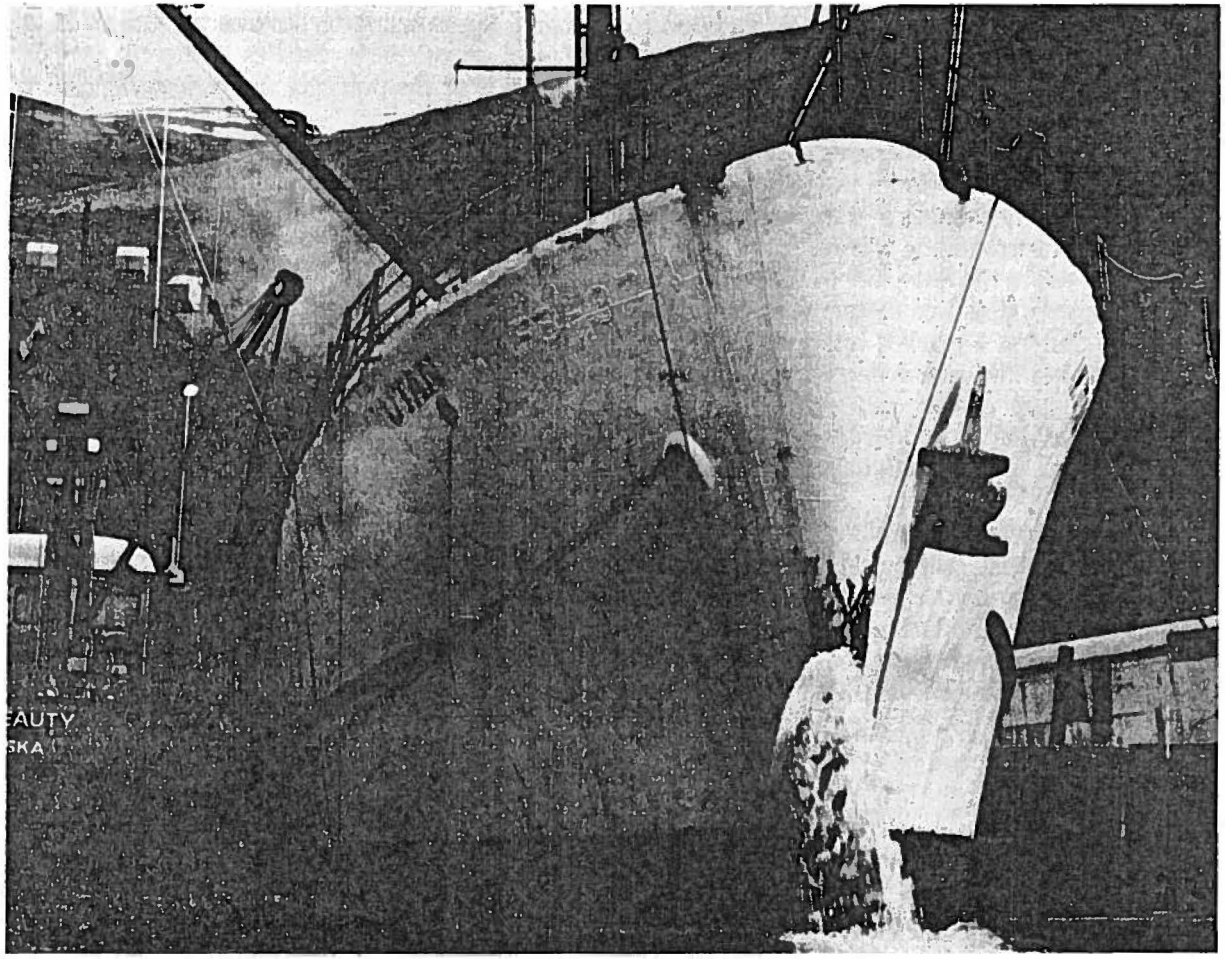
The discharge of large amounts of waste causes a number of potential problems when discharged into the water. Aside from the visual and aesthetic degradation caused by floating remains, subtle biological processes are at work as well. Bacterial breakdown of discharged organic matter consumes large amounts of oxygen. In areas with poor water circulation, oxygen consumption may E::xceed the amount of oxygen being replaced. In some cases, oxygen content will drop to levels harmful to aerobic aquatic life.

Combined discharges of several seafood processors operating in the same area often cover acres of seafloor. Seafloor habitats necessary for attachment, protection, nursery areas and food gathering are lost. Waste from seafood processing does not easily scatter and may pile on the bottom. Oxygen levels in such waste piles are often too low to support aerobic life and may even smother those creatures unable or too slow to move from under the waste. Often, long periods of time are required before the forms of life that are killed return to the area.

Bacterial breakdown of organic materials in the absence of oxygen results in the production of hydrogen sulfide gas which is toxic to aquatic life at high concentrations. This gas from waste piles can build up to toxic levels in areas where there is poor water circulation. Grinding and screening of waste particles to make by-products helps to reduce the problem near Kodiak, Seward and Petersburg. Relocating outfalls to areas of better mixing is currently practiced in Dutch Harbor and its vicinity. Smaller waste particles made by grinding are subject to a wider range of dispersive forces than larger particles, and the increase in surface area created by breaking up large particles allows for faster bacterial breakdown and oxygen consumption but ultimately less build-up on the seafloor.

Various species of fish and shellfish are often seen feeding on seafood waste near processing plants. Nitrogen levels also increase in areas where seafood waste is discharged. Nitrogen is a vital nutrient for aquatic plants which are the first link in the food chain. The potential beneficial impacts of seafood waste as a source of food and nitrogen weighed against the known detrimental effects will be debated into the foreseeable future.

The department monitors seafood waste discharges in areas where processors operate as part of a larger program to protect the waters of the state. There are many identified uses of the state's water including consumption, fishing, recreation and seafood processing as well as other industrial uses. In the coming decade the department will continue to monitor the state's waters for the benefit of all users.



Seafood processing ship.

WATER QUALITY IMPACTS OF PULP MILLS

by Dick Marcum

Treated emuent from a pulp mill.

The pulp mills near Ketchikan and Sitka have been two of the most significant wastewater dischargers in southeast Alaska during the past decade. Until 1973, receiving waters from these mills had been used to dump untreated wastewater for over fifteen years. By 1973, both mills were required to construct primary treatment plants, or those which remove solids, as well as recover ninety percent of all spent sulfite liquor, a liquid used in the process of making pulp.

The effect of primary treatment, in addition to improved log-handling techniques at both mills, has decreased the amount of solid materials being discharged significantly. Studies of benthic deposits (deposits on the bottom of an ocean, lake, etc.) in 1974 indicated the presence of previous deposits but noted that recently deposited fibers were not present.

The Sitka mill started operating a biological wastewater treatment plant to provide secondary treatment removal of dissolved organics in 1978. The Ketchikan mill followed in 1980. Since that time, both mills have made several changes in their operations which have reduced the amount of polluting material being discharged in surrounding waters.

A 1980 study at the Sitka mill by the Department of Environmental Conservation showed that less waste liquor and more dissolved oxygen were present in the water than had been during the 1974 study. Water quality is showing a marked improvement since both mills have begun pollution abatement programs. Since the pH of the water is decreasing (becoming more acidic), more work needs to be done to meet state and federal water quality standards.

As of the last survey conducted by the department, the biological treatment plant in Ketchikan had not been operating long enough to determine changes in water quality. There are plans to continue tests in 1982 at both mills.

A major problem in controlling discharges from pulp mills is possible side effects of pollution abatement on the environment. Biological treatment produces more sludge. Burning sludge requires huge amounts of energy and causes air quality problems. Landfilling sludge is difficult if not impossible in southeast Alaska because of the lack of suitable land and high rainfall. In balancing environmental impacts across the board, the department does not believe that further removal of non-toxic organic matter from wastewater generated by southeast Alaska pulp mills would be productive.

WATER QUALITY IMPACTS FROM PLACER MINING

by **Karen Cantillon**

Throughout the state, interest in placer mining has grown in the past decade as the value of gold, along with other precious metals such as silver, tin, and platinum, has increased. It is estimated that the number of active placer mines in Alaska has increased over 300% in the last five years. There are at least 350 mines using heavy equipment, and another 600 smaller scale mines including suction dredges. Major mining districts include Talkeetna, Seward, Chitina, Circle, 40-Mile, Seward Peninsula, and Fairbanks.

People who are willing to speculate on the risk of finding precious metals in drainages are investing in equipment and searching for metals. The considerable increase in mining activity has had several effects. An obvious effect is upon the environment. Placer mines can discharge large quantities of silty water which may interfere with many uses of the water such as public water supply, recreation, fish and wildlife habitat, agricultural and industrial water supplies. Another effect is due to miners applying for water use permits, sometimes needing miscellaneous Land Permits, Anadromous Fish Stream Protection Permits, and filing annual assessment affidavits. These permit reviews and filings increase the administrative burden of the state.

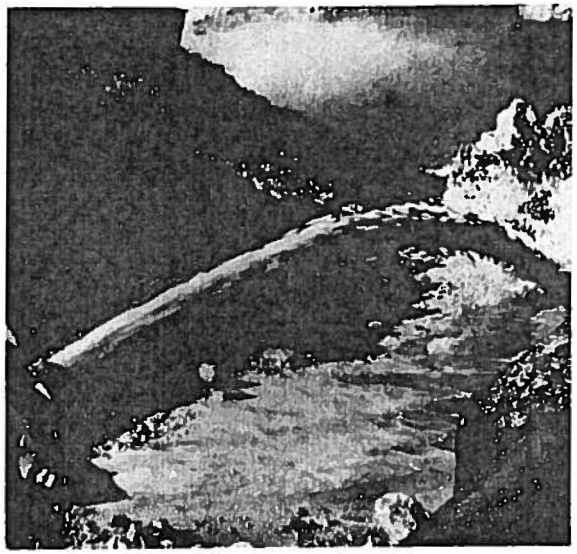
The presence of turbid, silty water in once-clear streams prevents fishing, hides rocks which are hazardous to canoes and rafts, and results in aesthetic unpleasantness. Settleable solids can clog spawning gravels, coat stream bottoms, and destroy insect larvae and other food for higher organisms such as fish. Turbidity blocks light penetration which reduces productivity along the entire food chain. A high solids load may make water unusable for industrial water supply by downstream users. In addition, silty water may not efficiently separate gold from overburden.

Modern miners use equipment capable of cutting a river down to bedrock from one side of a floodplain to the other, and sometimes the mines extend to higher terraces where previous river channels existed. Occasionally, fifty vertical feet or more of overburden may be removed to reach a mineral or metal deposit along a drainage. Drainage left behind may or may not exhibit a distinct channel, although the miner may dig the channel back in prior to moving to the next site. Soil and nutritive matter may be washed from the gravel to the detriment of water quality.

Other options exist to leaving a drainage damaged for years after a placer mining operation has taken place. Near Healy, the well-documented Usibelli coal strip mine is being recontoured and then will be reclaimed with stock-piled soil. A similar approach to placer mining would help alleviate some of the potential problems. The department has demonstrated that settling ponds help reduce sediment loss into streams, although other techniques such as flocculation and recycling may be necessary to protect water quality.

A common application form has been developed for the miner to obtain necessary permits from Fish and Game, Natural Resources, Environmental Conservation, and the Department of Revenue. These agencies are also coordinating their field visits to reduce administrative and regulatory burdens on the miners.

Future department plans include an educational effort designed to encourage placer miners to use less water in their operations. More sophisticated methods of separating gold exist, some of which lead to more cost-efficient mining operations.



Some placer mines use "giants," or hoses which spray water at great pressure, to strip overburden from ore-bearing deposits.

ON-SITE WASTEWATER DISPOSAL

by Bob Gilfilian

In the past, the common methods of on-site disposal consisted of privies and cesspools. It has long been recognized that such methods can become unsanitary and develop into a serious health hazard as population density increases. Over the last decade the department has provided technical assistance and has adopted and enforced regulations designed to ensure proper design and constnJCtion of on-site disposal systems.

Provision of adequate and environmentally sound wastewater disposal services for rural and suburban communities in Alaska is a continual challenge to the Department of Environmental Conservation. The traditional practice of limiting development through restrictions on sewage treatment methods as practiced in the continental United States is not applicable in many areas of Alaska. Rural A!aska lifestyles often dictate the use of large remote homesites. Likewise, suburban Alaskans are also likely to demand their own "acre of Alaska." Construction of a network of sewers to convey wastewater from such large homesites to a central facility for treatment and disposal is not now economically practical. Thus, on-site wastewater disposal methods become the most likely alternative for many developments.

In the past, the common methods of on-site disposal consisted of privies and cesspools. It has long been recognized that such methods can become unsanitary and develop into a serious health hazard as population density increases. Over the last decade the department has provided technical assistance and has adopted and enforced regulations designed to ensure proper design and construction of on-site disposal systems. As a result of public demand for department approval of individual on-site systems, the department developed a program to certify installers in 1976. This certification program began with approximately seventy-five participants in the Mat-Su Borough and has since included other populated areas of southcentral and interior Alaska. During the past five years, the program has remained on a voluntary status for installers. The program has two main objectives: to inform installers of department regulations and to familiarize installers with proper design and construction practices.

Although the on-site installer certification program remains voluntary, it has been demonstrated to be an effective means of reducing the number of inadequate on-site disposal systems. Department regional and district offices have noted a decreased incidence of cesspool installations. Citings for raw sewage discharges onto the ground from failed on-site disposal systems have also decreased.

Anchorage, under federal funding, is administering its own on-site waste disposal study. One project under study is in a hillside community where central sewers are impractical. With the aid of the DEC's technical staff, Anchorage is developing alternatives which will answer their specific on-site waste disposal needs.

The department has further recognized that the use of on-site wastewater disposal methods is complicated by Alaska's unique and sensitive environment. On-site conditions vary considerably in Alaska. Such conditions often include one or a combination of high water table, poorly drained soil, bedrock near the surface of the ground, deep seasonal frost, and permafrost. Installation can be difficult, and operational problems can develop for on-site systems. Developing systems that are sanitary, environmentally sound, yet economical, remains a primary goal of the department's wastewater disposal program. In an effort to meet this challenge, the department secured funding in 1980 from an EPA water quality management grant and initiated a state-wide study to develop best management practices for on-site waste disposal. Information gathered from the study will be used as a basis for departmental decisions on the approval, operation and inspection of on-site systems.

LAKE WATER QUALITY

by Rich McConaghy

Alaska has more than three million lakes larger than twenty acres in size. Most of these lakes are healthy and pristine. A number of lakes, however, are gradually becoming unsuitable for such uses as fishing, swimming, boating, and other recreational uses. Increased sedimentation, nutrient enrichment, and bacterial pollution have contributed to the impairment of some lakes. The natural process of eutrophication1 has been accelerated mainly as a result of failing on-site septic systems installed at nearby lake developments and other non-specific pollution sources such as urban and agricultural run-off and alteration of natural water flows.

Increased recreational activities and expansion into rural areas have exerted more pressure on some lakes in recent years. In August 1980, a DEC questionnaire identified fifty-eight lakes in Alaska which have suffered impacts from development. Some of these lakes are near rural villages, but the majority are in or near major urbanized areas or associated with lakeshore development. Improved access to land around many of these lakes has also placed more stress on the carrying capacity of lake waters.

Availability of federal funds through the Clean Lakes Program of the Environmental Protection Agency has encouraged the development of several local programs designed to diagnose the problems and make recommendations to reduce the problems. In 1980, Alaska applied for funds and received $212,445 in 1981. Local communities will contribute $172,000 for projects.

These funds and the encouragement of DEC have fostered local community interest in protecting and restoring lakes and providing scientific information. The program is strictly voluntary and intended to provide financial assistance rather than enforcement or regulatory programs.

Because of federal budget cuts, funds for the program are expected to be depleted by the end of 1982. Another source of funds will be required if the program of data collection and assessment of recreationally important lakes is to continue. Restoration plans for three lakes are currently being developed that will also need a source of funding if they are to be implemented.

1Eutrophication is a natural aging process in lakes. In a natural situation, nutrients entering the lake from upstream and from surrounding uplands support a slowly evolving system of plants and animals. Sewage, fertilizers and other pollutants increase the amount of nutrients entering the lake. As the growth of algae and other plants increases, oxygen levels decrease and fish and other organisms die. Increased sedimentation results, and the lake becomes a wetland.

WATER QUALITY MANAGEMENT PLANNING

by Marty & Alwin Turiel-Strauss

urban runoff
transportalion
limber harvest
waste oil
wetlands
on-site disposal
clean lakes

Water quality management planning in Alaska is carried out as part of a national program mandated by section 208 of the Clean Water Act. The objective of water quality management planning is to achieve and maintain surface water quality which is "fishable" and "swimmable." In Alaska, this program is the major means by which control of non-point pollution from runoff or erosion is managed.

The Department of Environmental Conservation is responsible for 208 planning for all of the state but Anchorage, which has its own planning program. Technical work under the program is completed by consultants, other governmental agencies or departmental staff. Most funding for projects is obtained from grants received from the Environmental Protection Agency.

Projects developed under water quality management 208 funding include the following:

1) Urban Runoff
   Runoff from urban transportation corridors may cause sedimentation in water bodies. Oil and chemicals collected on roadways and other surfaces may be washed into water bodies as a result of heavy rains or flooding.
2) Transportation
   Erosion from roads, railroads, rights-of-way and pipeline corridors may cause sedimentation in adjacent water bodies. Problems usually result when erosion, permafrost, glaciation and extreme temperature variations are not taken into account during planning. Such problems are often unique to Alaska, and the federal and state programs are studying them under the 208 program.
3) Timber Harvesting
   Until recently, Alaska's timber industry was associated entirely on public lands. Because of this, management of the state's timber resources was less complex than it is today, for thousands of acres of timber-producing lands have now passed into private hands.
   Various aspects of timber management practices hold potential for adverse impacts on water quality. Road construction and Jogging can result in sedimentation and cause deposit of debris in streams and other bodies of water adjacent to lands being Jogged. In the introduction of toxic substances into the state's waters, the Department of Environmental Conservation sponsored a study to determine the best management plan for timber harvesting. This study addressed the best means of implementing the Forest Resources and Practices Act, implemented by the Department of Natural Resources.
4) Waste Oil
   A large amount of waste oil is generated throughout the state. Because some of this oil is illegally dumped into water bodies, potential exists for toxic waste oil pollution in the state's waters. Studies have shown that much of the waste oil now being dumped onto land or into water can be reused. The department is presently studying ways in which waste oil may be cleaned. Unfortunately, it is currently uneconomical to reprocess waste oil in quantities less than 500,000 gallons. At present Anchorage is the only area of the state which could produce this quantity.

5) Wetlands
Wetlands provide several social and economic values of importance. Migratory birds use them for nesting, fish and shellfish breed in them, and they act as filtration and storage systems for ground waters.

Under the authority of the Clean Water Act, the department reviews permits issued by the Army Corps of Engineers and other federal agencies to ensure that proposed activities on or near wetlands comply with state water quality standards and other state environmental regulations.

6) On-Site Disposal
The state DEC offers training in installation and design of on-site disposal systems as part of a comprehensive program to educate installers in use and regulation of on-site disposal systems. The department has also funded a number of past and current studies to evaluate existing systems operating in the state and to develop improved methods of on-site disposal.

7) Clean Lakes
Through a voluntary program, funding is available from EPA to study the effects of sedimentation on lakes and for restoration projects. A number of projects currently in the planning stage will help restore the water quality in lakes near urban and recreational development areas.

Water quality management planning monies have made it possible to study the problems generated by residential and industrial activities as well as provide funds for community education programs. Progress has been made in the last decade toward a better understanding of water quality problems and their causes. The department looks forward to developing more solutions to these problems in the coming decade.

When comparing the air quality of Alaska to other parts of the United States, it is difficult to imagine Alaska having an air pollution problem. On a clear spring day, Mt. McKinley can be seen from Anchorage 250 miles south.

Though air quality in the state is generally excellent, periodic problems occur due to wintertime arctic meteorological conditions in Anchorage and Fairbanks, the two largest population centers. These problems result from carbon monoxide emissions from motor vehicles. High amounts of air pollution are hazardous to people's health, causing respiratory and other problems. Damage to vegetation can also result from air pollutant concentrations.

One of the major problems in controlling air pollution is that it often originates from several different and unidentified sources. Also, because much air pollution is in gaseous form, it is transported by air currents. Thus, a "smokestack" emitting particles into the air may affect an area hundreds of miles away when the particles finally fall to the ground or drift overhead with the wind.

Recognizing a growing air pollution problem, Congress passed the Air Quality Act in the late 1960's. Later, in 1970, amendments to the Act were passed, setting national standards for air quality and giving the newly formed U.S. Environmental Protection Agency enforcement authority.

Using the national standards as guidelines, Alaska started its own Air Quality program under the direction of the Department of Environmental Conservation. Since its formation in 1971, the department has learned a great deal about the unique aspects of air pollution control in subarctic climates as urban centers develop.

SECTION II: AIR

URBAN AIR POLLUTION

by Marty & Alwin Turiel-Strauss

Even though cities the size of Anchorage and Fairbanks in the continental United States do not usually have significant air quality problems, the subarctic location of Alaska's two largest cities, combined with climatic and human factors, creates air pollution problems caused by high carbon monoxide concentrations in the air, during some time of the year. The Department of Environmental Conservation has been monitoring air pollution levels in these areas for nearly a decade.

Carbon monoxide (CO) is a colorless, odorless and tasteless gas created during incomplete fuel combustion in gasoline engines. Although found in nature, large quantities of this gas released into the atmosphere are toxic to many forms of animal life. Carbon monoxide will combine with blood hemoglobin in place of the oxygen, thus reducing the amount of oxygen available to the organism for life support functions. An overdose of CO gas will result in dizziness and headaches in mild doses, to heart and brain dysfunction leading to death in extreme cases. Individuals with existing respiratory problems are particularly susceptible to CO pollution.

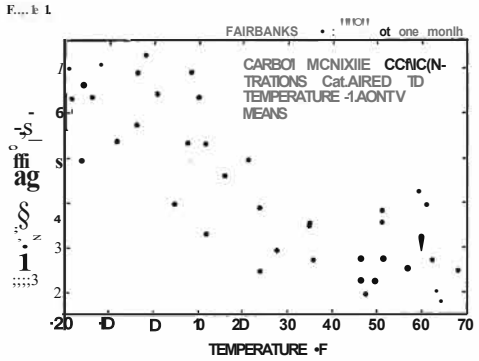
Approximately ninety-six percent of the carbon monoxide produced in Fairbanks and eighty-five percent of the gas produced in Anchorage comes from automobile exhausts. During the winter months, concentrations in the air rival the amounts found in large urban complexes of the contiguous forty-eight states. The reason for this situation can be traced to extreme winter temperatures and associated meteorological phenomena. Cold temperatures increase vehicle emissions by requiring a richer fuel mixture to keep the engine operating. Winter weather conditions are often typified by temperature/pressure inversions which do not allow ground air to rise and mix with the upper atmosphere. This stagnant air becomes more and more polluted as air is held down by the "pressure cap" formed by the upper air.

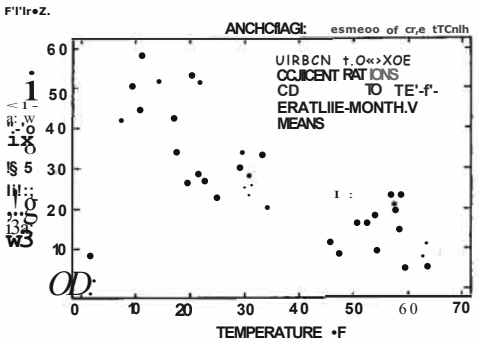
Tests in Canada and the United States have shown that the first four to eight minutes after engine starting (i.e., warm-up time) is when the highest carbon monoxide emissions occur. The amount of time it takes an engine to warm up is related to its design, emission control equipment, maintenance of the engine and outside air conditions.

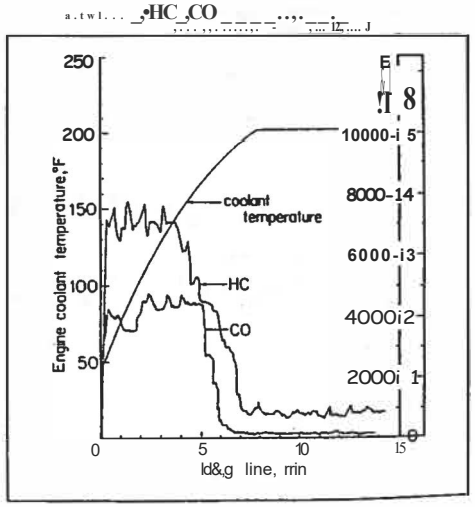
During the winters of 1974 and 1975, tests of over 100 in-use vehicles in Fairbanks determined that starting an engine cold accounted for a large percent of vehicle emissions produced. In fact, it was found that nearly two-thirds of all carbon monoxide emissions produced in the Fairbanks central business district originated during the first four to eight minutes of vehicle use.

These studies and others have shown that the problems related to carbon monoxide are closely tied to engine design, maintenance and operating conditions. Four methods of reducing emissions during the "warm-up" phase have been developed. These are: (1) modifying engine design and/or emission control systems, (2) improved engine maintenance, (3) preheating the engine prior to starting, and (4) use of non-petroleum based fuels.

There seems to be little that can be done about general climatic factors which contribute to holding air pollution over an area. Built-up areas are known to create "heat islands," however, which may help to dissipate polluted air. Fairbanks, during the winter, creates a heat island equal to that of an urbanized east coast city. This is still only enough heat to break up a small inversion.







A two-year study is planned to improve understanding of winter meteorological conditions found in Anchorage and Fairbanks. This study will attempt to determine methods which will help alleviate the carbon monoxide problems these cities experience during winter. The department is also borrowing a Mobile Emission Test Facility from EPA which will allow the state to test vehicles operating under normal conditions. These tests should give the department a better understanding of the effects of cold on automobile emissions. Once testing is completed, a program to reduce air quality problems from vehicle exhausts will be designed and implemented.

The core of the new program is the Mobile Emission Test Facility. At this facility the DEC will be able to determine what the benefits are of inspection and maintenance, new retrofit devices designed to aid cold-start problems and use of alternate fuel such as gasohol and liquid gas. In addition, the staff of the facility will develop a typical Alaskan driving cycle to compare with the federal model and develop new emission base line data for cold weather climates.

STATIONARY SOURCE AIR POLLUTION

by Stan Hungerford

Air pollutants are generated from stationary sources which are usually industrial. For example, pulp mills can produce sulfur dioxide, asphalt plants emit particulate matter, and the incomplete combustion of hydrocarbon fuels used in heating releases sulfuric and nitric oxides into the air.

During the past decade a growing population and expanding industrial activities have contributed to an increase in air pollution. Realizing the potential for air pollution problems during the early years of its existence, the Department of Environmental Conservation published its first set of air quality regulations in 1972. These regulations set standards to control the particulate matter, sulfur dioxide and visible emissions (smoke) from about fifty major sources of air pollution and seven hundred minor sources in the state.

At the time the original regulations were passed, pulp mills were relatively minor offenders. The two mills near Ketchikan and Sitka complied with sulfur dioxide emission standards within the first three years. In 1975 the U.S. Navy facilities in Ifodiak and Adak converted to low sulfur fuel oil. At present the Mt. Edgecumbe heating plant is continuing to bum fuel which may cause emissions exceeding the standards, but no adverse environmental effects have been noticed or are anticipated.

Initially, fifteen asphalt plants using low energy scrubbers were unable to comply with particulate emission standards. Since that time, thirty plants are now equipped with high energy scrubbers, or filtering bag units, and are operating within the limits set by the state and federal regulations.

Approximately twelve sawmills operated tepee burners to dispose of wood waste, creating highly visible emissions. A number of the mills since installed boilers to replace the open air tepees and now produce useful steam while disposing of their waste.

Golden Valley Electrical Association eliminated its emissions of particulate matter by installing a baghouse in the Healy power plant. The Fairbanks Municipal Utilities System made significant improvements in emission control through design modifications.

Energy development in the state occurring in the Prudhoe Bay Field, and projects such as the Alyeska Pipeline, Pacific Alaska Liquid Natural Gas Project, Tesoro Refinery expansion, the Northwest Alaska Pipeline Project, the proposed Beluga Coal Gasification Project and Dow-Shell petrochemical operations, and expansion of several small power plants will be the major source of future air pollution in the state. Of special concern would be petrochemical projects which, if built, emit not only sulfur dioxides and nitrogen oxides from the plants themselves, but will also generate increased oil-burning tanker traffic to transport the finished products from Valdez or Cook Inlet.

Population growth, along with other pressures, has increased the demand for energy and transportation which have in tum resulted in more nitrogen oxides and carbon monoxide being released from power plants and motor vehicles. In Fairbanks, Anchorage and the Kenai Peninsula, the rate approaches an additional 3,000 tons per year.

Through continued monitoring and enforcement of air quality standards, the department will continue to safeguard the Alaskan airshed throughout the next decade of industrial expansion.

EMISSIONS FROM MAJOR STATIONARY SOURCES[1]

Amount• In Tons per Year Either Reduced or Increased

PARTICULATE EMISSIONS

Loallon	Tons (year)	Tons (year)
Ketchikan Pulp Company	4000 ('72)	1000 ('78)
Alaska Lumber and Pulp Co.	4000 ('72)	1000 ('80)
Golden Valley Electric Assn. (Healy)	2500 ('72)	100 ('80)
Union Chemicals	1800 ('72)	800 (expected 1982)
Fort Wainwright	1000 ('72)	1000 ('80)
Fairbanks Munic. Utility System	600 ('72)	350('79)
Asphalt Plants (each)	30-50 ('75)	1-5 ('80)
(Iota!)	1000 ('75)	100 ('80)
Tepee Burners (each)	30-300 ('72)	10-15 ('78)
(total)	950 ('72)	50 ('781

SULFUR DIOXIDE EMISS1ONS[2]

Ketchikan Pulp Co.	700 ('72)	1500 ('75)
Alaska Lumber & Pulp Co.	2000 ('72)	3000 ('75)
Alyeska Pipeline Terminal		50 ('80)

NITROGEN OXIDE EMISSIONS

Union Chemicals	3000 ('72)	7500 ('80)[3]
Tesoro	250 ('72)	350 ('81)
Chugach (Beluga)	2500 ('72)	3000 ('78)
Arco-Sohio (Prudhoe Bay Expansion)	1000 ('72)	88000 (Expected '84)

CARBON MONOXIDE EMMISSIONS

Union Chemical	500 ('72)	1000 ('80)
Chugach (Beluga)	500 ('72)	800 ('78)
Arco-Sohio	200 ('72)	15000 ('84)
GVEA (North Pole)		300 ('78)
Pacific Alaska LNG		275 (proposed)
Tepee Burners (each)	500-6000 ('72)	100-250 ('78)
(total)	1700 ('72)	400 ('78)

FOOTNOTES

1. All these sources are currently in compliance with stale air quality standards except the first three listed under particulate emissions. These companies are each in the final stages of schedules to achieve compliance.

2. due primarily to increa5e in sulfur content offuel available in Alaska

3. size doubled with new plant

No matter where people live, they all use and depend on land. The sites of homes, offices and industrial plants, as well as the highways that connect them, all require space in the landscape. Removal of mineral resources and forest management activities must often take place side by side with recreational use in wild areas.

Multiple uses often make it difficult to ensure that all activities will be compatible. When uses conflict with each other problems can result such as where to locate landfills and waste disposal sites so that they are accessible to the residential and industrial areas that use them but do not constitute a health or aesthetic problem.

Many of the activities which cause damage to the land also affect air and water quality. Improper development practices may cause unnecessary erosion, sending runoff into lakes, rivers and streams. This runoff can include sediment, oil, pesticides and toxic chemicals, garbage and trash. Waste burned in landfills to reduce its volume can in turn cause air pollution. These effects require a holistic approach to environmental quality.

Proper implementation of land use policies helps a community guide population growth rather than follow it. Sewer lines, transportation systems and public facilities may be restricted to areas which are suitable for development. The exploitation of natural resources may be balanced against other alternative uses through land use planning.

While land use planning is largely a local responsibility, at least in organized boroughs in Alaska, the department has many mechanisms which are used to promote wise land use in the state. These mechanisms include permit review and stipulations; siting of water, sewer, and solid waste facilities funded by DEC grants; requirements for revegetation and restoration of construction scars; subdivision plan review; and technical assistance to communities.

SECTION III: LAND

SOLID WASTE DISPOSAL

by Dick Williams

Understanding of solid waste disposal activities and their effect on health and the environment has increased greatly during the past thirty years. This understanding has also increased concerns about and made changes in the way solid waste is managed. This is especially true in Alaska, where just ten years ago only five or six disposal sites could meet the minimal standards of the time. The remaining facilities were basically unmaintained open dumps. Many of these facilities practiced open burning which polluted the air, threatened user safety, and at times started forest fires. Some dumped directly into, and thus polluted, lakes and streams. Many had rat, fly and other disease vector problems. Many attracted bears into populated areas. Most were littered eyesores.

In 1973, the department promulgated its first solid waste management regulations, establishing standards for safe, sanitary solid waste disposal. The department's solid waste program also began about that time, providing technical assistance and training, enforcing the regulations and administering the solid waste management permit program.

The following years have seen some significant improvements in solid waste management in Alaska. Many of these were initiated by local governments or concerned citizens, and many have received assistance or guidance from the department staff. Major improvements have included the closure and replacement of bad facilities in Homer, Seldovia, Dillingham, Chitina, and Prudhoe Bay; the development of approved facilities serving Tok, Nenana, Big Delta, Glennallen, Healy, Livengood, and many other communities; the installation of leachate collection systems at Merrill Field in Anchorage, at the Sitka landfill, and the new Homer landfill; and the installation of innovative technology systems such as the high density baler in Fairbanks, the shredder/incinerator facility at Deadhorse and the shredding plant in Anchorage. There are also many more major improvements and new facilities now in the planning and construction stages.

These improvements are major accomplishments, but they do not mean that all or even most of Alaska's rural communities have not changed much except that there are more solid waste problems. Many facility operators have no training. Some of the regulatory standards are outdated or inapplicable. Data on Alaska's solid waste problems is very limited. New disposal techniques need to be developed for some of Alaska's unusual conditions and many rural communities need technical assistance and training.

The department has drafted a five-year solid waste management plan that will be out for public review and comments in spring of 1982. This plan proposes to bring nearly all facilities into compliance with a set of appropriate standards by 1987. Its elements include revised regulations, formal facility inspections, greatly expanded technical assistance and training, the on-going permit program, development of how-to-do-it guidelines for solid waste activities, a construction grants program, data gathering, and a public information program. These elements will help the department place more and more emphasis on problem prevention activities and less on reacting to existing problems.

LITTER REDUCTION AND RECYCLING

by Joe Ferguson & Anne Moore

Aluminum cans are crushed at the Fairbanks North Star Borough's baler. The dense bales reduce freight costs when they are shipped south for recycling.

Litter is perhaps the most obvious of environmental problems. It is seen in most public places, along highways, city streets and often in parks. Polls and informal surveys sponsored by the state in 1977, 1978 and 1980 indicated that litter is among the most widely recognized environmental problems in the state and that there is public support to seek solutions to the problem.

Litter is a function of human activity. However, population growth and modern society, with its throw-away packaging and other disposable products, have exacerbated the problem during the past ten years. In 1980 the state legislature enacted the Comprehensive Litter Reduction and Resource Recovery Act. In fiscal year 1981, $500,000 was appropriated for the program, with $567,000 pending for the 1982 budget.

Recycling is a solution rather than a problem. It is a solution to problems such as resource depletion and environmental damage related to solid waste disposal, raw material extraction and processing. Many materials that are disposed of in solid waste facilities are valuable and may be reused. Recycling and reuse can save valuable resources, energy and prevent new lands from being turned into landfills.

Population increases have caused a tandem increase in solid waste matter in the state. Rising costs of energy are making recycling more desirable for some of the materials being disposed of as solid waste. For instance, secondary aluminum saves ninety-five percent of the energy needed to process raw materials into aluminum.

During the past ten years tighter controls regulating solid waste disposal practices have increased costs of maintaining landfills. This has provided some incentive to decrease the amount of waste being disposed of in landfills.

One of the largest problems for recycling in Alaska is the lack of transportation systems in many areas coupled with low population densities. Through educational efforts and technical expertise, however, the Department of Environmental Conservation has helped create some successful on-going recycling efforts. There are 47 recycling activities underway throughout the state in 19 different communities.

Some materials, such as aluminum, copper, bronze and brass, are collected and sometimes bought by recyclers in Anchorage, Fairbanks and other cities for sale to markets on the west coast and in the Far East. Office paper, junked cars, washers and dryers and other large appliances are shipped to buyers in the lower forty-eight states. Newsprint is bought by Alaskan manufacturers of insulation and sold in Alaska as reprocessed cellulose home insulation.

Under the Litter Reduction and Resource Recovery Act the department has begun a program to determine what materials normally discarded can be recycled. The department will also encourage, whenever possible, increased recycling and reuse of these materials in Alaska. In addition to data collection and research, the litter and recycling program activities include a public awareness campaign, coordination with industry and government agencies, technical assistance to nonprofit and voluntary local recycling programs, and a grants program.

The department also helps communities sponsor cleanup days. Individual communities solicit their citizens to help clean up litter in their area. The department supplies large bags for litter collection as well as sponsors educational efforts to make the public aware of the potential hazards litter creates.

In June of 1981 grants of up to $15,000 were awarded to 18 groups around the state to act as seed money for promising local projects. These projects will include recycling activities and youth litter patrols.

PESTICIDES
by Bill Burgoyne

Alaska, through the Alaska Department of Environmental Conservation, is among less than a half-dozen states with agencies responsible for the regulation and use of pesticides. Although even the compounds used most in Alaska, herbicides, are consumed in amounts of hundreds of pounds, rather than the tens of thousands of pounds applied in major agricultural states, a full variety of compounds is used in this state. It is regulating this use, which is concentrated in a very short growing season, with a small staff that is the major problem for the department's pesticide program office located in the Matanuska farming area.

The most significant factor in the pesticide program has been an increasing public awareness of the safety hazards associated with pesticide and herbicide use. When this concern is combined with a lack of dependable information on the true extent of the dangers from pesticides, important use decisions may be made in an atmosphere of fear and panic. Such situations are as likely to admit into use an unsuitable or unsafe compound as to deprive a segment of industry or agriculture a safe and necessary formulation.

While safety factors for humans and animals are usually exceeded by 100 times when a pesticide is tested for marketing, this factor may not apply to lower animals, plants and certain "non-personal" environmental concerns such as scenery or recreational potential. In addition, it is impossible to assess every potential impact of more than 20,000 products classed as "pesticides" before the product is sold and used.

Prior to 1970 only military facilities and a few farmers in the Matanuska Valley used pesticides in amounts that could be described as "commercial." The remainder were weak formulations designed for home and garden use. Ten years later, there are ten commercial firms in the state that apply pesticides in homes and gardens, three city mosquito control programs, one aerial applicator, plus military, railroad, highway, airport and forestry uses that impact every citizen. With increased availability and recognition of the benefits of pesticides, a greater segment of the population has begun using the chemicals around homes and gardens.

Since 1975 there has been only one pesticide-related fatality in Alaska and two incidents that could be described as "serious." During the same period, the department, in cooperation with the University Extension Service, has certified 800 applicators and recertified an additional 200 through 1983. The department credits its safety training as a major factor in preventing pesticide accidents and deaths. In 1981 the department will train ten staff members for part-time pesticide use enforcement. It is expected that more accidents will be reported as a result of this program and it is hoped that a broader base of statistical data will be compiled for use over the next few years.

To date, the department's pesticide program has consisted of a single full-time and one part-time staff member. All dollar support has come through state funding. The U.S. Environmental Protection Agency has in most years supported training and special projects. All private applicator training has been the responsibility of the Alaska Cooperative Extension Service which receives additional grants from the EPA and U.S. Department of Agriculture to carry out the program.

The major goal of the pesticides program is human safety. The single area where little progress has been made is in developing an awareness in the public that violation of pesticide laws and regulations is a crime and not merely an accident for which remorse and an insurance payment is sufficient. The major problem

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areas remaining are: (1) incompetent home and food plant applications, and (2) the unfortunate image herbicides have in the public's mind. Conversely, a major accomplishment has been that almost one hundred percent of large users of pesticides in the state have been to at least one training session. Training has been offered from Ketchikan to Unalaska, a distance equal to that from Miami to San Francisco.

At present there is no full-time entomologist available to farmers and gardeners in the southcentral part of the state. During the growing season, however, the Palmer pesticide office offers consultation to an average of fifteen to twenty-five users per month. In general, it may be considered an accomplishment that, ten years after the organization of the department, there is an active and watchful presence in the area of pesticide regulation and use where none existed before.

COASTAL ZONE ENVIRONMENTAL IMPACTS

by Paul O,**Br1en**

Many activities occur along the shoreline and coastal zones of Alaska ranging from industrial development to subsistence hunting and fishing. Some of these activities may not necessarily be water dependent or water related. Because the coastal zone is relatively small in area, and since some water dependent activities cannot locate elsewhere, it is important that these types of activities, such as seafood processing, be given high priority over uses that are not water dependent. In addition, unique ecosystems exist along coastlines which must be protected from detrimental environmental impact. Often, the issues of coastal development versus environmental impacts create conflicts between various user groups such as occurs when a coastal industrial project is proposed in an area that has important natural resource values.

In an effort to decrease these conflicts, a coastal planning process and management system has been established through the Alaska Coastal Management Program which attempts to define those uses and activities that will be allowed to occur in a coastal zone and balance the social/economic values of a project with potential environmental impacts.

Alaska adopted the Alaska Coastal Management Act in 1977 following passage of the National Coastal Zone Management Act of 1972. As a result, guidelines and standards were established for development along the coast, and local communities were provided funds for the development of coastal management programs. The Department of Environmental Conservation is currently involved in a program to provide technical assistance to communities developing coastal management programs and review of these plans for consistency with state coastal management guidelines and standards. Also, all state water quality certifications issued by the department for federal permits, as well as internally issued permits and actions, are required to be consistent with approved district plans, guidelines and standards.

Funding to carry out the Coastal Management Act is provided by the federal Office of Coastal Zone Management through grants to state agencies for use in their own individual coastal management efforts and to coastal districts as "pass through" grants for the development oflocal plans. Presently, the program is in jeopardy due to federal budget cuts which would allow federal funding to cease during state fiscal year 1983.

Coastal zone management has become an important issue as more pressures have been exerted on the limited resources of Alaska's coast. One of the areas most affected by these pressures are rural communities where oil and gas development is an issue. Western and northern Alaska are the two geographic areas experiencing the effects of oil and gas activities as industry seeks out new areas for exploration and development. This action has raised serious concern in local communities which feel that hydrocarbon development may have adverse impacts on the region's natural resources, which will in turn generate repercussions in subsistence lifestyles. Before the Coastal Management Act was passed, communities in rural Alaska that were located in the unorganized borough had little voice in activities occurring in their area since they did not have planning and zoning authority. Under the coastal zone management regulations, however, communities in the unorganized borough may voluntarily organize for coastal zone management planning, and thus take an active role in their region's coastal planning.

As the state's population has grown and residential development increased, coastal management has also become an important issue around urban centers. Land suitable for residential building sites is at a

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premium in some communities in Alaska. Many coastal lands in the state can be classified as wetlands and approval must be given by federal and state agencies before construction on these lands may begin. Development pressures for housing and other uses are often exacerbated by the difficulty in obtaining necessary governmental approvals prior to construction.

There are now six approved district programs in the state: Anchorage, Annette Island, Cordova, Haines, Skagway and Yakutat. In the next year, a dozen more coastal districts are expected to submit their programs for approval. When every district in the state has developed a coastal management program, approximately thirty-seven coastal programs will exist which will, with the exception of federal lands, cover the entire coastline of Alaska.

The department will continue its role as a reviewer of local coastal management plans, weighing the plans against state and federal guidelines. Through the department's permits section, monitoring of coastal development to avoid potential environmental damage will continue.

SECTION N:
THE PIPELINE

THE PIPELINE

by Marti Early

The trans-Alaska pipeline has generated more concern over the environment than any other single project, public or private. Its conception in 1969 was almost concurrent with that of the national Environmental Policy Act. National awareness of the environment grew almost as the concept of the pipeline itself grew. This awareness and resultant court action delayed construction for almost five years. As a result, the environmental controls on the construction and operation of the pipeline and its associated marine terminal facility have been the most rigorous of any large project.

Oil Discovery and Pipeline Construction

In 1968 Atlantic Richfield completed the discovery well of the Prudhoe Bay oil field and started pumping oil at a rate of 2,415 barrels a day. Since that time, several hundred more wells have been drilled and the largest oil field ever discovered outside the Persian Gulf has been developed.

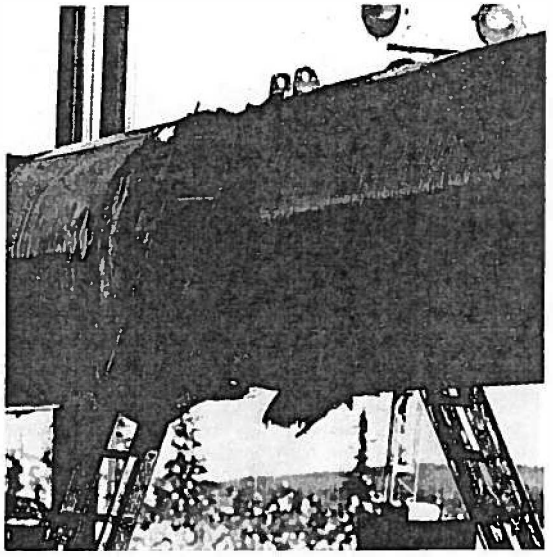
The oil strike was so large that most Alaskans could not conceive of its effects, particularly_a little over a year later when the state opened competitive lease bids in Prudhoe Bay and collected $900 million, over $3,600 for every person in the fledgling stale.

By 1969 three major oil companies had applied to the U.S. Department of the Interior to build a forty-eight inch pipeline the length of the state in order to transport the newly-found oil to an ice-free port in southcentral Alaska. Governmental approval was a long time coming. Preliminary stipulations for construction were issued, followed by an Environmental Impact Statement. Passage of the Alaska Native Claims Settlement Act in 1971 removed one legal hurdle and objections over the EIS were settled not by the courts but by the U.S. Congress, with passage of the Trans-Alaska Pipeline Act in 1973.

In January 1974, an agreement was signed by the Governor of Alaska and the Secretary of the Interior which allowed joint action on lease stipulations and project review in order to expedite issuance of the numerous permits necessary to begin construction. By the end of the year, both state and federal governments had issued their leases.

To see that concerns over environmental impacts were met, both the federal and state governments established new agencies, the Alaska Pipeline Office under the U.S. Department of the Interior and the State Pipeline Coordinator's Office under the Governor of Alaska. These institutions provided engineering, technical, and environmental review and field surveillance of the construction phase of the project. They also coordinated the efforts of other state and federal agencies during construction. All of the costs of these activities were borne by the company constructing the pipeline.

Because of the special problems involved in ensuring that the fish and wildlife resources in the vicinity of the pipeline were protected, a special group of experts, the Joint Fish and Wildlife Advisory Team, was formed to advise the federal and state monitoring organizations. These representatives of the U.S. Fish and Wildlife Service, the National Marine Fisheries Service and the Alaska Department of Fish and Game were involved in all phases of the project, from design review to construction monitoring. The Department of Environmental Conservation had one full-time staff member at the beginning of construction to monitor pollution control measures taken by Alyeska. That number had increased to over seven by the end of construction.



An oil-soaked pipeline from the spill al Steele Creek.

Typical monitoring duties for the department were to check on compliance with the terms of permits for solid waste disposal, sewage and wastewater treatment and air emissions from equipment used to dry rock aggregate. Complaints and violations, including oil spills, were responded to by the staff. Permits required by other agencies such as for placement of the pipeline over fishbearing streams, were reviewed by DEC staff to prevent air, land and water quality violations.

Environmental Concerns - Construction

The stipulations in the leases formed the basis for environmental control by government agencies over design, construction and operation of the pipeline project. Developed through the EIS process and supervised by monitoring organizations, the stipulations were designed to mitigate potential environmental hazards. For instance, intrusion into formerly pristine areas was a major concern. Along portions of the route which cross caribou migration routes, special burial techniques were developed to provide crossing areas for the animals.

Likewise, sedimentation in fish streams was minimized by allowing construction only between outmigration and spawning periods, requiring settling ponds and burying the line. Restoration and revegetation of all areas was required. Since construction, over 8,000 acres have been regraded, contoured and revegetated.

Oil spills were a constant worry and a construction oil-spill contingency plan was developed. When spills occurred, the department's regional offices responded immediately to ensure adequate cleanup and disposal of the spilled oil. This function is still a major aspect of the department's program as the pipeline continues to operate.

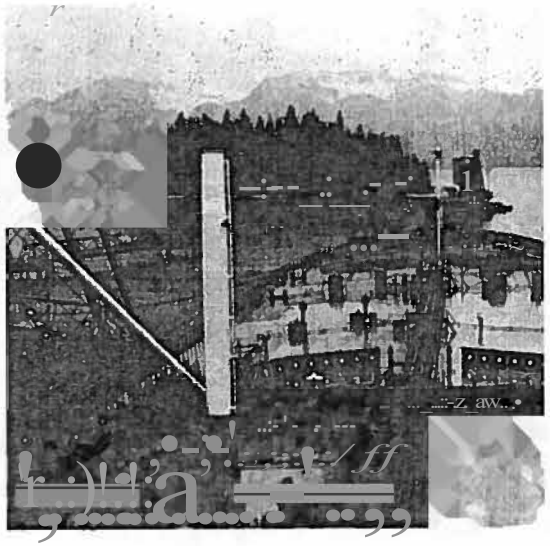
During construction of the pipeline, an estimated 16,024 spills caused over 771,000 gallons of oil to be spilled. At this writing there have been four major oil spills since the line began to operate.

Oil from tanker truck spills have totaled over 88,000 gallons to date. These spills were often caused by inattentive or poorly trained drivers and treacherous road conditions. Other common carrier spills were caused by lack of attention during loading or unloading, particularly during the early construction phase and especially in aircraft carrying fuel in bladder-type tanks.

Alternate freezing and thawing of buried fuel lines sometimes resulted in unscrewing of threaded joints or pipeline breakage. When this occurred, large quantities of fuel could leak into the gravel pad where it remained undetected until observed leaking onto the ground.

Virtually all of the largest spills could have been prevented. Better training of drivers and routine vehicle inspections, proper installation of camp fuel lines and regular pressure tests would have gone a long way toward minimizing the oil spill problem during the construction phase.

The lessons of the oil pipeline are being given careful consideration during the planning stage for the proposed gas pipeline. Seven members of the DEC staff are currently working with the Northwest Pipeline Company as part of the State Pipeline Coordinator's Office to develop plans that will avoid the problems of the oil pipeline.



A tanker receives its cargo of North Slope crude oil at the Valdez terminal. The oil is shipped to southern refineries.

Since the beginning of construction, disposal of wastes, both sewage and solid wastes, from the pipeline construction camps, has been a continuing problem. Certain types of package sewage treatment plants which were used initially had to be supplemented or replaced due to unanticipated camp and environmental conditions.

Often, the camps were not located in areas where treated effluent is easily disposed of. In most camps, the treated waste was discharged into a lagoon or reservoir. The walls and bottom of the reservoir were constructed of permeable gravels, designed so that the wastewater would slowly percolate into the surrounding soils.

Solid waste disposal is one of Alaska's biggest environmental problems. In permafrost soils, sanitary landfills are physically impossible, as well as environmentally unacceptable. In many high water table areas, landfills are unacceptable because of possible contamination of the aquifer. Open garbage dumps attract bears, foxes and rodents. Although the department allowed open burning of some waste, an enclosed incinerator was recommended. These incinerators had the added advantage of being able to destroy sludge from the sewage treatment plants.

After the pipeline was put into operation, many of the camps had to be dismantled. To prevent burial of massive amounts of unneeded materials, the department encouraged hauling the materials back to major population centers for recycling. Tires, batteries, vehicles and most metal materials could be recycled and an estimated eighty percent of the recyclable materials were hauled out for that purpose.

Operation of the Line

The major environmental problems associated with the pipeline's operation are oil and air pollution. In fact, very soon after the line's startup came the first oil spill. During the month-long trip of the first load of oil to Valdez, the line was shut down twice. The first stoppage was due to a minor crack in the line but the second shutdown occurred on July 8, 1977 after an explosion at Pump Station 8. The spill was quickly contained but the event pointed out the constant danger oil spills present not only to the environment but to human life.

The line was designed with a leak detection system which is sensitive to pressure changes in the line. Unfortunately, variances in pressure and volume are frequent and the alarm system is therefore set to go off only when a major change in these variables occurs. As of this writing, the leak detection system has yet to detect a spill before it is found through other surveillance methods.

Water pollution generated by tanker traffic has also been a major concern. Pollution can result from two sources, oily ballast water discharge and actual oil spills. A ballast water treatment facility was required at the terminal site to treat the expected daily average of 41.4 million gallons of ballast water. Tank cleaning wastes are also treated at the facility.

Prior to building the terminal site, permits issued by the department and EPA required strict limitations on the amount of oil, grease and other insoluble petroleum components to be released by the treatment plant. A study commissioned by EPA showed a potential for harmful effects on the marine environment

MAJOR PIPELINE OIL SPIU.S
1974-1981

Date	Location	Amount Spilled In Gallons
5/29n4	Toohk Camp	5,000 to 20,000
10114ns	Franklin Bluffs Camp	30,000
12/17n5	Surfcole Camp	60,000
Ifl3n6	Five-Mile Camp	5,000
1/29/76	Prospect Camp	40,000 lo 60,000
2/24n6	Oldman Camp	4,000
st sns	Hawy Valley C..mp	8,000 to 10.000
7/19n7	Check Valve 7	110,000
6/10n9	Atigun Pass	150,000 to 200,000
2/!SnB	Steele Creek	150,000
I/ 1/81	Check Valve 23	100,000
Spills Reported		16,024
Gallons of Oil Spilled		771,604

Note: A cash settlement of $100,000 was made to the state by Alyeska for the first seven spills.

from soluble hydrocarbons which are not removed at all. As a condition of permit issuance, Alyeska is funding a three-year monitoring program conducted by the University of Alaska to test for the subtle effects of long-term release of these compounds into Prince William Sound.

DEC requires a comprehensive ambient air quality study as an ongoing aspect of the operation at Valdez. The monitoring is being conducted by Alyeska as a condition of the company's air quality permit. The main concern is production of sulfur dioxide caused by tankers burning high sulfur fuels. Test results have shown that actual levels have been kept quite low, and even at peak operation times the sulfur dioxide levels do not exceed national and state air quality standards. Currently, the City of Valdez is considering requiring tankers to burn only low sulfur fuels so that other industrial development will be possible without exceeding the limits set by the national Clean Air Act.

The Trans-Alaska Pipeline has probably been the most visible environmental issue statewide and nationally for Alaska over the past decade. Not only is the project the largest single investment of private capital in history, the possible effects of the pipeline were probably the most closely studied and monitored of any large project on record. Public interest has been intense. A case in point is the 70,000 gallon oil spill that occurred in December 1975 on the North Slope. DEC staff received calls from all over the United States and Canada within hours of the report of the spill. Contrast that response to the reaction to two other spills that same year which dumped over 100,000 gallons of gasoline into a boat harbor and 50,000 to 90,000 gallons of fuel into the Nenana River near Mt. McKinley National Park. Neither of these two incidents was of interest beyond Alaska. This contrast in public response makes comparison of the pipeline project with other efforts doubly difficult.

Aerial view of leftover sections of pipe, stockpiled to be recycled.

ISSUES OF THE NEXT DECADE

HAZARDOUS WASTES

by Alan Boggs

Increasing quantities of hazardous waste are being generated in Alaska which, without adequate safeguards, can create conditions that threaten not only the public health and safety but also the state's environment.

Under the national Resource Conservation and Recovery Act of 1976 (RCRA) facilities or companies which generate, treat, store or transport over 1000 kg, or 2,204 pounds, of hazardous waste per month are subject to regulations. Most Alaskan facilities do not generate or handle this large an amount of material. There are about 150 industrial facilities and twenty-five transporters in Alaska which will have to conform to the strict requirements of RCRA.

A hazardous waste control bill for Alaska was enacted in 1981, and it gives the department added authority. Regulations are expected to be written and take effect in spring of 1982. These regulations will enable DEC to control hazardous wastes in the state, including quantities too small to be regulated under RCRA.

The major waste-producing industries in Alaska are military installations and petroleum companies. The military generates solvents and oil from equipment maintenance, chemicals from laboratory works, hospital waste from its health-care facilities, insecticides from field operations and stored PCBs (Polychlorinated Biphenyls) used in electrical generation. Oil exploration companies use herbicides to increase their well productivity, solvents and oil for equipment maintenance and various chemicals associated with drilling processes.

In addition, canneries generate various chemicals used in fish processing and packaging, and mining companies generate waste associated with ore processing and transportation. There are also fur tannery operations in Alaska using chemicals to preserve furs and a plating operation which generates toxic wastes.

Finally, businesses and households can generate small amounts of hazardous wastes which are not regulated under the RCRA. These wastes include solvents, insecticides, waste oil and other hazardous materials. The state plans to develop policies and guidelines for handling these wastes since even small amounts of such wastes have the potential for causing damage to the environment and public health.

Up to now there have been no detailed programs or controls put into effect in Alaska. In the past few years, however, hazardous waste disposal and handling have come under public scrutiny because of the adverse and often long-term effects of the substances. Future industrial and economic growth will result in substantial quantities of hazardous wastes, making it imperative that adequate controls be established now.

Significant quantities of hazardous wastes were not generated in Alaska until World War II. Most of these wastes were generated by mining, petroleum development and military activities. Little is known about the types, quantities and final resting place of these wastes, but it is assumed that most were disposed of in local dumps or sewer systems.

Until recently, the DEC considered hazardous wastes only a minor problem because of the small quantities of hazardous substances and the lack of major chemical industries in the state. However, in the past two years several incidents have occurred which caused the department to reassess the potential threat of

hazardous wastes. These incidents included a PCB spill at Fort Richardson Army Base, and possible water contamination from the release of radioactive wastes from an experimental nuclear power plant at Fort Greeley. There are also potential health hazards due to hazardous wastes improperly disposed of in the Kenai city dump. Drums of cyanide have been found in Nome and at the Elmendorf Air Force Base.

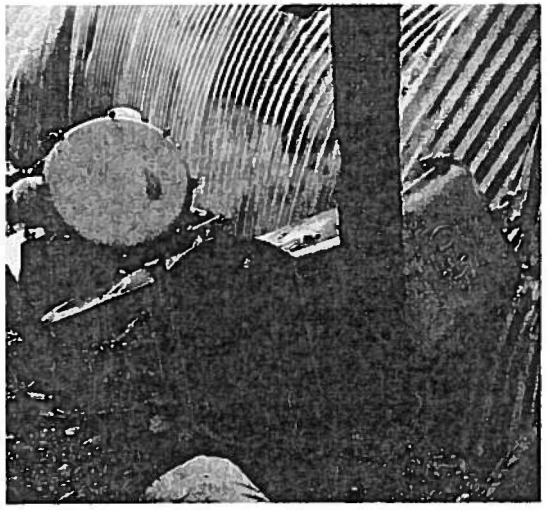
Additionally, the serious problem of deteriorated asbestos in Alaska public schools has recently become part of the department's responsibility. Contractors used sprayed asbestos in schools between 1945 and 1973, when its use as fireproofing and insulation was outlawed. The Environmental Protection Agency required all schools to be sampled for friable asbestos by September 1981. Survey results so far indicate that thirteen percent of the 101 schools sampled have asbestos damage sufficient to require rehabilitation.

Currently there are no legal hazardous waste disposal sites in the state. All hazardous wastes must be shipped outside Alaska for proper disposal in secure landfills. However, in the past two years only twenty-five shipments have been received by the nearest secure landfill (Chem-Security in Oregon). It is not known where the remaining waste has been disposed. It *is* suspected that a large number of sites, probably over IOQ, illegally contain or dispose of hazardous waste in the state.

The department has briefly surveyed low-level radioactive wastes. This survey determined that the Nuclear Regulatory Commission (NRC) is regulating and controlling the majority of radioactive sources and wastes which ship into the state and are not controlled by the NRC. The department *is* currently in the process of developing regulations to control storage, disposal and shipment of unregulated radioactive wastes.

Increased industry such as additional oil and gas development, the new gas pipeline and new lands set aside for oil exploration will undoubtedly increase Alaska's volume of hazardous wastes. The state will manage these wastes through implementation of RCRA. A tracing and manifest system will ensure that all wastes end up in a permitted facility. New, safer facilities with highly developed technological capabilities will come into use as the cost and responsibility of handling wastes is placed on the generators. This should in turn create incentives to reduce the production of hazardous waste in the second half of the 1980's as alternative products and production processes are developed.

The state is exploring the possibilities of approving a secure landfill-incinerator combination capable of accepting hazardous wastes and improving the treatment and transport of wastes to lessen the amount exported. As Alaska and the rest of the nation grapple with the problem, it *is* likely that better solutions will emerge.



Old electrical transfonners, like these three at an abandoned military site, can contain hazardous wastes, such as PCB's.

ENVIRONMENTAL IMPACTS OF PETROCHEMICAL DEVELOPMENT

by Dave Sturdevant

For some time, various interests have considered the possibility of using Alaska's natural gas resources to manufacture petrochemical products in the state. A consortium led by Dow Chemical USA and Shell Chemical Company, under an agreement with the State of Alaska, is presently conducting a detailed economic feasibility study of the potential for such an industry.

The first phase of the projected development would cost five to seven billion dollars. Completed by 1987, it would extract natural gas liquids (ethane, propane, and pentane) from the Prudhoe Bay field for transport via a second pipeline across the state to Fairbanks or the south coast. There, a petrochemical plant occupying up to 1,000 acres with its own shipping terminal would process the liquids prior to shipment.

The first phase of the petrochemical plant would transform the ethane component into ethylene, polyethylene, ethylene glycol and ethyl benzene. The second phase would add ethylene dichloride and alpha olefins. Ethane consumption initially would be around 45,000 barrels per day, with possible doubling if a second facility were built. Ammonia, urea, and caustic soda may be manufactured in ancillary facilities. The propane, butane and pentane would be shipped from the state in tankers as liquid petroleum gas at a volume of 110,000 barrels per day, a volume greater than the present annual consumption of propane in Alaska.

As a companion to the feasibility study, in 1980 the Lieutenant Governor directed the Department of Environmental Conservation to conduct a survey of public attitudes regarding petrochemical development. In the spring of 1981, a three-fold project was initiated. The project included a detailed survey of opinion in 670 households statewide, an information program and a series of public meetings held around the state. The results of this project were submitted to the Lieutenant Governor in September of 1981.

This information will be used by decisionmakers determining disposition of the state's royalty natural gas resources.

An additional task undertaken by the department is an assessment of important social, economic and environmental issues regarding petrochemical development. A technical group was formed of state agency personnel representing various fields. This group has identified issues relating to potential impacts in each area. Reviews of these issues will be compiled and submitted with the public attitudes report. The reviews are intended to provide information for decisionmakers on key questions and variables in connection with a petrochemical industry.

The Dow-Shell feasibility study, submitted in September 1981, included an analysis of environmental impacts associated with the project. Sites under study for the petrochemical plant and shipping terminal include Anchorage, Point MacKenzie, Kenai, Seward, Valdez, and Fairbanks. A variety of impacts are possible, including effects upon fish and wildlife, habitat, water quality, air quality, land use, coastal zone use and social considerations. In some locations, air pollution may be a serious concern; in others, obtaining sufficient cooling water may require special efforts. Large quantities of treated wastewater and wet sludge would be produced at a plant and need disposed of. The pipeline, although smaller and simpler than the Alyeska line, may cause disturbance to fish streams and wildlife habitat. The work force associated with a plant could expect to substantially increase the demand for housing, services and recreation in smaller

According to the U.S. General Accounting Office, Alaska generated 40,000 metric tons of hazardous waste in 1980, making it one of the lowest generators of this type of waste in the nation. However, even this volume can be a threat to the public and natural environment if improperly managed. Some preliminary inventories conducted in the slate give an idea of the type and volume of hazardous waste in Alaska:

	PER YEAR
Amount of PCBs	2,831 tons
Amount of Oily Wastes	20,000 kg
Amount of Hazardous Waste	25,380 tons
Amount of Hazardous Materials	17,468 tons

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communities, and could add significantly to the wintertime presence of carbon monoxide generated by automobile traffic in some locations. The requirement for state services and facilities would also be increased. Petrochemical products also are frequently flammable, and storage and transport of large volumes of products presents a potential fire and explosion hazard.

An additional concern may be the use or generation of chemical compounds classified as hazardous or toxic, including carcinogenic materials, and their potential effects on public health. The risk of health impairment from such substances is difficult to assess and considerable controversy exists in the scientific community as to safe occupational exposure levels. Three compounds known to promote cancer are associated with the facility under study. The most important, benzene, can cause a plastic anemia, and chromosome damage leukemia in humans with chronic exposure. Benzene is used in the manufacture of ethylbenzene, and would be shipped to the facility either from out of state or from a petroleum refinery within the state. Transportation accidents could present an important public concern. Two other compounds have been found to be carcinogenic in laboratory tests. Ethylene dichloride would be a major product in the second phase. Ethylene oxide, normally an intermediate in the manufacture of ethylene glycol, would be associated with both phases. Two additional products, ethylbenzene and ethylene glycol, are under study at the National Cancer Institute for possible carcinogenic effects. Each of these five substances would be manufactured in quantities from one-half billion to two billion pounds per year. Small amounts of other hazardous or toxic materials, such as catalysts, may be used in various processes.

Hazardous wastes are not planned to be disposed of in the state, but will be neutralized, destroyed by incineration, or shipped outside the state for disposal. All of the processes and compounds proposed for an Alaskan petrochemical industry are in everyday use at similar plants across the U.S.

A petrochemical complex in Alaska will certainly have significant effects in some of the areas mentioned. There is no indication, however, that the project could not be constructed so as to meet environmental laws and regulations. Detailed analysis must wait until a specific project is proposed. Such an analysis will include an environmental impact statement and early pinpointing and resolution of issues among all of the agencies involved.

WOOD SMOKE

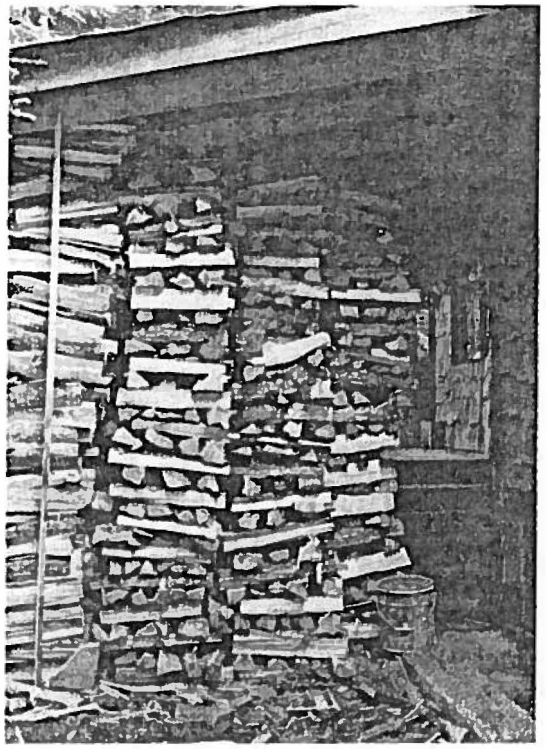
by Tom Chapple

Rising heating oil prices over the past three years have caused many residential home owners to install woodbuming stoves as a way to reduce heating costs. Today, many people use wood as their chief source of heat, with oil or gas as a backup source during severe winter weather. This is especially true in southeast Alaska with its abundance of wood from forested areas.

With the growing popularity of wood heat, some previously unknown environmental problems are beginning to appear. In areas of high population density where there is a predominance of woodstoves in use, calm winter conditions can cause smoke to hang in the air. When combined with temperature inversions, the effect can gradually worsen for a period of days or weeks until a severe air pollution problem exists. Presently, the problem is especially evident in Juneau, Fairbanks, and Sitka.

Currently, the department has not regulated woodstove emissions. If smoke from woodstoves becomes a problem, the department will work to control the situation first through public education. Woodstove emissions have not yet been known to cause any major pollution problems. However, the department is conducting some air monitoring studies to assess the present health related impacts of increased wood burning in selected locations.

The amount of smoke produced can often be reduced by educating the user in proper woodbuming techniques. Proper seasoning, use of dry wood and greater familiarity with woodstove operation are the three major factors. Recently, the department has initiated a public information project designed to teach woodstove owners woodbuming techniques which will prevent pollution.



This firewood is protected from rain and stacked to allow air circulation. Wet wood when burned gives off less heat, more creosote, and more air pollutants than dry wood.

ACID RAIN
by Jeff Hock

Much of the world is dependent on fossil fuels. Cars bum gasoline, homes are heated from fuel oil or coal, and many electrical generation plants are fueled by oil or coal.

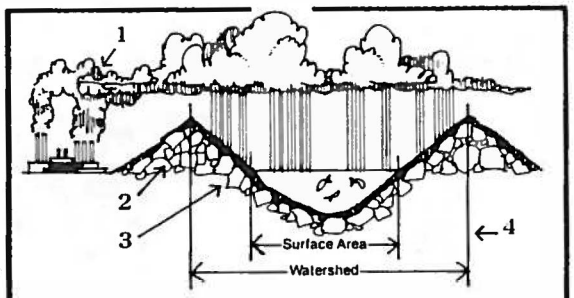
Unfortunately, fossil fuels do not combust completely, and the resulting residues escaping into the atmosphere consist primarily of sulfur dioxide and nitrogen oxides. These gases react with water in the air, forming sulfuric and nitric acids. When these acids return to the ground with rain, snow or sleet, soil and water pH level may be increased. This increase in acidity lowers the buffering capacity of stream and lake waters and can create stress on organic life forms found in the ecosystem.

The nature of acid rains makes them an international problem. Because the acids are transported by wind currents, an area need not be causing acid rains to experience them. Coal high in sulfur content which is transported from Alaska to Japan and burned there may return as acid rains on the west coast of the United States. If enough falls to change pH levels substantially, leaching of heavy metals and ion exchange may occur which can be detrimental to some life forms.

Industrial expansion and urban growth are the two most significant factors that may accelerate problems with acid rainfall in Alaska during the next decade. To date, acid rains have not been recognized as a problem in the state. The department is currently developing baseline data on acid rains in Alaska which will help in determining the type of damage which might be expected and where such damage is likely to occur.

The expansion of the Kenai Tesoro refinery and the existing facility have raised questions about the danger of acid rains over the Kenai National Moose Range. Presently, there is no apparent problem. Nevertheless, realizing the potential problems acid rain could produce, the department is closely monitoring changes in air, land and water quality. Equipment for monitoring atmospheric levels of sulfur dioxide and nitrous oxides has been purchased and will be in use by 1981 or 1982.

Limnology studies are presently underway on the Kenai Peninsula to determine the effects of the Tesoro plant on water quality. Through monitoring Kenai lakes, the department has documented their low buffering capacity. This fact makes them extremely sensitive to acid rain disposition and the department plans to keep a watchful eye on the situation.



Lakes Most Susceplible to Acidification

1-are located downwind. sometimes hundreds of miles downwind. from major pollution sources-electricity generation. metal relining operations. heavy industry. large populalion centers

2-are surrounded by hard. insoluble bedrc,ck with thin. sandy. inh!flile soil
3-have low bullering capacity due to the terrain
4-have a low watershed to lake surface area ratio

"WHAT'S AHEAD"

by Ernst W. Mueller

Alaska has experienced more intense resource development in the last ten years than at any time since the gold rush. Unlike the gold rush, however, these new projects are only the beginning. Within the next few decades, Alaska's energy, mineral, timber, fishery and agricultural resources will be developed at a rate unprecedented in Alaska's history. Although an exciting challenge, intense resource development in our emerging frontier state is not without its problems-environmental, social and economic. Helping prevent and solve these problems is a major mission of your Department of Environmental Conservation. Over the last decade, our programs and activities have grown more diverse and complex in response to the needs of our burgeoning resource development. In my opinion, we stand much better prepared to meet the challenges of the future than at DEC's founding ten years ago.

Part of this preparation includes important legislation strengthening programs important to protecting the environment from potential impact from Alaska's new industries. These include major oil pollution control legislation passed in 1976 and 1980, and a hazardous and radioactive waste management law passed in 1981. Others include major programs to assist industries in meeting environmental and other permitting requirements, especially through the Environmental Procedures Coordination Act. Others provide bold new initiatives and innovative means to solve particular problems-increased funding for publicly owned water supply and waste disposal facilities, water and wastewater operator training and certification programs, and the new Comprehensive Litter Control and Recycling Act.

In addition to changes in basic legislation, we have also expanded through administrative action. Most recently, as a result of an executive order signed by Governor Hammond, major health inspection programs were transferred to DEC from the Departments of Health and Social Services and Natural Resources, bringing with them a number of staff positions. With these new programs, we will be able to provide a single coordinated point of contact within state government for a broad variety of health-related inspection programs-restaurant sanitation, food safety, water supply protection, waste disposal, pesticide use and others. By properly cross training and stationing staff, we can do a more effective and efficient job, often with a single person inspecting facilities for a wide variety of requirements. Using this approach saves the public money and time, and also reduces the level of disruption to industry caused by repetitive, multiple inspections.

Alaska's future is bright and challenging. As resource development expands, through new coal mines, oil refineries, petrochemical plants, molybdenum mines, bottom fisheries and many others, we face a continuing challenge to protect the high quality of life Alaskans' lifestyle demands. We also face a great need for new public water supply, sewage collection and treatment, and solid waste management facilities, particularly in rural areas. Many of Alaska's smaller communities have inadequate supplies of drinking water, or water which is contaminated. Others have no regular sanitary means of disposing of their sewage or solid waste. The state's expanded financial resources present an opportunity to provide these much needed services to communities which heretofore could not afford them.

The Department of Environmental Conservation still retains some of the vitality and sparkle that come with a new idea. I hope that the challenge and opportunity that face us in the future are met with the same enthusiasm and dedication of the last ten years.

Ernst W. Mueller, commissioner since 1974.