

ALASKA LEGISLATURE COMMITTEE FILES 1983-1984 8672

2310 SHESS, HERB. & PEST. USE HEARING - STUDENT LOAN INFO.

program and the system does not pretend to manage pesticides by their safety but on a reasonable risk. A fundamental question that we may want to ask ourselves as a state is, are we willing to follow the present system with its loose guidelines, the unknown risks inherent in the system, the unknown liability that the state may incur by following the present system. It's time to have the state look into developing an overall pesticide policy for the state. Also have a policy where the public is informed, workers are informed, as well as managers.

26 We have to begin to really fund departments, like DEC, Department of Labor, with adequate funding to get them out there to do what their main function is to do, which is to protect the environment and protect workers and public health in Alaska. And we must make this a priority.

31 What we have to do is look at all the data, and come up with a rational decision and a plan and a policy guideline for which pesticides, herbicides are to be used. It's not a real clear cut decision making process. It's very arbitrary. We need to have more adequate testing facilities here within the state.

35 Raymond Jorgensen, Alaska Department of Labor, Chief Industrial Hygienist in Labor Standards and Safety Section:

Josephson: What is the Railroad inspection program with respect to herbicides?

Jorgensen: That's a good question. I don't think there is any activity. The scope of the inspection team that's taking a look at the railroad for federal/state changeover is looking and focusing in on facilities only. They're not looking in at the right of way.

Josephson: Are the OSHA violations within your jurisdiction?

Jorgensen: Not until the changeover becomes effective. We have not received any complaints from employees working at the Railroad. We may. And we would have some impact by our actions in responding to those complaints.

Josephson: Can you summarize the Department of Labor's relationship to the Alaska Railroad.

Jorgensen: Now the Department is spending money for information gathering for serving the facilities to produce a report to the railroad people for corrections for health and safety hazards.

Josephson: Do you know if or not the ongoing work indicates any significant health hazards, whether there's herbicide exposure otherwise?

Jorgensen: I'm not knowlegable of that. However, there are people in the Department that are.

Senator V. Fischer: Assuming the transfer has occurred, what jurisdiction would your Department have over the Alaska Railroad with respect to these issues?

Jorgensen: We would be looking at the protection of the employees of the Railroad that are mixing, applying the pesticides or herbicides.

39 Senator V. Fischer: Is this the kind of jurisdiction you'd have in responsibility for any department of the state?

Jorgensen: Yes it is. We have jurisdiction over all places of employment in the state, whether they're state government or private enterprise.

Josephson: After the transfer of the railroad, you will be able to address the issue of herbicide, not from the standpoint of the safety of the Alaska public at large, but focused upon the issue of employees.

Jorgensen: Yes. We suspect we will be spending alot of time looking at railroad facilities and occupational safety and health problems there. Department of Labor has recently hired a physician that will enable us to do some medical work on workers that have been exposed to herbicides as well as perhaps even collecting blood samples, tissues and have those analyzed. Analysis is very expensive and time consuming and only occassionally can we use local laboratories. But legally we cannot resort to uncertified laboratories, and most of these certified laboratories are located out of state.

TAPE II - SIDE B

7 Jorgensen: We rely heavily upon research of others and try to make it apply to Alaska. I'm not advocating that we set up our own research team. We do follow the U.S. Department of Labor's mandates on their standard setting. Which is based upon research all over the world and the country.

Josephson: How many people do you have in your office?

Jorgensen: As far as the people with the expertise to look at the application of herbicide, the industrial hygienists, there are currently five enforcement types and one consultant type that cover the entire state. Our working budget for the entire program for all of our staff is somewhere around \$2 million. \$1 million is matched by \$1 million from U.S. Department of Labor. The transfer action of the railroad gave a lot of money to the Department of Labor to pick up several other people to do the survey. So there are two people that are primarily looking at safety hazards associated with the railroad facilities. The inspectors do not have the health credentials that they should probably be having to make the health, to recognize and evaluate the health hazards.

- 10 Senator Moss: Your department is responsible for the safety of the workers, but what about those people that live along the railroad. How often do they have to be exposed to these chemicals before your department will say we have a health and safety problem?

Jorgensen: It's a good question about where does one's jurisdiction end and where does one's begin. The law that we're operating under says that there has to be an employee/employer relationship. Many people are happy because that's where our jurisdiction does end. Where it has to be picked up then, from that point on, would be the people in charge of public health or the environment. The Department of Labor and OSHA tries to focus in on the sources of the hazards and the causes of the conditions that would expose the public also if they happen to be in the vicinity.

- 18 There are some things you cannot expect the Department of Labor to do under the OSHA law. Such as to protect the general public, the innocent bystander. For example, while a building with asbestos is being demolished, the people doing the demolishing are protected as employees, while the bystanders aren't.

We would inform the employer and the employee that the hazards that they're exposed to are dangerous and they're not adequately protected. They must take measures to protect from those exposures. Including: elimination, substitution, personal protective equipment, and other types of control (engineering or administrative) measures.

- 25 Senator V. Fischer: In regards to broader protection, beyond just the worker, when you become aware of a hazard when they affect more than just the workers, when they affect the community or whatever, is there any communication between your Department and others?

Jorgensen: There is communication. There's probably not enough. What generally happens, the public health people encounter the problem of exposure and do not have the capability of evaluating it and call us to evaluate it. The people that should be responsible for it are the people who are protecting the environment, DEC or Public Health Department or whoever. But they frankly do not have the technical equipment or the funding or the people or all of it and they rely upon our little department to come up with our expensive equipment and do the monitoring and measuring. And we have done that.

There's two ways that people that who are running businesses can get help for occupational safety and health. They can ask for it through a consultant, a voluntary type of way, where we would send consultants out to evaluate their problems and they do not run the risk of being cited or fined. The other way is for us to knock on their door, unannounced, and conduct an inspection, and they do run the risk of being cited and fined. So the Railroad can ask to use our voluntary compliance services, they're free to all the places of employment in the state.

30 Bill Burgoyne, Alaska Department of Environmental Conservation, Pesticide Control:

OSHA or the Department of Labor is responsible for the safety of workers involving pesticide use or application. DEC is responsible for everyone else, including the general aspects of the environment. In addition, the DEC pesticide section has had a responsibility in the past eight years under a contract with the federal government, we are responsible for the federal pesticide law.

I've worked with the Alaska Railroad on their pesticide use and safety program for the past six years.

Like most government agencies we're not happy with the number of staff that the pesticide section has. It presently has one person.

We have done some research on long term effects of the ---- herbicide on the environment and was funded almost entirely by the Railroad (expense of research was over \$750,000 over the past six years). It gives us one of the very few data basis that we have on toxicity in cold climate. With the pesticides, in our cold weather, they don't disappear as fast, they don't work as well. The dosage that's recommended for outside states, where most of the research is done, is not totally applicable up here. There is at the University system one investigator, at the Ph.D., level who is working on herbicides, there's myself and the railroad studies have been finished for the present. And that's about it in this state. Not much research done

on pesticides in northern latitudes. Thus we make alot of decisions done on lower 48 data. Most of the time it works, sometimes it's been called into question. If it's questioned, it takes alot of time, alot of money and people to answer the question.

35 Josephson: Has the Railroad ever asked your office for alternatives to the herbicide they use? How do you get involved in what herbicides to select and where and how they should be used?

Burgoyne: When I started about ten years ago, the 245T (?) was commonly used in the state. I said this one was no good. I finally got voluntary compliance.

Josephson: Does the Railroad use 245T?

Burgoyne: At the present time, it uses 240, a related compound. Not used at all now in Alaska presently.

37 Dianne Soderlund, Environmental Protection Agency:
EPA promulgates regulations to protect the environment from unsafe uses or abuses from pesticides. EPA can enter into cooperative agreements with state agencies, thus allowing the state to have a permanent responsibility for implementing a program. And this is what we've done in Alaska. Up to this point, in this role, EPA has provided funds to Alaska DEC and these have been in the amount of \$10-15,000 annually and have been used solely for the purpose of certifying and training operators. These funds are matching grant funds. There are other funds available to the state, in the range of \$45-60,000 annually for enforcement purposes, but so far the state has opted not to accept these grant monies. I believe these are matching funds but not positive.

My first order of business is to develop a profile or inventory of pesticide uses in the State of Alaska. Presently, it's unknown what quantity of pesticides are used in this state, where they're used, whether they create a problem. This profile will take about a year. The profile will include the quantity used, concentrations, acreage it's covered, where they're used at, who's using them, is it commercial applicators or private citizens, what are problems with the uses, and what the state needs are. With pesticides, I'm talking about a broad range (pesticides used in seafood processing, oil and gas industry, in agriculture, and right of way, etc.).

TAPE III - SIDE A

EPA now is spending a great deal of time and resources with what toxicity effects are, whether the data is adequate, and reregistering pesticides that are old, to bring them up to par with the national guideline that is used today.

In the State of Alaska, DEC has been making the recommendations to the railroad and are using EPA data, and other data to do that.

7 Paul Bratton, Alaska Survival Group:

Read a statement from an Judy Price (attached) who has been exposed from herbicide used along the railroad tracks around Talkeetna, and became ill as a result and is currently still suffering.

17 In 1982 I and another representative from the community went with Herb Rice, who at that time was in charge of the Railroad spraying. We identified and flagged sensitive areas in the community which should not be sprayed (creeks, trails, cabins, gardens, etc.). The spray truck went through that summer and did not spray those areas. We felt at last we were successful in our requests for the railroad not to spray certain sensitive areas. Then about a week later, the spray truck went through again, this time just after midnight and it sprayed everything, over creeks, trails, gardens, everything. To this day, Herb Rice denies that he sprayed those areas. It was about that time that Alaska Survival Group filed suit against the Alaska Railroad in federal court.

In 1983, I once again went to identify sensitive areas along the railroad. I admit I had reservations as to the usefulness of it. I walked twelve miles to Talkeetna to meet with Mr. Rice and other railroad people. We road up the track and discussed what areas should not be sprayed. Mr. Rice agreed that the entire area could be considered sensitive and that there was no need to spray herbicides that summer. Less than ten minutes after we returned to Talkeetna, Mr. Rice called me and said he talked to Mr. Weeks on the phone and he would have to spray the area. This was because Mr. Weeks, 100 miles away, not even seeing the area, insisted that it must be sprayed. And it was sprayed.

We have offered to clear the tracks of vegetation for free, they refused. We have offered to clear them for a price no greater than the cost of herbicide and they have so far refused to respond. Many of the people in this area are

sick, are afraid for themselves and their children, many are angry. We hope that the State, as it assumes responsibility for the Railroad, will work with the residents to develop safe alternatives to the spraying of toxic herbicides before it is too late.

Josephson: Is the information regarding the effects of the spraying verified by medical information?

Bratton: In Judy's case, it's verified that her thyroid no longer functions.

Josephson: More specific, does the physician link her thyroid condition upon the spraying of herbicide?

Bratton: In the three or four major cases we're talking here, it's been a pretty consistent theme that the doctor's have told them that what you are suffering can have two or three causes. One, toxic chemicals, two genetic..

Josephson: What is the population of your area?

Bratton: About 200 full time residents north of Talkeetna.

25 Josephson: What is the present status of the law suit?

Bratton: We hope and expect the Railroad will complete the environmental impact statement. But its up to the Railroad to make that decision. We are represented by the Sierra Legal Defense Fund.

30 Marilyn Heiman, Anchorage citizen:
Worried that the Railroad won't take into consideration health and social effects, for example economically when decisions are made (if herbicide spraying is cheaper than an alternate safer form of clearing vegetation). Alternatives should be used whenever possible. Concerned about lack of adequate information on the chemicals sprayed by the railroad. Many of the studies in the environmental assessment that the Alaska Railroad did were determined inadequate by the U.S. EPA. Also many of these studies were done by the chemical companies which produced the chemicals. DEC needs additional funding.

32 Becky Long, Talkeetna citizens:
Read a letter from Linda Stefanowski of Talkeetna who could not be present (letter attached). Thank you for giving attention to this matter. The only access to our home is via the Alaska Railroad stop. We have been involuntarily

exposed to toxic chemicals the Railroad has decided to use in its vegetation control program. We have made repeated requests to the Railroad to at least stop spraying herbicide at flag stops. Finally in June 1982, the Railroad agreed not to spray areas of vital concern to resident's health, but when the spray truck went through the following month, they violated the agreement and sprayed everywhere as usual. At that June meeting, Dr. Burgoyne informed us that our area had been selected for experimental use of a new chemical of unknown toxicity. I have seen two of my neighbors become seriously ill with thyroid disorders and it just so happens that chemicals used by the Railroad are linked to these disorders. It is a life or death matter to those of us who live here. We must curtail the use of herbicides/pesticides along the use of the Railroad, power line right of way and in the agriculture business.

Ms. Long's personal comment is that the Railroad's chemical weed control costs \$375 per mile per year while DDT-PF control highway vegetation with no herbicide at \$104 per mile.

35 Denis Ransy, Talkeetna, Alaska Survival Group:
Has testimony from Jim Sykes, Chase resident - thank you for holding these hearings. My family feels there are serious risks from herbicide spraying, some of them yet unknown. The Alaska Railroad didn't use herbicide until 1953, or thirty years of maintenance without herbicide. Various people in our area have experienced serious health problems which they feel are traceable to APR's spraying program. I hope the state will take more interest in the well being of the citizens than the federal leased owned line has done to date.

Ransy's own comments - will any of these herbicides be discovered as the new DDT? Many of the residents in the area will be willing to work on a contract basis clearing the brush. What effects will these herbicides have on people twenty years from now? Urges the legislators to continue working on this problem.

40 Bill Robb, Municipal Horticulturist, Anchorage:
As a horticulturist, I look at the plant aspects. All the pesticides should be used safely. We contract out on the spraying in Anchorage. Most of the applicators are reputable, and have pretty good training and knowledge of the materials they use. One thing the horticulturist industry has done in the past two years, has been to develop a horticulturist association to try to educate the public to safe processes. Discussed "fly by nighters" in spraying industry.

HESS hearing, 1/3/85
Herbicide
Page Seventeen

TAPE III - SIDE B

Various comments from people.

- 3 Josephson: Thanked everyone for participating and adjourned the hearing.



Legislative
Information and
Teleconference Networks

LEGISLATIVE TELECONFERENCE NETWORK SIGN IN SHEET

DATE: JANUARY

Start time: 1:00

End time: 5:00

Address: 1024 W. 63RD AVE

Bin Number:

LOCATION: ANCHORAGE

SPONSOR/SUBJECT:

SEN. JOSEPHSON
W/S ON HERBILIDES

PLEASE PRINT

Observe
Here to
Testify

NAME/REPRESENTING	ADDRESS	PHONE	Observe	Here to Testify
Wm. W. Mitchell Aerie Fly. Station	537 E. Firewood Palmer AK 99649	745- 3797		✓
GEORGE A. MITCHELL LEGISLATIVE EXPENSE SERVICE	P.O. Box 349 Palmer, AK 99645	745- 3257		✓
✓ JUDITH A. ANDERSON ELEN RAY	ANCHORAGE CITIZENS 2664 LOVELAND DR. ANCHORAGE, AK 99508	274- 8049		✓
✓ Guy M. Conwell Alaska District Council of Engineers	Box 878 Anchorage 99506-0878	753- 2514		✓
✓ Dan Rice Alaska Resource Planning Council	Pouch Z Laramie Alaska 99001	465- 3201		✓
✓ Arvid Vanni Hippel Self-employed citizen	1649 Bannister Drive ANCHorage 99508	279- 5140		✓
Fred Helsten RESID FRIEND SERVICE	2212 NEASTERN LIGHTS Suite 2308 Anchorage AK 99508	246-0117		✓
✓ David W. Bowers Alaska Health Project	417 West 9 th Avenue Anchorage, AK 99510	270- 2904		✓
✓ Bill Bourne Bourne	→ ADEC / REPUBLICAN Box 2307 PALMER 99645	745- 7318		✓
David Finkelskin Sen. Joe Josephson	3911 Petokih Ave Anchorage, AK 99508	279- 6719		✓
✓ Bill Lamoreaux ADEC	437 E. St. Suite 200 Anchorage AK	274- 4573		✓
Dan Pilet MOA Parks & Rec.	5300 W. Burr Hill Anchorage, AK 99508	582-2818		✓
✓ Raymond J. Josephson Director of Alaska Dept of Labor	4573 Pennington Dr Anchorage AK 99510	269-2514		✓
✓ Frances O.B. Weeks Alaska Railroad				
→ Please send minutes ↑				

News and Views

Canadian high court clears 2,4-D, 2,4,5-T

The spraying of 2,4-D, 2,4,5-T or combinations of both can be carried out safely and does not present a health hazard, the Supreme Court of Nova Scotia ruled this past fall. The 182-page decision cleared the way for use of these phenoxy herbicides in that Canadian province and may influence thinking elsewhere.

Justice D. Merlin Nunn, author of the decision, wrote, "I am satisfied that the overwhelming currently accepted view of responsible scientists is that there is little evidence that, for humans either 2,4-D or 2,4,5-T is mutagenic or carcinogenic and that TCDD is not an effective carcinogen, and further, that there are no-effect levels and safe levels for humans and wildlife for each of these substances."

The Supreme Court had heard scientists from both environmental groups and industry present their case, and clearly he could see a difference between them: "While I do not doubt the seal of many of the plaintiffs' scientific witnesses or their ability, some seemed at many times to be protagonists defending a position, thereby losing some of their objectivity. There was a noticeable selection of studies which supported their view and a refusal to accept any criticism of their or contrary studies. Where the study was by anyone remotely connected with industry there was a tendency to leap to the 'fox in the chicken coop' philosophy, thereby ruling out the value of the study as biased. In my view a true scientific approach does not permit such self-serving selectivity, nor does it so readily decry a study on the basis of bias.

"I had the opposite impression of the scientific witnesses offered by the defendant. I did not detect any partisanship. They related their work, their involvement with the

substances, the results of their studies, and their considerations of other studies in a professional, scientific manner and I therefore found their opinions to be reliable and, indeed, I accepted them as such."

Judge Nunn wrote that it would be a Herculean task to go through the evidence of each witness indicating which particular facts were accepted or rejected. In summary, though, he wrote that, "As a general point, I accept the evidence of the defendant's witnesses as representing the generally accepted view of responsible scientists, and also as indicative of the risks involved. Each of them categorically states that neither 2,4-D nor 2,4,5-T, nor the concentration of TCDD presently in 2,4,5-T, nor the mixture of 2,4-D and 2,4,5-T in the concentrations to be sprayed on Nova Scotia forests pose any health hazard whatever."

The judge continued, "Having made this finding, it is unnecessary for me to consider the matter of riparian rights or groundwater rights. Since I have accepted that no risk to health has been proved, I need not consider these areas. Were I required to do so, and perhaps to allay public fears, I will add that the strongest evidence indicates that these

substances sprayed in the Nova Scotia environment will not get into or travel through the rivers or streams, nor will they travel via groundwater to any lands of the plaintiffs who are adjacent to or near the sites to be sprayed.

"Further, if any did, the amount would be so insignificant that there would be no risk."

This is one of the strongest and most clear rulings to come out of any court regarding these two herbicides. When asked if he thought this ruling as a defeat for the environmental movement, George Cooper, attorney representing Nova Scotia Forest Industries, Inc., said it was not, but rather it was "a victory for responsible environmentalism."

Computers can help create agchemicals

Scientists can now synthesize agricultural chemicals with a computer model that can spot the active compounds, says Judith B. St. John, USDA-ARS biochemist, Beltsville, Md.

"Picking out the chemicals that will have agricultural uses is a bit like finding a needle in a haystack," she says. For example, a group of similar compounds named pyridazinones has thousands of possible variations of the basic structure. But only a few of them are useful.

The biochemist cooperated with Falk Rittig and Hermann Blicholder of BASF Aktiengesellschaft, Germany, in synthesis and testing of the different pyridazinones. Based on the structure-activity relationships of 50 compounds, the computer predicted which structures of pyridazinone would be effective in altering the lipid (fat) in the membranes that line the plant cells.

Scientists are interested in changing the lipid composition of the membranes since previous studies have shown that this affects the



"Shouldn't you be taking notes?"



The herbicide 2,4,5-T [(2,4,5-tri-chlorophenoxy) acetic acid] has been a valuable asset for the past 25 years due to its excellent control of broadleaf plants. It has

been especially important for clearing rights-of-way and in the production of pine timber and rice. However, recently 2,4,5-T has been under investigation to determine whether it may be harmful to animal or human life. The Environmental Protection Agency has suspended many uses of 2,4,5-T and it has been the subject of much controversy.

Included with the information currently being compiled by EPA are data collected by researchers at the University of Arkansas. We were interested in collecting information which was lacking on actual human exposure to 2,4,5-T. For our study, field workers were tested who used 2,4,5-T in their regular spray operations. The proximity of these people to mixing and application operations should afford the maximum human exposure possible to 2,4,5-T applicators.

A great amount of investigation has already taken place with 2,4,5-T. The Council for Agricultural Science and Technology (CAST) has studied 2,4,5-T, along with other phenoxy herbicides. CAST reports issued in 1975 and 1978 state that these herbicides are beneficial and safe for use if precautions that must be taken with any pesticide are observed.

Although opposition to this opinion remains, the reputation of 2,4,5-T may have been clouded for the public by its past association. It was among the broadleaf defoliants used in Vietnam and, consequently, is sometimes still allied with the reputations of Agent Orange or dioxins. These compounds are presently being blamed for adverse effects on human life resulting from their use in the war in Vietnam.

To color the reputation of 2,4,5-T further, it is a fact that TCDD (2,3,7,8-tetrachlorodibenzo-*p*-dioxin), a dioxin toxic to a animal life, occurs as a by-product during the manufacture of 2,4,5-T. When 2,4,5-T was first produced, levels of TCDD remaining in the herbicide could run as high as 32 ppmw, but the process today produces 2,4,5-T with only trace levels of less than 0.05 ppm. The compound used

in our study contained 0.04 ppmw of TCDD. (This amount is equivalent to 1 drop in 7200 gallons of the spraying mixture). Although estimates had been made on human exposure prior to the study by our staff at the University of Arkansas, only limited information was available on the level of exposure to humans applying 2,4,5-T.

The study was carried out using crews engaged in their usual work activities in central Arkansas pine forests and rice fields. Twenty-two workers participated in the study. Some of these people have been involved in 2,4,5-T spray operations for several years. None of them have reported harmful effects as a result of working with the herbicide. As nearly as possible, investigators did not interfere with work habits of the crew members. Spray operations included a ground crew with backpack spray rigs, a tractor-propelled mist blower crew, and helicopter crews who make aerial application.

Our objectives were to analyze the 2,4,5-T content of the air around the worker to which his skin might be exposed, the air he breathed, and his urine, which can indicate the total internal dose to which he is subjected.

To accomplish the first analysis, we attached gauze patches to the clothing of the worker on the chest, upper back, bicep, and thigh areas just before each spray operation began and removed them immediately after the spraying was complete. The gauze patches were placed in amber-colored glass jars containing methyl alcohol and transported to the laboratory for analysis.

To measure 2,4,5-T in the breathing zone, we attached a small pocket-sized air pump to the clothing of the crewman. The pump pulled air across an absorbing resin which trapped the 2,4,5-T present. This resin was taken to the laboratory, extraction made with methyl alcohol, and analysis performed with a gas chromatograph equipped with an electron capture detector.

Complete urine samples were collected from each crew member from one day before to four days beyond the spraying operation. Previous studies had shown that over 95% of the 2,4,5-T that enters the body is excreted in a 7-day period.

Analyses were carried out at Northrop Laboratories in Little Rock and at the Alzheimer Laboratory in Fayetteville. The methods used have been shown to be precise to the 10 parts per billion level. We attempted not only

to determine how much exposure each worker was subjected to but also to note the relationship of the amount of exposure to his official work duties. All workers involved in the spray operation were included: supervisors, spray mixers, backpack sprayers, tractor driver for the mist blower, helicopter pilots, and flagmen. Some workers handled the spray compound more than others, and some (backpack crewmen, especially) were in closer contact with the spray mist. Crewmen also had their individual techniques for performing their duties. Some wore protective clothing and were very careful; others

¹Published with approval of Director of Arkansas Agric. Exp. Stn., Univ. of Arkansas, Fayetteville.

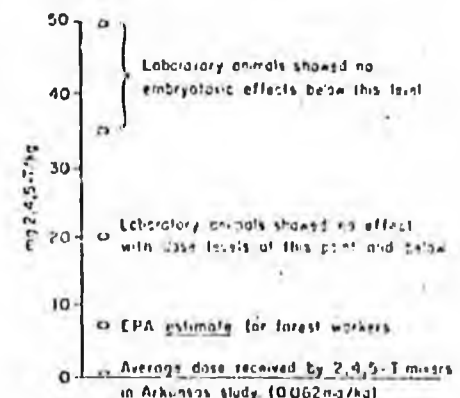


Fig. 1. Comparison of Arkansas Field test results with 2,4,5-T information from other studies.



Fig. 2. Backpack sprayers preparing to spray.



Fig. 3. Helicopter with spray boom.

scanned negligent in taking safety precautions. Our research crew made no suggestions and measured exposure without reference to work habits.

Total exposure was determined by the urine analysis and was measured in terms of milligrams per kilogram of body weight. This measurement can, in turn, be used with comparisons to exposure of laboratory animals in other studies. Mice (the most sensitive animal species studied) can tolerate levels of 20 mg/kg without showing any ill effects. Results from our tests indicated that workers who mixed the concentrate received the highest exposure with an average of 0.062 mg/kg, and backpack spray operators were second high with 0.047 mg/kg. The rice levee spray operator received less exposure than the backpack or mist blower crews. Helicopter flagmen received least with 0.001 mg/kg. Results averaged by crew showed that the backpack crew received the most exposure (0.055 mg/kg) followed by the mist blower (0.044 mg/kg) and the aerial crew (0.022). EPA had estimated that a backpack spray operator would receive an exposure of 7.0 mg/kg.

We compared the analyses of human exposure in these Arkansas tests with

EPA estimates on exposure and with other studies on toxicity of 2,4,5-T (Figure 1). These comparisons show that actual exposure to crewmen in these field tests were well below those that EPA had estimated for human exposure in spray operations. Exposure levels to 2,4,5-T and the dioxin associated with it are also well below those found to produce toxicity symptoms in sensitive laboratory animals. When we divide 20 mg 2,4,5-T/kg body weight (a dose level showing no effect in laboratory animals) by 0.062 mg/kg (the highest 2,4,5-T exposure received by any group of workers in our study), we interpolate that the crewmen could likely have been exposed to 322 times more than they were without harmful effects.

By analogy, if a human takes a single overdose of as much as 3 times the prescribed dosage of a pirin, he would likely exhibit adverse effects. Since over 95% of the 2,4,5-T absorbed by humans is excreted within 7 days, toxic levels could not build up in the body even for individuals repeatedly applying the herbicide.

The results of our test alone cannot be considered conclusive, but the popu-

lar reputation that 2,4,5-T has acquired, perhaps through association with dangerous substances, appears to be unwarranted. Our data have been included in the information which was recently evaluated by the Scientific Advisory Panel appointed by EPA to study 2,4,5-T. Final EPA decisions have not yet been made, but a portion of the panel's recommendations reads as follows:

"After extensive review of the data, we find no evidence of an immediate or substantial hazard to human health or to the environment associated with the use of 2,4,5-T or silvex on rice, rangeland, orchards, sugarcane, and the noncrop uses."

EPA has several alternatives to choose from: 1) lift the current ban of 2,4,5-T for forestry, rights-of-way, and pastures; 2) increase the ban to include the use of 2,4,5-T on rice, rangeland, orchards, sugarcane, and non-crop uses; 3) continue to study benefits and risks of using 2,4,5-T; or 4) take some other course of action. Hopefully, the information collected by our research team will help expedite this important decision.

Day and Night Differences in Sicklepod Response

How important is the time of day to application of herbicides?

It depends on which weed you are trying to kill, according to SEA weed scientist Robert N. Andersen.

For sicklepod, a weed common in field crops in the southeastern United States, herbicide spray treatments were nearly twice as effective when applied during the middle of the day than when applied in the evening, night, or early morning.

Andersen, stationed at the University of Minnesota, St. Paul, Minn., and Gary W. Kraatz, graduate student, selected the weed for detailed field studies because evidence from earlier research indicated sicklepod might show significant differences in response to day and night herbicide treatment.

When sicklepod leaflets fold together and droop, as they do from evening to early morning, the leaf area exposed to an herbicide spray from directly above the plant is only about 14 percent of the area exposed when the leaves are fully extended as they are during the middle of the day, Andersen says.

The researchers evaluated sicklepod plants treated with herbicide at different times of the day and night.

"Our results clearly suggest that leaf changes related to the time of day can be an important factor in the efficiency of some herbicide treatments on some species of weeds," Andersen says.

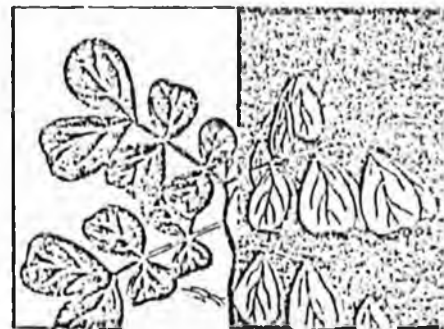
Because of extreme leaf movements, both sicklepod and coffee senna would be expected to intercept much less herbicide from an over-the-top spray application when they were in the "night" position than they would in the "day" position, Andersen says.

"Kraatz's specific studies of sicklepod show a very significant reduction in the effectiveness of herbicide applications from evening through early morning as compared to other times of application during the day," Andersen says.

In earlier research, Andersen and University of Minnesota plant physiologist Willard L. Koukkari found that all velvetleaf plants sprayed with herbicide at mid-day were killed, but only 28

percent control was obtained when plants were treated during the "sleep" period.

In other research, Andersen and Koukkari evaluated the leaf movements of nine weed species in growth chambers under several different light-dark schedules. They studied wild mustard, redroot pigweed, black nightshade, jimsonweed, common lambsquarters, common cocklebur, prickly sida, sicklepod, and coffee senna.



There are "day and night" differences in the response of sicklepod to herbicide treatments — depending on time of day plants are sprayed.

Phenoxyes

5

Herbicide exposure, mortality and tumor incidence. An epidemiological investigation on Swedish railroad workers

by Olav Axelson, M.D. and Lennart Sundell, M.D.*

Axelson, O. and Sundell, L. Work-environm.-hlth 11 21-28. Herbicide exposure, mortality and tumor incidence. An epidemiological investigation on Swedish railroad workers. An epidemiological investigation of tumor incidence and mortality among Swedish railroad workers, exposed to different herbicides, shows a slightly dose-dependent and significantly increased tumor incidence and mortality among workers exposed to amitrol (3-amino-1,2,4-triazole), whereas those exposed to phenoxy acids (2,4-dichlorophenoxyacetic acid = 2,4-D and 2,4,5-trichlorophenoxyacetic acid = 2,4,5-T) have about normal tumor incidence and mortality. Based on animal experiments, there is some evidence that amitrol may cause malignant tumors in different tissues, although tumors in the thyroid gland and the liver have been observed and discussed most frequently. Except for two lung cancers, the tumors in this study are of different origin, which is somewhat similar to what has been found and described in animals exposed to amitrol. However, exposure to amitrol in this study is sometimes related also to exposure to diuron and to some extent to monuron which confuses the evaluation of the relationship between the amitrol exposure and the excess tumor incidence. Although this investigation may be criticized on this point and perhaps in other respects, the result, being in agreement with animal data, suggests precautions in using amitrol.

See page 24 →

In early 1972 rumors caused newspaper headlines in Sweden about excess lung cancer mortality among railroad workers exposed to the herbicides 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). These rumors also made the Swedish National Board of Occupational Safety and Health request an epidemiological evaluation of the stated excess mortality and its relation to herbicide exposure.

The railroad workers were found to be exposed not only to 2,4-D and 2,4,5-T but also to other herbicides, especially 3-amino-1,2,4-triazol (amitrol), sometimes in combination with 3-(3,4-dichlorophenyl)-1,1-dimethylurea (diuron) and to some

extent also with 3-(p-chlorophenyl)-1,1-dimethylurea (monuron; table 1). Spraying with phenoxyacids was performed by means of hand- or motor-operated equipment carried on the back. A wagon on the track was used for amitrol spraying (fig. 1). The exposures of the railroad workers are not exactly known in terms of concentrations of different herbicides in ambient air but many have reported wet skin in the face and on the hands due to the aerosol. On the whole those exposed to amitrol and its combinations had a fairly low exposure to phenoxy acids and vice versa but several also had both types of exposure. Therefore in considering the possible effect of exposure to one particular herbicide the exposures to other herbicides obviously will be somewhat confusing and thus the situation is difficult to evaluate properly.

* Regionsjukhuset, Yrkesmedicinska kliniken, Örebro, Sweden.

Reprint requests to: Dr. Olav Axelson, Yrkesmedicinska kliniken, Regionsjukhuset, Skolgatan 36-38, 701 85 Örebro, Sweden.

MATERIAL AND METHODS

Consulting the literature (3, 4, 12) and particularly the Report of the Secretary's Commission on Pesticides and Their Relationship to Environmental Health (15) it was found that especially amitrol might be suspected of carcinogenicity judging from animal experiences reported. Based on one of these reports (15) monuron exposure to some extent also could be suspected of carcinogenicity. However, as shown by table 1, monuron was used to a fairly limited extent and the individual exposure to this compound was more or less impossible to evaluate. Table 1 also shows that diuron was sometimes used in a fixed combination with amitrol and consequently there are difficulties in differentiating these exposures.

Because of facts and difficulties outlined above, it was decided that particularly the exposure to amitrol and its combinations should be considered, as this compound might be of interest from the carcinogenic point of view. The rumors which started the investigation also made it necessary to account for the relation of the mortality and cancer incidence to the exposure of phenoxy acids and their combinations. A remaining group with those exposed to other different preparations also had to be created, but to the greater extent this group also appeared to have been exposed to amitrol and combinations. Due to general epidemiological considerations (1), i.e. avoiding a "dilution" by those with a very low exposure, the studied population of sprayers was restricted to those with a total herbicide exposure of > 45 days (corresponding to about one spraying season).

Thus, four cohorts were considered: one with a total exposure to herbicides of > 45 days and consisting of 348 people contributing 2,978 person-years at observation; another cohort with exposure > 45 days to phenoxy acids and combinations and consisting of 207 persons contributing 1,747 person-years at observation; a third cohort with exposure > 45 days to amitrol and combinations consisting of 152 persons contributing 1,285 years at observation; a fourth group with exposure > 45 days to other herbicides and combinations consisting of 29 persons contributing 293



Fig. 1. Spraying amitrol and combinations in front of the open wagon, pushed by a locomotive.

person-years at observation. It should be pointed out that the different cohorts overlap each other which also means some of the cases to be in common for the cohorts, e.g. in the total cohort there will be found people with an exposure of 30 days to amitrol and combinations and with another 30 days exposure to phenoxy acids and combinations; these people, however, do not appear in either the phenoxy- or in the amitrol and combinations cohort. Although desirable, a closer evaluation of diuron and monuron exposure had to be given up for reasons discussed above.

In spite of a retrospective study, the exposure evaluation and the assessment of the different cohorts probably are reasonably adequate as the Swedish (state-owned) railways have a fairly effective administration which was able to provide not only comprehensive lists of persons engaged in herbicide spraying but also fairly good data in terms of exposure days. However, the number of days with herbicide exposure may sometimes be very different from the actual exposure expressed as a concentration-time product, unfortunately not available. For each cohort the expected number of deaths during the study period 1957—1972 was calculated from the Swedish average age and sex specific death rates and incidence rates provided as the official statistics of Sweden (14) and by the Cancer Registry

Table 1. Available information about amount of herbicides consumed 1957--71 on Swedish railways, in tons.*

Trade name	Active compounds	Year														
		1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Tolex	Atrazin	57.1	X													
Urcabor	Dinatriumtetraborate + Monuron		X	X	X											
Karmex	Diuron		X	X	X											
Telwar	Monuron		X	X	X											
Flyvar	Bromacil						0.29									
Primatol A	Atrazin		X	X	X		3.7									
Primatol D 43	Atrazin + Mecoprop + 2,4,5-T		X	X	X		4.0									
Ernisol 100	Amitrol		X	X	X		7.2									
Ernisol 50	Amitrol						2.3									
Weedex tel	60 % Amitrol + 40 % Monuron						28.8									
Weedex kar	60 % Amitrol + 40 % Diuron										1.2					
Totalex extra	Atrazin + Dichlor- propionic acid + 2,4-D + 2,3,6-TBA						3.8	19.5	23.5	23.0	22.4	20.0	21.3	21.4	20.2	19.6
Uridal	Diuron + Dichlor- propionic acid									2.3		4.5	4.5	4.5	4.2	
Total amount of different herbicides (X)			52.8	51.5	40.0	45.0										

* The (inactive) vehicles are unknown. Additional 2,4-D and 2,4,5-T seems to have been used.

(7, 13). Statistical evaluation was based on Poisson distribution and one-tailed p-values (1).

However, the latent period problem has to be taken into account (2) as far as by now (1973) is practically possible, the exposure occurring as late as during 1957-1971. Therefore, we considered observed versus expected deaths and incidences without the latent period aspect as well as with a latent time of ≥ 3 and ≥ 5 years respectively, which means that a member of the cohort is a counting risk (i.e. person-years at observation) from the third and the fifth year after achieving an accumulated exposure of > 45 days (of total exposure or exposure to either amitrol and combinations or to phenoxy acids and combinations etc. in the different cohorts, respectively).

A case-control study (6, 8, 9, 10) using four age-matched controls (11) was also applied in an attempt to evaluate a possible dose-response relationship and also for the investigation of possible co-carcinogenicity from smoking. The smoking habits also were controlled in the cohorts; table 8.

RESULTS

As shown in table 2 there seems to be a possible association between excess tumor mortality and exposure to amitrol and its combinations, especially if a latent period is considered ($p < 0.03$). On the contrary, in the cohort exposed to phenoxy acids and combinations a fairly good agree-

Table 2. Observed and expected number of total deaths; deaths due to tumors (WHO chap. II) and lung cancer (WHO A 50) during 1957-72 among herbicide sprayers with a total exposure ≥ 45 days. Expected number based on Swedish average age and sex-specific death rates.

Exposure	Cause of death	Latent period *								
		0 yrs			3 yrs			5 yrs		
		Obs. pers. yrs	Exp.	Obs.	Obs. pers. yrs	Exp.	Obs.	Obs. pers. yrs	Exp.	Obs.
Total	All causes	2,978	20.54	18	1,948	15.25	16	1,362	11.58	14
	Tumors		4.88	6		3.67	6		2.81	6
	Lung cancer		0.23	2		0.63	2		0.50	2
Phenoxy acids and comb.	All causes	1,747	12.48	10	1,128	9.22	8	770	6.88	7
	Tumors		2.97	2		2.22	2		1.68	2
	Lung cancer		0.51	0		0.39	0		0.29	0
Amitrol and comb.	All causes	1,235	8.51	9	830	6.13	4	531	4.62	6
	Tumors		1.96	4		1.47	4		1.11	4 ³
	Lung cancer		0.33	2 ²		0.25	2 ³		0.20	2 ³
Other herbicides and comb.	All causes	293	1.63	4	209	1.34	4 ²	156	1.09	4 ³
	Tumors		0.39	3 ⁴		0.32	3 ⁴		0.26	3 ⁴
	Lung cancer		0.05	1		0.05	1 ²		0.04	1 ²

* 2 p < 0.05 3 p < 0.03 4 p < 0.01

ment is found between the expected and the observed deaths independent of the latent period. The corresponding tumor incidence data, however, may be more relevant than the mortality data, particularly as the latent period in the mortality evaluation will include not only the «latent time proper» but also the duration of cancer illness. Moreover, cancer may not always cause death within a few years. As found in table 3 an excess tumor incidence is associated with exposure to amitrol and combinations (p < 0.01). The significance-levels in the cohort exposed to other herbicides and combinations are probably just reflecting the fact that those people exposed to amitrol also to a great extent were exposed to a variety of other preparations as described in table 1.

An evaluation of the situation may also be performed on the basis of a case-control study, which appears in tables 4 and 5. In these tables the exposure is considered in categories of exposure and the corresponding relative risk is calculated in table 6. In these calculations of the relative risk the individual matching is not maintained however, which probably means some loss in validity as there is some tendency of correlation between the

exposure of cases and controls. Concerning amitrol the table might indicate dose-response relationship, which also can be suspected in considering the data in table 7, although this table does not account for any influence of age as a risk factor for developing cancer.

It should finally be added that there has been some dispute about the actual exposure in the case of the reticulum cell sarcoma and in the case of the prostate cancer (table 7). These men are supposed to have been exposed to amitrol and combinations, but should perhaps be considered in the phenoxy acid cohort instead of in the amitrol cohort. (If so, there may be an excess of cancers in the phenoxy acid cohort (p < 0.05) but the p-value of the amitrol cohort will still be on the 0.05-level; no changes in the total cohort (p < 0.025). However, amitrol exposure seems to be most probable).

The tabulation of the smoking habits appears in table 8 and 9. Thus, the railroad workers were found to smoke a little less in 1971 than did the Swedish people in 1963 (12). Applying the case-control view it is possible to construct table 10, which is indicative of a co-carcinogenic influence from smoking.

Table 3. Observed and expected incidence 1957-1972 of all tumors (WHO 140-205), respiratory tumors (WHO 160-165) and lung cancers (WHO 162) among sprayers with an exposure to different herbicides.

Exposure > 45 days	Type of tumor	Latent period **								
		0 yrs			≥ 3 yrs			≥ 5 yrs		
		Obs. pers. yrs	Exp.	Obs.	Obs. pers. yrs	Exp.	Obs.	Obs. pers. yrs	Exp.	Obs.
Total *	All tumors	2,978	8.36	15 ³	1,948	6.26	13 ³	1,362	4.78	11 ³
	Respiratory tumors		1.22	3		0.93	3 ¹		0.72	2
	Lung cancer		1.02	2		0.78	2		0.60	2
Phenoxy acids and comb.	All tumors	1,747	5.03	8	1,128	3.78	7	770	2.83	5
	Respiratory tumors		0.74	1		0.56	1		0.43	0
	Lung cancer		0.62	0		0.47	0		0.36	0
Amitrol and comb.	All tumors	1,295	3.36	9 ⁴	839	2.51	8 ¹	581	1.90	7 ⁴
	Respiratory tumors		0.49	3 ³		0.37	3 ⁴		0.29	2 ²
	Lung cancer		0.41	2 ¹		0.31	2 ²		0.24	2 ³
Other herbicides and comb.	All tumors	233	0.63	4 ⁴	209	0.55	4 ⁴	155	0.45	3 ³
	Respiratory tumors		0.10	2 ⁴		0.07	2		0.07	1 ¹
	Lung cancer		0.03	1 ¹		0.07	1 ¹		0.05	1 ¹

* "Total" means that any comb. amounts to > 45 days.

** 1 p < 0.10 2 p < 0.05 3 p < 0.01 4 p < 0.01

Table 4. A case-control study on tumor incidence (WHO 140-205) during 1957-72 concerning Swedish railroad workers with > 45 days of total (combined) herbicide exposure.*

Case no.	Case	Phenoxy acids (2,4-D; 2,4,5-T)**			
		Controls			
098	--	II	II	--	--
079	I	III	--	II	--
257	--	--	I	II	--
135	--	I	--	--	--
127	II	--	--	--	III
354	--	--	--	III	--
014	--	--	--	III	--
256	--	--	I	--	II
009	II	II	II	II	--
309	II	--	--	II	--
317	II	--	--	--	I
163	--	--	I	--	II
268	III	II	II	--	II
172	II	--	--	--	--
266	III	II	III	II	--
334	II	III	II	--	I

* Amount of exposure (> 1 day I; > 45 days II; > 90 days III) at date of case's last exposure, age-matched (within 1.5 yrs).

** ≥ 1 day p < 0.03 (one-tailed); relative risk = 1.6.

Table 5. A case-control study on tumor incidence (WHO 140-205) during 1957-72 concerning Swedish railroad workers with > 45 days of total (combined) herbicide exposure.*

Case no.	Case	Amitrol **			
		Controls			
098	I	II	II	--	III
079	I	III	I	--	III
257	III	I	II	--	III
135	III	--	II	I	--
127	--	--	--	I	--
354	II	--	--	--	--
014	III	--	II	III	I
256	III	III	--	III	--
009	II	--	--	--	III
309	II	III	II	--	III
317	--	I	--	I	--
163	I	--	I	II	--
263	--	--	--	III	--
172	--	--	--	--	--
266	III	--	--	--	II
334	II	--	--	II	--

* Amount of exposure (> 1 day I; > 45 days II; > 90 days III) at date of case's last exposure, age-matched (within 1.5 yrs).

** ≥ 1 day p < 0.025 (one-tailed); relative risk = 4.6.

Table 6. A case-control study on tumor incidence during 1957-72 concerning Swedish railroad workers with > 45 days of total (combined herbicide exposure)*

Exposure, days	Phenoxy acids			Amitrol		
	Ca	Co	Rel.risk	Ca	Co	Rel.risk
> 90	2	6	1.7	5	11	4.1
46-90	6	15	1.9	4	9	4.0
1-45	1	6	0.9	3	8	3.4
0	7	35	1.0	4	36	1.0

* Ca = cases; Co = controls. The individual matching is not maintained in table.

DISCUSSION

This investigation considers a comparatively small group of people with both a particular type as well as a considerable degree of exposure to different herbicides. The results obtained may therefore not necessarily reflect the situation at hand when herbicides are used in agriculture or forestry. However, the observed association of amitrol exposure and an excess tumor incidence in the study needs further evaluation in light of animal data.

The tumorigenic effect of amitrol has

Table 7. Data on population with diagnosed cancer, year of incidence, and exposure.

	Number exposed	Case no.	Diagnosis	Year	Amount of exposure in days if required latent period is		
					0 yr	≥ 3 yrs	≥ 5 yrs
Not exposed to amitrol	150	127	Ca. ventriculi	1972	0	0	0
		317	Mb. hodgkin	1970	0	0	0
		268	Ca. recti	1967	0	0	0
		172	Ca. renis	1972	0	0	0
Exposed to amitrol 1-45 days	46	098	Ca. labii	1962	20	0	0
		079	Ca. coli	1970	28	28	20
		163	Ca. maxillaris	1970	10	10	10
Exposed to amitrol 46-90 days	80	354	Reticulum cell sarcoma (retroperitoneal)	1972	90*	90*	90*
		009	Chron. lymphat. leucemia	1969	55	45	45
		300	Ca. epipharyngis	1968	63	49	35
		334	Ca. prostatae	1971	52*	52*	52*
		257**	Ca. pulm (Acinous adenoca.)	1970	249	215	215
Exposed to amitrol > 90 days	72	135	Ca. vesicae urin.	1969	128	128	128
		014	Ca. pancreatis	1965	139	93	47
		256**	Ca. pulm (oatcellca.)	1967	166	166	106
		266	Tumor cerebri	1970	433	381	280

* Also divergent information about exposure occurs.

** Moderate smokers.

Table 8. Smoking habits among herbicide sprayers (railroad workers) in 1971.

	Phenoxy acids and comb. %	Amitrol and comb. %	Other herbicides and comb. %	Swedish average 1963 %
Non-smokers	53	50	49	38
Occasional	0	0	0	10
Smokers	47	50	51	52

Table 9. Smoking habits among Amitrol sprayers (railroad workers) compared to frequency to be expected from Swedish average.

	Obs. %	Exp. %	Diff. %	Rel. risk of lung cancer*
Non-smokers	49	40.4	+ 8.6	1
All smokers	51	59.6	- 8.6	
Cigarettes/day				
1-9	15.2	22.6	- 7.4	2 5
10-19	8.3	6.0	+ 2.3	2 8
>20	1.4	3.0	- 1.6	2 12
Pipe				
≤ 50 g/week	20.0	16.1	+ 3.9	
> 50 g/week	6.2	11.9	- 5.7	

* Relative risk estimated from Doll & Hill as quoted by MacMahon & Pugh (1971).

been a matter of discussion as to malignancy or not and the amitrol-induced tumors in animals most frequently have been observed in the thyroid gland and the liver (3, 4, 12). In this epidemiological study there is no overrepresentation of any particular type of tumor with the exception of the two lung cancer cases, but it may be reasonable to consider the three respiratory cancers and the bladder cancer to be of special interest as representing critical organs from the exposure point of view. Furthermore, particularly one of the papers referred to (12) offers information of great interest in comparison with the result in this study, because amitrol was found not only to cause more or less malignant tumors in the thyroid gland and the liver but the animals (rats) also developed sarcomas and mammary gland tumors. The author of this paper, Napalkov, also states that tumor development might be expected in different tissues as a result of exposure to amitrol and other compounds with a similar anti-thyroid action like the one of amitrol. The anti-thyroid action itself, however, might not be responsible for the tumorigenicity to judge from the experiments undertaken (12).

There is also some excess tumor incidence (not significant) in the cohort exposed to phenoxy acids and combinations. This finding may be more easily explained by the fact that four of the eight cases in this cohort also were exposed to amitrol and combinations (thus appearing in both cohorts), rather than by suspecting an underestimate in the expected in-

Table 10. Case-control study on tumor incidence and smoking among herbicide exposed railway workers, age-matched as in tables 4 and 5.*

Case no.	Case	Smoking**			
		Controls			
098	+	+	-	-	-
079	+	+	+	-	-
257	+	+	+	-	-
135	+	+	+	+	+
127	+	+	+	+	-
354	+	-	+	-	+
014	+	-	-	-	+
256	+	-	-	+	+
009	+	-	+	-	+
309	-	+	-	+	-
317	-	-	+	-	+
163	+	+	-	+	+
268	-	+	-	-	-
172	-	-	+	-	+
266	+	-	-	-	-
334	-	-	-	+	-

* + denotes a smoker.

** $p \sim 0.10$ (one-tailed).

cidence, because of the close agreement between expected and observed mortality when tumors are excluded. This also indicates that the cohorts have been correctly assessed, which is also reasonable to believe for other reasons as pointed out previously.

As mentioned, to some extent there has been a fixed combination between amitrol and diuron, which confuses the evaluation of observed excess tumor incidence as clearly related to amitrol. The same may be stated about the relations between

amitrol and monuron, although the monuron exposure probably has been fairly low. Thus, it is not reasonable to charge monuron with an etiological role of tumorigenicity in this particular investigation.

It is important to consider the vehicles for the different compounds and possible contaminants. The vehicle for amitrol, monuron and diuron consisted of water, whereas water as well as mineral oils were used for the phenoxy acids. No data concerning contaminants in the different preparations are available.

Although some factors might be considered as less well controlled in this small-scale investigation, the result is not unexpected in view of the animal data and the hypothesis referred to (12) and therefore suggests a recommendation of a restrictive and closely supervised use of amitrol (15).

ACKNOWLEDGEMENTS

We are grateful to Mr. Magnus Rehn for skillful help. The investigation was requested and supported by the Swedish National Board for Occupational Safety and Health.

REFERENCES

1. Cutler, S. J., Schneiderman, M. A. and Greenhouse, S. W. Some statistical considerations in the study of cancer in industry. *Amer. j. publ. hlt* 44 (1954) 1159—1166.

2. Hueper, W. C. and Conway, W. D. *Chemical carcinogenesis and cancers*. Thomas, Springfield, Ill. 1964.
3. Innes, J. R. M., Ulland, B. M., Valerio, M. G., Petrucelli, L., Fishbein, L., Hart, E. R., Pallotta, A. J., Bates, R. R., Falk, H. L., Gart, J. J., Klein, M., Mitchell, I. and Peters, J. Bioassay of pesticides and industrial chemicals for tumorigenicity in mice: A preliminary note. *J. nat. cancer inst.* 42 (1969) 1101—1114.
4. Jukes, T. H. and Skaffer, C. B. Antithyroid effects of aminotriazole. *Science* 132 (1960) 296—297.
5. *Kungl. medicinalstyrelsen Fakta om rökning och hälsa*. Stockholm 1965.
6. MacMahon, B. and Pugh, T. F. *Epidemiology, principles and methods*. Little, Brown & co., Boston 1970. 376 p.
7. Mattsson, B. (officer at The cancer registry) Personal communication about cancer incidence trends later than 1968.
8. Miettinen, O. S. The matched pairs design in the case of all-or-none responses. *Biometrics* 24 (1968) 339—352.
9. Miettinen, O. S. Individual matching with multiple controls in the case of all-or-none response. *Biometrics* 25 (1969) 339—355.
10. Miettinen, O. S. Estimation of relative risk from individually matched series. *Biometrics* 26 (1970) 75—86.
11. Miettinen, O. S. Matching and design efficiency in retrospective studies. *Amer. j. epidem.* 91 (1970) 111—118.
12. Napalkov, N. P. On blastomogenic effect of antithyroid drugs. In: *Potential carcinogenic hazards from drugs*. UICC monograph series 7 (1967).
13. *National board of health and welfare*. The cancer registry. Cancer incidence in Sweden 1958, 1959—1965, 1967—1968. Stockholm, Sweden, the respective years.
14. *National central bureau of statistics*. Causes of death 1957—1970. Stockholm, Sweden, the respective years.
15. *U.S. department of health, education and welfare*. Report of the Secretary's commission on pesticides and their relationship to environmental health. 1969.

Received for publication: 27.9.1973.

alaska survival

Nov. 15, 1984

BOX 343 TALKEETNA AK 99676

Governor Bill Sheffield
Pouch A
Juneau, Alaska 99811

Dear Governor Sheffield,

Thank you for your Oct. 12 reply which stated your intention to delegate the authority for initiating the use of herbicides to the Alaska Railroad Corporation. We will certainly argue the case against public exposure to toxic herbicides in every available forum. However the managers of the Alaska Railroad have shown a consistent inability to deal competently with this matter and therefore we believe the Corporation board is likely to be hamstrung on this issue.

In addition, it is our belief that public herbicide use throughout the heart of Alaska is a public health and safety issue rather than simply a railroad management problem. Since former Governor Hammond prohibited the use of herbicides on our state's roads in a 1978 order, Alaskans have come to expect our state to exercise more concern and caution about the health of its citizens than has been the case in too many other states. At that time Gov. Hammond stated, "Since we have other means of controlling brush build-up, I think it is better to prohibit the use of herbicides while there are still questions about its potential effects."

Questions about the effects of herbicides have multiplied in the past six years. While Alaska led the way in prohibiting herbicide use, other areas are only now beginning to realize the ramifications of this practice. In seven consecutive federal court decisions in recent months, various agencies have been found guilty of illegally failing to assess or disclose potential health effects of their herbicide use. Based on these court orders, the Chief of the U.S. Forest Service has halted all use of herbicides on federal lands in Oregon and Washington, and has severely restricted use in Alaska, California, Nevada, Idaho, and Montana—allowing only ground application in nurseries, research areas, and other non-public areas.

We believe that the introduction of herbicides to 535 miles of state right-of-way in some of the most populous areas of our state would be a significant change in state executive policy. In addition a Deputy Commissioner of DOTPF has informed us that ARR herbicide policy will guide future vegetation management decisions on state highways.

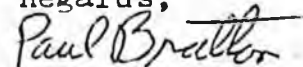
As is true of much of Alaska, our area contains a high proportion of men and women of child-bearing age, young children, Vietnam Veterans, and others who face serious risks from exposure or reexposure to these chemicals. At the present time several residents of our area are suffering debilitating illnesses that can be linked to exposure to ARR herbicides, many others suffer acute effects following every spraying, and all are fearful of the long-term effects which may yet appear. We simply cannot allow the Alaska Railroad to again expose us and our children to these toxic chemicals when reasonable alternatives are available.

It is sometimes difficult for those whose bodies don't carry the obvious scars of toxic herbicide exposure to realize the full ramifications of this problem. Therefore I am enclosing two papers which I hope you will take the time to review. Dr. Shearer explains the breakdown of EPA regulation and summarizes the review of the scientific literature which she conducted for Metropolitan Seattle health authorities. The Swedish Railroad Worker study is the first in a series of Swedish studies which has linked exposure to various herbicides with increased levels of cancer and other chronic diseases.

I might point out that I sent the Swedish Railroad Worker study to ARR officials in 1981, more than a year before we filed suit in federal court. It is indicative of ARR officials' disregard for worker and public health that absolutely no action was taken to reassess their own herbicide use even though a very similar program produced increased levels of cancer in the Swedish workers.

I am aware that other experts will assert the complete safety of all herbicides, nevertheless it is our belief that the people of Alaska have come to expect our government to lean towards, rather than away from, protecting the public health. We hope you will continue the six-year-old prohibition on herbicide spraying on our state's rights-of-way and thereby ensure protection of the public health.

Regards,



Paul Bratton

RECEIVED JUL 12 1982

FILED

JUL 09 1982

UNITED STATES DISTRICT COURT
DISTRICT OF ALASKA

By _____ Deputy

Alaska Survival, et al
V Francis Weeks, Chief
Engineer of The Alaska
Railroad, et al

No. A82-253 CIVIL

AFFIDAVIT OF DR. RUTH W. SHEARER

STATE OF WASHINGTON
County of KING

}
ss:

July 1, 1982

I, Ruth W. Shearer, am a consultant in genetic toxicology affiliated with the Issaquah Health Research Institute, a nonprofit health research organization in Issaquah, Washington. I hold a Ph.D. in molecular genetics from the University of Washington and completed a two-year postdoctoral fellowship in pathology there. For eleven years I did grant-funded research on the mechanism of carcinogenesis and other aspects of normal and abnormal gene regulation, and have published fifteen research papers on this subject.

For the past six years I have intensively studied the regulation of chemicals which cause genetic toxicity (carcinogens, mutagens, and teratogens) and the testing methods used to detect these effects in animals and to predict hazard to humans. I have been a consultant in this field for five years, assisting public agencies and citizens' organizations in the evaluation of existing test data on the health effects of chemicals of concern to them, including many herbicides. During this study I have become aware of the shocking failure of the Environmental Protection Agency (EPA) to protect the public from untested toxic pesticides (1).

Prior to 1972, no testing for chronic or cumulative injury to animals was required for pesticide registration. Since the passage of major amendments to the Federal Insec-

ticide, Fungicide, and Rodenticide Act (FIFRA) in 1972, the EPA has been charged with reviewing and reregistering more than 35,000 pesticides whose registrations were carried over from previous regulatory agencies, as well as registering new pesticides. Reregistrations and new registrations were to be done only after tests on animals indicated that the pesticide was unlikely to cause cancer, mutations, birth defects, sterility, neurotoxicity, or many less dramatic injuries.

No pesticide on the market today has been reregistered after meeting the health testing standards set by Congress in 1972. Now, over nine years later, less than thirty active ingredients have been reviewed for the publication of registration standards listing the data gaps which must be filled before they can be reregistered. Actual reregistration cannot take place until the EPA has received and evaluated the new data requested in the registration standards.

No pesticide registration has ever been cancelled or even suspended for lack of safety test data on an active ingredient, although a few formulations have been cancelled for not responding to a published registration standard by providing a schedule for the start of testing. The EPA recently reiterated this position: "the Agency's policy is not to cancel routinely the registration of products for which it lacks data or to withhold registration merely for the lack of data"(2).

I have completed world-wide literature searches and evaluated the testing data on Tordon 101 and its active components, 2,4-D (2,4-dichlorophenoxyacetic acid) and picloram (4-amino-3,5,6-trichloropicolinic acid). There are no reports of animals exposed to Tordon 101 by any route for longer than one month, and no reports of animals so exposed having been observed beyond one month from the start of exposure. No testing for absorption, metabolism, neurotoxicity, chronic toxicity, mutagenicity, fetal toxicity,

or induction of cancer, birth defects, or sterility has been reported. All of the tests of acute toxicity were done for the manufacturer, Dow Chemical Company, which has consistently refused to allow public examination of any health test data, even after the pesticide law was amended in 1978 to explicitly make such information public.

The Tordon 101 formulation contains the isopropanolamine salts of 2,4-D and picloram, which break down to the acid forms. Nearly all of the testing of picloram has been done by the manufacturer, and most of it has concerned acute effects. Picloram has a high lethal dose, or low acute toxicity. This is not relevant to chronic low-dose environmental exposure. Rats fed picloram for three months showed histopathological changes in the liver and kidneys (3). A three-generation reproduction study on rats fed picloram continuously showed increased stillbirths in the first generation (3). A variety of birth defects also occurred, but no data on the control rats was released for comparison. A teratology study used such high doses that maternal toxicity made the developmental toxicity produced of questionable meaning (4).

Picloram has had two long-term feeding studies to detect chronic injury and cancer. The first of these was done by Industrial Biotech Labs under contract with Dow Chemical, and was reported to be negative although the data were never made public. After it was discovered that IBT had turned in fraudulent and unsubstantiated test results to both FDA and EPA (5) an audit of all health tests done there was initiated. Pesticide tests were divided between EPA and Health Protection Branch of Canada, and picloram was assigned to Canada which found the cancer test invalid. No review of the IBT picloram cancer test was possible because no raw data exists.

The second picloram cancer study was done by Gulf South Research Institute under contract with the National Cancer Institute (NCI) and was also reported to be negative by the test laboratory (6). When EPA later audited many more contract laboratories, the report on Gulf South Research said:

"Serious deficiencies noted in bioassays done on contract for NCI. These include improper feed mixing procedures, possible cross contamination of diets with other substances being tested concurrently in the same room, as long as a 99-day time lag between time of sacrifice and time of necropsy, discrepancies between the raw data and final report, improper recording of age of animals at death, questionable animal identification and record-keeping practices" (7).

A careful review of the NCI test slides by an independent pathologist(8) showed a positive correlation between treatment with picloram and tumors of the liver and endocrine organs in rats, and tumors of the spleen in mice. Animals fed Picloram developed liver and kidney damage, tremors, thyroid and parathyroid hyperplasia, skin irritation, hair loss, vaginal bleeding, dark urine and atrophy of the testes (6,8).

Picloram was selected for testing by NCI because its extreme persistence in soil and water suggested a potential for long-term low-level human exposure (6). It has been responsible for contamination of many wells and aquifers (9,10,11).

Picloram has been involved in many cases of human accidental poisoning by means of hand spraying, drift from aerial spraying, and contamination of drinking water. I am personally acquainted with 14 persons who have had symptoms for at least two years following exposure to Picloram in combination with 2,4-D, including one small child and five teenagers. All continue to suffer from pain and swelling in joints, weakness and rapid fatigue, and sensitivity to re-exposure to nonphysiological chemicals. Residual symptoms common to at least half of them include chronic headaches, vision problems (poor focus or double vision), deterioration of memory and concentration, and tingling hands and feet. These symptoms are not detectable in standard animal tests.

I am familiar with more than 30 people who have been acutely poisoned by 2,4-D alone or in combination with other herbicides. Many of these are still incapacitated years later. Acute symptoms in my own experience include nausea, vomiting, diarrhea, headache, temporary loss of vision,

weakness, burning eyes, sore throat with burning in chest, and difficulty in thinking. Residual effects include numbness and tingling in hands and feet, chronic respiratory impairment, bleeding tendency, concentration and memory problems, and hypersensitivity to non-physiologic chemicals which prevents participation in most modern job environments. Many of those injured were young forestry workers, but others were poisoned by drifting of an aerial spray, hand-spraying weeds, drinking from a contaminated spring, mowing a newly-sprayed lawn, or inhaling powdered 2,4-D. Reports of other cases of 2,4-D poisoning with similar symptoms have been published.

2,4-D is fat-soluble and rapidly absorbed through all normal routes of human exposure (inhalation, ingestion, or skin absorption). 2,4-D is rapidly distributed into all tissues (including through the placenta) and moves readily into cell nuclei. It is apparently not metabolized in the body, and is excreted fairly rapidly in the urine. No evidence of storage in animals has been found, indicating that long-term effects on health are of a hit-run nature.

Nearly all the human symptoms of 2,4-D poisoning are undetectable in laboratory rodents. Bleeding is detectable, however, and has been demonstrated in animals given high doses of 2,4-D and in fetal rats whose mother was given very low doses. Although most of the human 2,4-D poisoning symptoms referable to the nervous system are undetectable in test animals, altered brain function and paralysis have been reported. A rat study demonstrates impaired function of the blood-brain barrier during 2,4-D poisoning (12). This is supported by the observation that blood cells appear in the cerebrospinal fluid as a consequence of capillary injuries.

Animal research on the health effects of 2,4-D points to the likelihood of serious human side effects. 2,4-D has been shown to cause point mutations in animal cells, chromosome damage in human lymphocytes as well as mouse bone marrow

cells, DNA damage which mimics the effect of ionizing radiation, and stimulation of cell division in non-dividing muscle cells (13,14). The primary use of testing for ability to cause mutations or DNA damage at present is as a pre-screen for likely carcinogens. However, mutation is a most undesirable injury in its own right. Aging of tissues is thought to involve an accumulation of mutated cells. Mutation in germ cells can result in loss of fertility, early death of the embryo, malformation and malfunction which may lead to death in the fetal or neonatal period, and hereditary diseases which limit physical or mental function.

A three-generation reproduction test for the Food and Drug Administration (15) detected no interference of 2,4-D with reproduction and fertility in rats, but a more recent study (16) demonstrated loss of fertility in both sexes of rats after relatively low doses of 2,4-D butyric acid, a herbicide of the 2,4-D family. Impaired fertilizability was also observed in first generation progeny, and in the third generation there was a 12% incidence of hairless and 15% incidence of dwarf young among the newborn, indicating induction of recessive mutations in the germ cells of the treated grandparents.

Birth defects can be the result of mutations in the sperm or egg before conception, toxic injury to the embryo or fetus during development, or nutritional imbalance resulting from maternal toxicity. These three problems can be separated by appropriate experimental design. The significance of various forms of developmental toxicity induced by 2,4-D in test animals depends on this separation. The hairless progeny and dwarfism reported above are of the first kind (mutation) since no 2,4-D was given at any time during the pregnancy. Skeletal and eye malformation and fetal deaths have been reported only when doses producing maternal toxicity have been given during pregnancy, but malformation and malfunction of the peripheral circulatory system were seen after very low doses. The effects of

2,4-D on the fetal circulatory system are synergistic with those of its impurity and degradation product, 2,4-dichlorophenol; there was a significant increase in fetuses with hemorrhaging cavities, organs, and soft tissues at doses at which neither chemical produced an effect alone (0.1 mg/kg/day) (17). This suggests a greater risk from exposure after part of the 2,4-D has been broken down by soil microorganisms than immediately after spraying.

The U.S. Council on Environmental Quality recently released a report on the chemicals for which it is possible to compare the lowest dose which causes reproductive effects in humans and animals. For eight out of eight teratogenic chemicals, humans were susceptible at lower doses than the most sensitive animal species (18). Humans were also distinctly most sensitive to seven out of eight chemicals having non-teratogenic reproductive effects.

Carcinogenicity testing of 2,4-D has been limited to three studies. The experimental design or assay of these is inadequate according to present standards. In spite of this, the two American studies reanalyzed by Reuber in 1979 demonstrate statistically significant increases in malignant tumors when analyzed by organ systems (15,19, 20). In both mice and rats, the lymphoreticular system was most sensitive to 2,4-D carcinogenesis, but other organs also showed increases in rats. Inadequately designed assays for carcinogenesis will give false negative, not false positive results. Therefore, such studies cannot be used to prove safety of a test substance, but positive results should be considered valid proof of hazard. The only other carcinogenicity study on 2,4-D was done in the USSR and indicated tumor promoting activity in mice (21).

Following great public pressure, EPA conducted a review of much of the 2,4-D literature and resolved the problem of the large body of adverse data by declaring it invalid because the published papers did not include the detailed individual records for each animal which are now required with the manufacturers' test data. (No journal would publish such detail.) This allowed EPA to make the totally misleading

AFFIDAVIT OF DR. RUTH W. SHEARER - 7 RS.

ing statement that "information from scientifically valid studies does not indicate that the continued use of 2,4-D poses an imminent hazard of unreasonable adverse effect" (22), which has been widely quoted as an assurance of safety rather than an acknowledgement of lack of valid studies.

Nearly all negative tests of 2,4-D health effects were also invalid by modern testing criteria, leaving EPA with practically no "valid" data at all (22), and leading to EPA's notice of August 29, 1980 that registrants must begin to develop data in the categories of oncogenicity (cancer), reproduction (including fetal toxicity), teratogenicity (birth defects), neurotoxicity, metabolism, acute oral toxicity, acute dermal toxicity, and dermal absorption (23). These tests include all of the major categories of tests theoretically required for registration with the exception of mutation tests which were to be done by the Department of Health, Education, and Welfare instead of the registrants.

A primary consideration in the EPA's conclusion that "the presently available information on the potential adverse health effects of 2,4-D does not support a regulatory action to remove 2,4-D products from the market" was that "there is no evidence available at this time that 2,4-D contains any form of dioxin ...". A few months later, Canadian scientists reported that 12 out of 26 commercial samples of 2,4-D analyzed for dioxin content were positive at 80 to 8000 parts per billion (ppb) for three types of dioxin: 2,7-dichlorodibenzo-p-dioxin (DCDD), 1,3,7-trichlorodibenzo-p-dioxin, and 1,3,6,8-tetrachlorodibenzo-p-dioxin. After receiving this information, the EPA still took no action to restrict 2,4-D exposure, but began a sampling program to determine whether dioxin contaminants are present in U.S. products. During the first phase of this program, 3 out of 30 samples were found to contain DCDD in concentrations below 100 ppb and no TCDD was detected. However, when the three positive samples were sent to another laboratory for higher resolution confirmation, concentrations of DCDD up to

184 ppb were found, and 2 out of the 3 samples contained 1,3,6,8-TCDD at 6 to 11 ppb. The other 27 samples were not assayed by the most sensitive procedure, and none of the 30 samples was tested for the trichloro-dioxin found in Canadian analyses. In addition, the higher resolution laboratory reported that extremely high concentrations of unidentified chlorinated contaminants were also present in the U.S. samples.

There are few data available on the toxic effects of the dioxins in 2,4-D. A Dow Chemical Company study reported that DCDD was minimally toxic. However, Khara and Ruddick of the Health Protection Branch, Department of National Health and Welfare, Canada, found significant teratological injury to the heart muscle in fetuses of rats given 2.0 or 1.0 mg/kg/day of DCDD (suppression of growth of cardiac tissue was indicated) (24).

A bioassay of 2,7-DCDD for possible carcinogenicity in rats and mice was completed in 1979 under sponsorship of the National Cancer Institute. Rats developed toxic liver lesions but no tumors in excess of controls. In male mice, liver tumors occurred in dose-related incidences; there were also significant increases in the incidence of leukemias and lymphomas, hemangiosarcomas, and hemangiomas in the low-dose male mice, but not in the high-dose group (25).

Although the dioxins found in 2,4-D are not nearly as toxic as the one present in 2,4,5-T (2,3,7,8-tetrachlorodibenzo-p-dioxin), they clearly add to the health hazard of 2,4-D because they would be expected to be much more resistant to degradation than 2,4-D, and to be stored in fatty tissue like the 2,3,7,8-TCDD.

Both 2,4-D and picloram are readily leached under high rainfall conditions (26). After application of Tordon 101 at 0.6 gallons/acre to a freeway right-of-way in Ontario, Canada, the picloram began to move vertically down the soil profile immediately. In spite of this loss, it was determined that if picloram were applied at this rate every two

years, the levels in the soil would slowly rise (27). The planned application rate for Tordon 101 on the railroad right-of-way in Alaska is 1 gallon/acre every year, which is clearly excessive for the purpose intended unless leaching in water is much more rapid and extensive than in Ontario. Putting a persistent poison like picloram into water creates a definite health hazard to persons using that water over a long period of time.

It is apparent from documented cases of contamination with Tordon 101 that the presence of picloram inhibits the usual rapid degradation of 2,4-D in soil, even in warm climates such as Alabama and Tennessee. This effect would be even more significant in a cold climate where degradation is already slower. The health effects of Tordon 101 in runoff water are particularly insidious because they develop slowly and do not go away after the cause is finally identified and a new water source is used. Tordon 101 should not be used where either ground or surface water will be used for domestic purposes, or where there is any possibility of human exposure to drift of the volatile 2,4-D breakdown products after application.

REFERENCES

1. Staff Report to the Subcommittee on Administrative Practice and Procedure of the Committee on the Judiciary of the United States Senate (December 1976) The Environmental Protection Agency and the Regulation of Pesticides.
2. U.S. Environmental Protection Agency (1981) Pesticide Registration Standard for 2-Ethyl-1, 3-Hexanediol, Chapter II:4.C.
3. National Research Council of Canada (1974) Picloram: The Effects of its Use as a Herbicide on Environmental Quality. Publication No. NRCC 13684, Ottawa, Canada.
4. Thompson, D.J., Emerson, J.L., Strebing, R.J., Gerbig, C.G., and Robinson, V.B. (1972) Teratology and Post-natal Studies on 4-Amino-3,5,6-trichloropicloinic Acid (Picloram) in the Rat. Food & Cosmet. Toxicol. 10, 797-803.
5. Smith, R.J., (1977) Creative Penmanship in Animal Testing Prompts FDA Controls. Science, 193, 1227-1229.
6. NCI (1978) Bioassay of Picloram for Possible Carcinogenicity. DHEW Publ. No. (NIH) 78-823.
7. EPA (November 7, 1979) Health Effects Data Quality Status Reports, #25.
8. Reuber, Melvin D. (1981) Carcinogenicity of Picloram. J. Tox. Environm. Health 7, 207-222.
9. Chemical Regulation Reporter (March 27, 1981) EPA Pesticide Program Increases Emphasis on Groundwater Contamination; page 1619.
10. Frank, R., Sirons, G.J., and Ripley, B.D. (1979) Water. Pest. Monit. J. 13, #3, 120-127.
11. Washington State Department of Agriculture (December 1979) Spokane Tordon Problem.
12. Elo, Heikki and Ylitalo, Pauli (1977) Substantial Increase in the Levels of Chlorophenoxyacetic Acids in the GHS of Rats as a Result of Severe Intoxication. Acta Pharmacol. et Toxicol. 41, 280-284.
13. Shearer, Ruth W. and Halter, Mark (January 1980) Literature Reviews of Four Selected Herbicides: 2,4-D, Dieldrin, Diquat, & Endothall. Municipality of Metropolitan Seattle, 1-54.
14. Pilinskaya, M.A. (1974) Cytogenetic Effect of the Herbicide 2,4-D on Human and Animal Chromosomes. Tsitologiya i Genetika, 8 (3), 202-206.
15. Hansen, W.H., Quafie, M.L., Habermann, R.T., and Fitzhugh, O.G. (1971) Chronic Toxicity of 2,4-Dichlorophenoxyacetic Acid in Rats and Dogs. Toxicol. and Applied Pharmacol. 20, 122-129.
16. Belova, R.S. and Sokolova, L.A. (1971) Toxicological Evaluation of the Herbicide 2,4-D- γ -Butyric Acid from the Standpoint of Food Hygiene. Gigiena i Sanit. 36, 211-215.
17. Konstantinova, T.K., Ephimenko, L.P., and Antonenko, T.A. (1976) The Embryotropic Effect of the Dissociation Products of Herbicides Based on 2,4-D. Gigiena i Sanit. 11, 102-105.

18. Council on Environmental Quality (1981) Chemical Hazards to Human Reproduction. U.S. Government Printing Office.
19. Bionetics Research Labs, Inc. (1969) Evaluation of Carcinogenic, Teratogenic, and Mutagenic Activities of Selected Pesticides and Industrial Chemicals. Vol. I, Carcinogenic Study. National Technical Information Service, U.S. Dept. of Commerce.
20. Reuber, Melvin D. (1979) Carcinogenicity of 2,4-Dichlorophenoxyacetic Acid. Manuscript; personal communication.
21. Arkhipov, G.M. and Kozlova, I.N. (1974) Study of the Carcinogenic Properties of the Herbicide Amine Salt of 2,4-D. Voprosy Pitaniya 2, 83-84.
22. EPA (April 29, 1980) Review and Conclusions Concerning Potential Health Effects of the Herbicide 2,4-D.
23. EPA (August 29, 1980) Order and Notice to Registrants of 2,4-D.
24. Khara, K.S. and Ruddick, J.A. (1973) Polychlorodibenzo-p-dioxins: Perinatal Effects and the Dominant Lethal Test in Wistar Rats. Advances in Chemistry Ser. 120. Ed. R.F. Gould, 70-84.
25. National Cancer Institute (1979) Bioassay of 2,7-Dichlorodibenzo-p-dioxin (DCDD) for Possible Carcinogenicity. Department of Health, Education, and Welfare (DHEW Publication No. (NIH) 79-1378).
26. Busaker, J.W., Johnston, H., Martin, R.T., and Redemann, C.P. (1963) A Picolinic Acid Derivative: A Plant Growth Regulator. Science 141, 363.
27. Sirons, G.J., Frank, R., and Dell, R.M. (1977) Picloram Residues in Sprayed Macdonald-Cartier Freeway Right-of-way. Bull. Environ. Contam. Toxicology 18, 526-533.

Ruth W. Shearer

RUTH W. SHEARER

SUBSCRIBED AND SWORN to before me
this 2 day of July 1982.

Wendell B. Kelly
Notary public for Washington
My Commission expires: 6/5/1986

Testimony submitted by Judy Price
for the Senate Health, Education and Social Service Committee Hearing
on Herbicide and Pesticide Use

For thirty years the Alaska Railroad has sprayed herbicides on the railroad right-of-way. For the last 10 of those years, I have been exposed involuntarily to these chemicals. Most of those years I was exposed not only against my will, but without my knowledge. No signs were erected to warn of the spray; no public notice was given.

Like many of the people who regularly use the railroad tracks, I ate berries and drank water from beside the tracks. I ate grouse and moose that had been feeding there, and fish from creeks that run beneath the tracks. I probably have walked the nine miles of tracks between Chase and Talkeetna a hundred times.

I am not an exception in the amount of time I have spent on the tracks. For bush residents of the railbelt, the railroad right-of-way is, and has always been, a major access route. It is the only open passageway that connects the roadless area north of Talkeetna to a supply point and the State's road system. It is the only route with bridges across creeks and the Talkeetna River.

I have no idea how many chemicals I have been exposed to on the Alaska Railroad, nor what these chemicals are. The Alaska Railroad officials say they don't know what chemicals were sprayed there either. They say that prior to 1978 the Alaska Railroad's spray record is a complete unknown.

We have learned however that 2,4,5-T of Vietnam's Agent Orange was sprayed on the Alaska Railroad before its use was banned. So

we know that the people of the railbelt have been exposed to 2,4,5-T and to its contaminant dioxin (TCDD) which has been called one of the most potent carcinogens known to man. TCDD is not only dangerous, it is persistent, and cumulative in the body, as well, which means that we may still be suffering exposure to that chemical though it is no longer considered safe to use.

Since 1978, people of the railbelt have been exposed to 2,4-D and Picloram, known as Agent White, Amitrole, Bromacil, and Garlon, as well as to their degradation products and whatever chemicals may have been produced by the combining of these chemicals.

The officials of the Alaska Railroad tell us that we are in no danger, that EPA is taking care of us. Does that mean it is taking care of us like it did when the Alaska Railroad sprayed 2,4,5-T on the right-of-way. Considering the latest EPA shake-up and the Bio-Test Scandal, I don't think any intelligent person can be expected to believe that EPA is so much more capable of protecting the public health than it was when it allowed the use of 2,4,5-T.

Even when EPA does make restrictions that are intended to help safeguard the public, the Alaska Railroad ignores them. For example, Bromacil is banned for use on walkways, and yet the Alaska Railroad has never faltered in its practice of spraying Bromacil on areas that are known to be walkways, such as stations and flag stops, and sections of track that have heavy foot traffic.

In the railroad's recent Environmental Assessment, it was determined that Amitrole should no longer be used because it is a powerful anti-thyroid agent. That fact has been known for many years and yet EPA has not banned Amitrole. I can't say I'm not pleased

that the Alaska Railroad has finally gotten around to making that determination, but it has come too late for me.

In 1979, my thyroid atrophied. Because the thyroid controls the metabolism, my body functions were drastically slowed. I became ill, I became extremely depressed; I could not function in any normal way. In effect, I was dying.

Fortunately there is treatment for thyroid atrophy. It is not a cure. It is replacement hormone therapy. It is medical bills and constant vigilance and dependence on a pill every day for the rest of my life.

At the same time that my thyroid malfunctioned, something else happened to me that was not as easy to diagnose. It took me years to find out what it was, to learn that it is a common symptom of herbicide exposure, that it is becoming a widespread problem in this country and growing in epidemic proportions. It is chemical sensitivity.

It is for that reason I am not here in person today.

I am not the only person exposed to herbicides on the Alaska Railroad who has suffered and is suffering herbicide related illnesses. In the Chase area alone, I know of at least one other person with thyroid dysfunction. There is also a man who took his drinking water from a spring beside the tracks who has developed multiple sclerosis; he is now in a wheel chair much of the time and no longer able to live at his home at Chase. There is another man with connective tissue disease who may have but a few years left to live; he is a young man. There was a child with epilepsy. Another child who lives beside the tracks has dizzy spells and an unnaturally croaky voice. And during nearly every spray season, there is an

epidemic of sore throats, colds, flus.,

At Chase, we have begun to ask ourselves how many people must get sick before the railroad stops their annual dumping of hazardous waste through our community. How many of us must face terminal illnesses; how many will die. And we have come to the conclusion that we may not be able to stop the sickness because the chemicals are likely still present in our drinking water, and moose and fish, and in our bodies. But we can stop any further contamination of our home. So that is what we have done.

In November, the Chase Community Council has unanimously passed a resolution declaring our community "toxic-free." The residents have decided that they have been the Alaska Railroad's and Dow Chemical's and Union Carbide's guinea pigs long enough. We have decided to exercise our right to say no to involuntary exposure to toxic chemicals.

In the past, before we reached such an irrevocable decision, members of Alaska Survival and residents of the Chase area were more than cooperative with the Alaska Railroad. We bent over backwards trying to work with that agency to avoid being exposed to these hazardous chemicals. When we tried to get information about the spraying, we were ignored us. When we made Freedom of Information requests, we were refused. I have never once been able to get a response from the Alaska Railroad without making a Freedom of Information request and I have never gotten information without appealing the request to Washington. Most times I have had to threaten to take the railroad to court to get information that should be freely available to all members of the public.

The last request I made for information had to be appealed

to Washington, and even when I won the appeal, the Alaska Railroad refused to send me the information. I had to make a 250-mile round trip to Anchorage to get it, after which time I was seriously ill for nearly a week as my body tried to detoxify itself.

For years people asked the Alaska Railroad not to spray near their cabins and gardens and drinking streams, and stops where they wait for the train; they were ignored. In 1981, residents of Chase called the Railroad and asked them again not to spray these areas. They were told that if the no-spray zones were marked, they would not be sprayed. So residents put up flagged stakes, and the spray truck went through and sprayed everything. They sprayed into Chase Creek. They sprayed near gardens and houses. They sprayed every flag stop.

In 1982, a representative of Chase community and I went with Herb Rice, who was in charge of spraying at that time, and together we identified and flagged sensitive areas, creeks, trails, gardens, and cabins. The spray truck went through that summer—several people watched it pass—and it did not spray the staked off areas. There was a lot of jubilation in the Chase community that year. We thought at last we weren't going to be poisoned any more. And then, about a week later, the spray truck went through again, this time just after midnight, and it sprayed everything, over creeks, beside cabins, gardens, trails, everything. Jubilation turned to despair and anger and fear.

To this day Herb Rice denies that he sprayed those staked areas, but we are not foolish enough to believe that a strange blight suddenly overcame all the plants beside the tracks in one night, that one night that the spray truck was seen pulling north out of

Talkeetna.

That year the Alaska did not even have enough respect or concern for the people to be truthful with them and give them warning so that precautions could be taken to avoid exposure to hazardous chemicals.

It was at that time that Alaska Survival filed suit against the Alaska Railroad in Federal Court.

In 1983, I once again went to identify and flag sensitive areas on the Alaska Railroad. I admit that I had grave reservations as to the usefulness of it. Nevertheless I walked 12 miles to Talkeetna to meet Herb Rice and other railroad representatives. We road up the tracks and discusses what areas should not be sprayed. After several hours of discussion, Herb Rice agreed that the stretch of track through the Chase community was heavily used, that the entire area could be considered sensitive, and that there was no need to spray herbicides that summer. I wrote down his exact words, and four times I noted the quote, "We will not spray between Talkeetna and 244."

Less than ten minutes after we returned to Talkeetna, Herb Rice called me into the station and said that he had talked to Obie Weeks on the phone and that he would have to spray the area he had just agreed not to spray. This was because Obie Weeks, who had not even seen the condition of vegetation on the tracks, who was sitting 100 miles away in Anchorage, had insisted that it must be sprayed. And it was sprayed.

The Alaska Railroad has never been fair, nor even honest in its dealings with us. They have lied to us and deceived us, poisoned us, denied us information and even the right to protect ourselves. They have committed innumerable criminal acts against us and the people of this State. They have behaved as if they are a multi-national

corporation in a third world country and we are the peasants.

We can no longer tolerate those abuses. We are tired of suffering the consequences of the Alaska Railroad's spraying simply because they refuse to develop alternatives. We are tired of taking the risks while they reap the benefits. We have offered to clear the tracks of vegetation for free; they refused. We offered to clear them for a price no greater than the cost of herbicides; they refuse to respond.

Many people who live in the Chase area are sick. Many are afraid for themselves and their children. Many are too angry to try again to solve this problem with words. But we are unanimously agreed that our uncompromising, unyielding position is "No More Herbicides".

We hope that the state, as it assumes responsibility for the Railroad, will work with residents to develop safe and efficient alternatives to the spraying of toxic herbicides before it is too late for us all.

Just Price

12/30/84

December 27, 1984

To: Senator Josephson and Committee on Health, Education and Social Services

From: The Stefanowski family, Box 161, Falkeetna, AK 99676

Subject: Hearings on Pesticide and Herbicide use on roadways in Alaska and other public corridors, especially the Alaska Railroad.

Dear Friends and Concerned Individuals:

We thank you for giving your attention to a matter of grave concern to us as 12-year residents of the "real" Alaska Railbelt. Since our only access to our home is via the Alaska Railroad stops where we must wait for the train, load and unload our food and supplies, or directly traverse the rail corridor by foot, skis, snowmachine, etc., we have been involuntarily exposed to the gamut of toxic chemicals the ARR has chosen to use in its "vegetation control" program. Over the years, myself and other mothers who live along the railbelt have made repeated requests to ARR to at least refrain from spraying herbicides at the flagstops (i.e. Mile 232, 233.5, 236, 244, etc.) where our children must wait for the train and near drinking water streams and springs, but never once were we afforded this small consideration in the concern of our health. Finally at a meeting in June, 1982 with O.B. Weeks of the ARR and Bill Burgoyne of the State Dept. Environmental Conservation, the ARR agreed not to spray areas of vital concern to residents health, but when the spray truck went through the following month they violated the agreement and sprayed everywhere as usual. At that same meeting we were informed by Dr. Burgoyne that our area had been selected for experimental use of a new chemical of unknown toxicity called Garlon, because "not very many people live in the area ...and they want to test it out on the fish." I am sure you are familiar with the court suit that followed, resulting in our first summer free of toxic sprays this past year. For once I was able to sit and wait for the train with my two children without worrying that it might be the day for the spray truck to come through.

Anyone who has studied nutrition and biochemistry, as well as the EPA reports on toxicity and side effects of its several hundred approved chemicals, as I myself have, can see the horror of exposing human beings to these mutagenic and carcinogenic substances. I have seen two of my neighbors become seriously ill with thyroid disorders and know two others succumbing to serious disorders of the central nervous system, and it just so happens that the chemicals used by ARR are linked to these disorders. I have also seen birds and spruce grouse return to the tracks this summer where previously I saw only dead birds.

Please understand that this critical situation demands your utmost attention. It is a life or death matter to those of us who live here and we will not be sprayed with any chemical anymore. Please listen to the truth and be courageous enough to act on it.

We all have the chance now to save Alaska from the fate of many states in the lower 48 that are becoming toxic wastelands where no water is fit to drink. We must seriously curtail the use of herbicides and pesticides on the railroad, powerline, right-of-ways, and in the budding agricultural business, or we will all be guilty of slowly poisoning ourselves and the planet God provided for us.

Sincerely,

Linda Stefanowski

December 30, 1974

Box 5

Talkeetna, Ak. 99676

Senator Joe Josephson
Health, Education, and Social
Services Committee

Pouch 1

Juneau, Ak. 99811

Dear Senator Josephson,

It is good you are holding hearings on the health effects of herbicide spray. My family feels there are serious risks to herbicide spraying, some of them yet unknown. We feel the Alaska Railroad's spray program is ~~is~~ a poison threat to local families' health.

We approve of the highway system ban on herbicides and feel it is sensible this policy be extended to the railroad. In fact, it recently came to light that the railroad owns plenty of mechanical vegetation clearing equipment to clear the line without herbicides. Apparently they have so much such equipment they have been leasing it to the State of Alaska to clear highway rights-of-way. They also didn't use herbicides until 1953, or 30 years of maintenance without herbicides.

Some people in our area have experienced serious health problems including spinal meningitis, which they feel are traceable to APP's spray program.

A railroad and State which serves its citizens with concern can surely think of better ways to clear vegetation.

So far the railroad has stonewalled our request to break out the real costs of the spray program, and have refused to answer written offers to clear the line with manual labor. (Hopefully the State will take more interest in the well being of its citizens than the Federally run line has to date.

Thank you.

Sincerely,
Jim Super

Herbicide spraying along Alaska RR tracks attacked

By CRAIG MEDRED
Daily News reporter

The herbicide-spraying policies of the Alaska Railroad were attacked Thursday as "abusive and arrogant" before a state Senate committee hearing.

Steven Kadish, an aide to state Sen. Vic Fischer, D-Anchorage, said residents of small, informal rural communities along the railroad were the most upset by the policies. They spoke at an Anchorage hearing of the Senate Health, Education and Social Services Committee.

To the dismay of residents along the railroad tracks between Anchorage and Fair-

banks, the railroad has for years used herbicides to control brush. The policy was put on hold last year because of complaints.

The railroad is completing an environmental impact statement on the hazards of spraying.

That hasn't eased the fears of rail-side residents. They simply want to see spraying stopped, Kadish said.

Some residents claim they have developed medical problems because of the railroad's spraying, he added.

The tracks are used as a hiking trail by many people living in the Bush north of Talkeetna, and there are some popular berry-

picking areas along the tracks. Such uses could expose residents to dangerous levels of herbicides, said Kadish.

He said Fischer and Sen. Joe Josephson, D-Anchorage, have considered legislation that could set state standards for herbicide and pesticide use.

"I think there will be legislation developed as a result of this," Kadish said.

He said the legislature could set standards for licensing sprayers, limit what chemicals are used in the state, or restrict the railroad to mechanical or manual brush removal.

Aside from concerns about the railroad's use of herbicides, Kadish said some people

expressed worries about home uses of pesticides and herbicides in Alaska.

"This was brought up over and over again by people who have had a neighbor spray," he said. The spray sometimes drifts around, coating a neighbor's yard or their children's toys, he said.

But Kadish noted the problems of pesticide and herbicide use in Alaska would not necessarily be solved by a ban on the chemicals.

Pesticides and herbicides are vital to modern agriculture, he said. Were Alaska to ban those chemicals, it might be making a decision to doom its still-struggling agriculture industry, according to Kadish.

Railroad sale includes legacy of weed woes

by Mary Scarpinato
Times Writer

1/4/85

Along with 600 miles of track, Alaska inherits something else from the federal government on Saturday: Weeds. Lots of them.

The scheduled takeover of the Alaska Railroad was what prompted Friday's state Senate committee hearing on the pros and cons of herbicide and pesticide use at the Legislative Affairs Agency offices here.

Several years of controversy over the railroad's chemical weed control program was indeed the main hearing topic — including an announcement that the railroad will continue to follow federal court-ordered spraying restrictions.

But neighborhood problems got a good portion of time, too —

including discussion of a local ordinance amendment, now in the drafting stage, to restrict pesticide spraying.

Information gathered from the hearing will be used in upcoming considerations on possible legislation or budgetary revisions, according to Sen. Joe Josephson, D-Anchorage, outgoing chairman of the Senate's Health, Education and Social Service Committee. About 20 people attended the hearing he chaired.

The railroad conducted no weed control spraying on or along its tracks last summer, in compliance with a federal judge's ban until environmental studies on such chemical use are completed this spring.

Francis Weeks, chief engineer
See Senate, page A-10

Officials resolve railroad transfer dispute

Times Staff and Associated Press

Officials negotiating the sale of the Alaska Railroad resolved a multi-million dollar dispute Thursday, clearing any doubt that the transfer from federal to state ownership would take place Saturday.

"The revolving fund and disabled workers' compensation issues have been settled and the transfer will go through," said Richard Knapp, commissioner of the state Department of Transportation.

"There's a little fine-tuning needed, but we do have an agreement," said Gerald Valinske, a member of the state railroad corporation's board of directors.

As late as Thursday afternoon — with

barely two days left before the railroad was to officially pass into state hands — officials in the governor's office were speculating that the transfer ceremony might have to be delayed until the method by which 50 disabled railroad workers were to receive about \$750,000 annually was resolved.

Board members and other state officials met all day in Anchorage, negotiating with federal officials there and in Washington by telephone.

The settlement "just happened later in the day," said Valinske, who declined to elaborate on details of the agreement. He said the transfer ceremony scheduled for Saturday in Nenana definitely is on.

The dispute was over who — the state or federal government — should assume liability for compensating railroad workers disabled while the line was owned by the federal government.

Officials said the dispute could cost the state between \$7.7 million and \$11 million — money the state wants the federal government to continue paying.

But federal transportation officials balked at that plan and wanted the bulk of the payments to come from a revolving fund the state will acquire with the railroad.

The talks, which had been under way for months, had intensified in recent days.
See Rail, page A-10

Senate committee probes railroad's pesticide, herbicide use

Continued from page A-1

at the railroad, said 13 chemicals are under study for possible use. He repeated earlier railroad arguments that a spray program is the only efficient means of keeping the tracks and easements safely clear of vegetation.

Opponents have argued the potential health hazards for those living or walking near the tracks.

One opposing speaker at the

hearing was Arndt von Hippel, a local physician, who said, "I believe all herbicides and pesticides are bad news."

"There are no long-term reliable studies of the effects of these chemicals on people," von Hippel said, adding that most research is funded by the major chemical companies and filled with "a lot of phoney data and sloppy work."

He suggested organic alternatives, such as weed and pest eating bacteria formulas. Salt water

and electrical charging were other alternatives mentioned at the hearing.

Judith Maenok and Glen Ray, two organizers of a Midtown homeowners group called Safe Home Environment, said a pesticide ordinance amendment is scheduled for hearing Feb. 5 before the Anchorage Municipal Assembly.

They had complained to city officials about drifting clouds of chemical spray onto their properties, their fear for their chil-

dren's health and the garden contamination warnings they had received after contacting conservation officials.

The amendment will propose a ban on spraying above six feet, Maenok said, adding that pest control professionals have endorsed root application as an effective alternative.

"There's no research that says any chemical is safe under all circumstances," Ray said. "None talk about risk. They only talk about the level of risk," he

said, suggesting the state regulate pesticide sales to those of minimum hazard, set up guidelines for application and fund research into hazardous chemicals.

Guy McConnell, a biologist with the U.S. Army Corps of Engineers, which is conducting the railroad studies, said the public is operating under the widespread misconception that all herbicides are similar.

"There is little rational basis to avoid all chemicals," he said, noting that a toxic reaction to

many requires heavy and prolonged exposure and many are rapidly eliminated from the body if exposure does occur.

McConnell said his research found no railroad in the United States or Canada that did not rely on herbicides for vegetation control.

To ban all, he compared would be like banning fiberglass because asbestos has been proven a hazardous insulation material.

STUDENT
LOAN
INFO.

STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

ALASKA COMMISSION ON POSTSECONDARY EDUCATION

POUCH FP
JUNEAU, ALASKA 99811
PHONE: (907) 465-2854

M E M O R A N D U M

TO: Members of the Senate HESS Committee

Senator Joe Josephson, Chairman Senator Paul Fischer
Senator Vic Fischer Senator Pappy Moss
Senator Rick Halford

FROM: Jane Byers Maynard, Director for Special Programs
Alaska Commission on Postsecondary Education *JBM*

DATE: April 5, 1983

At the Senate HESS Committee meeting on student loans, Senator Vic Fischer requested the number of community college loan awards to students enrolled in vocational programs by occupation area. This information has been added to the list provided at the meeting showing loan awards and estimated annual job openings in several vocational fields.

Seven hundred and thirty-two loans to students attending 142 community colleges are listed. Total loan awards to students at vocational/technical schools and community colleges represent about 17% of 1982-83 loans awarded to date.

Adding community college information has increased the list of occupation titles from 49 to 60. There are 18 occupation areas in which loan awards exceed estimated annual job openings. The list also shows those vocations where state manpower needs are greatest.

If the Committee would like additional information, please contact me at 465-2854.

Enclosure

[RECEIVED]

APR 05 1983

Josephson,

1982-83 LOAN AWARDS AND ANNUAL JOB OPENINGS
BY OCCUPATION AREAS

Occupational Title	1982/1986 Employment	Ave. Annual Job Openings*	Voc/Tech Schools		Community Colleges		Total Loan Awards
			In-State Loan Awards	Out-of-State Loan Awards	In-State Loan Awards	Out-of-State Loan Awards	
Accounting Clerks	1823/2192	143	64	7	59	8	138
Aircraft Mechanics	885/1052	54	5	12	25	6	48
o Airplane Pilots	1078/1297	57	303	51	6	5	365
Air Traffic Controllers	555/565	12	0	0	2	0	2
Announcers-Radio/TV	132/155	6	0	1	0	3	4
o Auto Body Repairers	104/126	8	0	15	0	0	15
Automotive Mechanics	1493/1822	95	28	4	19	2	53
Bakers	149/180	14	4	0	0	1	5
o Barbers	45/56	5	20	0	0	0	20
Bookkeepers	2433/2993	209	4	0	0	0	4
Buyers-Retail/Wholesale	213/267	25	0	4	0	0	4
Camera Repairers	18/22	1	0	1	0	0	1
Carpenters	2188/2522	142	3	1	0	3	7
o Caseworkers	459/532	29	26	0	10	1	37
Child Care Workers	533/660	49	1	0	0	0	1
Clerical Supervisors	904/1125	78	10	1	0	0	11
o Commercial Artists	72/88	5	1	5	2	3	11
Commercial Divers	NA	NA	0	10	0	0	10
o Computer Programmers	259/314	15	6	13	134	14	167
Cooks	2580/3140	227	5	1	1	1	8
o Cosmetologists/Hairstylists	333/414	32	233	8	0	1	242
Dental Assistants	297/362	26	0	2	7	2	11
o Dental Hygienists	110/137	13	0	0	22	0	22
o Diesel Mechanics	681/845	56	19	67	48	4	132
Drafters	536/657	38	0	11	16	3	30
o Electric Motor Repairers	29/36	2	1	2	0	0	3
Electricians	1399/1630	101	0	3	0	0	3
Electronic Mechanics	110/118	3	1	0	0	0	1
o Electronic Technologists	1504/1740	66	0	30	121	11	162
o Emergency Medical Technicians	12/13	0	0	0	0	2	2

* Projected annual job openings (1981-86) are those resulting from 1) industry growth and 2) death, retirement, and disability. Turnover openings are not included.

o Occupation areas in which loan awards exceed estimated job openings.

1982-83 LOAN AWARDS AND ANNUAL JOB OPENINGS
BY OCCUPATION AREAS (continued)



Occupational Title	1982/1986 Employment	Ave. Annual Job Openings*	Voc/Tech Schools		Community Colleges		Total Loan Awards
			In-State Loan Awards	Out-of-State Loan Awards	In-State Loan Awards	Out-of-State Loan Awards	
Flight Attendants	114/139	14	0	1	0	1	2
Flight Engineers	75/91	10	7	0	0	0	7
Food Service Workers	2942/3501	232	10	0	16	1	27
Forest Technicians	NA	NA	8	0	0	0	8
Heavy Equipment Mechanics	NA	NA	17	1	0	0	18
Heavy Equipment Operators	3051/3590	188	0	24	1	1	26
Helicopter Pilots	NA	NA	3	5	0	0	8
Horticulturists	NA	NA	0	4	0	0	4
o Jewelers	47/60	5	0	5	0	1	6
Kitchen Helpers	1981/2438	163	1	0	0	0	1
Legal Assistants	122/146	8	0	0	0	1	1
Machinists	359/420	35	0	1	0	0	1
Maintenance Repairers	2545/3067	217	17	0	0	0	17
o Marine Mechanics	35/41	2	0	0	0	5	5
Medical Assistants	247/308	15	0	0	9	0	9
o Medical Lab Technicians	87/109	8	0	0	14	0	14
Office Clerks	5596/6654	382	8	3	35	2	48
Photographers	95/117	9	0	3	0	0	3
Physicians Assistants	58/85	7	0	0	0	1	1
Plumbers	1101/1254	67	0	0	1	0	1
Police Administrators/Officers	1137/1253	44	0	0	9	1	10
Radiologic Technicians	44/55	4	0	0	1	1	2
o Refrigeration Mechanics	92/102	6	0	9	17	0	26
Roustabouts	853/1298	118	8	0	0	0	8
Secretaries	4944/5997	454	70	2	5	1	78
o Surveyors	407/483	21	0	6	28	0	+ 36
Ticket Agents	577/701	40	8	11	0	1	20
Truck Drivers	3658/4417	212	0	1	0	0	1
Typists	3358/3813	226	53	0	1	1	55
o Welders & Flame Cutters	791/926	63	173	40	27	8	+248
TOTALS			1117	361	636	96	2210

Source: Occupational Employment Forecast, Alaska Department of Labor, September 1981

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT

ALASKA STATE LEGISLATURE

INTERIM OFFICE:
P.O. BOX 81435
FAIRBANKS, ALASKA 99708

IN SESSION:
POUCH V
JUNEAU, ALASKA 99811
(907) 465-4930/4941



CHAIRMAN
1983 INTERIOR DELEGATION

MEMBER
TRANSPORTATION
HEALTH, EDUCATION AND SOCIAL SERVICES
LABOR SUBCOMMITTEE
JOINT OIL AND GAS
RURAL EDUCATION ATTENDANCE AREAS

Representative Mike Davis
House District 19

MEMORANDUM

To: Nancy Dietrich
From: Rep. Mike Davis
Date: March 23, 1983
Re: Senate Bill 197

Dear Nancy,

I am pleased that Sen. Josephson's scholarship loan bill includes provisions for students attending more than one school. I hope that the enclosed back-up materials are helpful for you.



University of Alaska, Juneau

11120 Glacier Highway

Juneau, Alaska

99801

(907) 789-2101

To: Chancellor Paradise

FEB 15 1983

From: Dianne Schmitt, Financial Aid Officer *DS*

Chancellor

Date: February 15, 1983

University of Alaska, Juneau

RE: LEGISLATION REGARDING THE ALASKA STUDENT LOAN PROGRAM

Senate Bill # 118 reduces the time a student must be in the state before applying for a loan, but also limits loans to students who apply before graduation from high school. The one year residency requirement (reduced from two years) will put a stop to litigation in that area. However, the requirement for all loan applicants to apply while still in high school will be a detriment to the spirit of the loan program and establish a new justification for litigation.

As the UAJ Financial Aid Officer, I must oppose this bill for several reasons. 1) It is sometimes difficult for high school students to decide if they want to go to college. I know there will be many young people who will neglect to fill out the application before high school graduation and later decide to go to college. This bill is asking all seventeen year old students in Alaska to decide their life goal without experiencing life beyond the academic setting. 2) Many students do not consciously choose a career path until several years after high school and after many life experiences. This bill would not afford this type of student the same opportunity as that provided for students who begin college shortly after high school. 3) Many students wait several years after graduation from a baccalaureate program before pursuing graduate study. This bill does not mention graduate study; therefore, I am assuming that it could also be interpreted to eliminate loans for post-baccalaureate students.

House Bill # 56 asks for the loan interest rate to be raised to 7% and for the loan to be limited to the cost of tuition, room and board. This bill is acceptable.

House Bill # 174 says that a student may attend classes at two institutions to accumulate the 12 credits required for the loan program. This bill is acceptable and also beneficial to many of the students in Southeast Alaska.



TANANA VALLEY COMMUNITY COLLEGE
Fairbanks, Alaska 99701

February 17, 1983

Representative Mike Davis
P.O. Box 81435
College, Alaska 99708

Dear Mike:

In regards to HB 174, Tanana Valley Community College supports the bill relative to students who "in total" are enrolled in 12 credits or more which makes them a full-time student within the system.

Sincerely,

A handwritten signature in cursive script that reads "Rod".

Rodney Enos
Campus President

RE/dac



Alaska Statewide Student Association

P.O. BOX 548
DOUGLAS, ALASKA 99824

REPRESENTING STUDENTS OF THE UNIVERSITY OF ALASKA STATEWIDE SYSTEM

ASSA requests that the following section be added to SPONSOR
SUBSTITUTE FOR HOUSE BILL 56:

AS 14.43.120(c) is amended to read:

(c) To maintain a loan the student must continue to be enrolled as a full-time student in good standing or as a part-time student in good standing in more than one institution for a total number of credits equivalent to a full-time student in a career education program, college, or university designated under (b) of this section. The commission shall adopt regulations defining "good standing" for purposes of this subsection.

At present, students enrolled at both UAF and TVCC, UAA and ACC, or Sitka CC and Sheldon Jackson may not receive scholarship loans unless they have a total of twelve credit hours at one or the other institution. This amendment would allow these perfectly legitimate, full-time students to be eligible for the loans.

Thank you.

Mike Davis Office
Pouch V
Juneau, Alaska 99811
ATTN: Jonathan Sperber

January 20, 1983

Mr. Sperber:

Enclosed is my appeal for the Alaska Student Loan Program to reinstate my student loan which was denied for spring semester, 1983. Also attached are copies of forms that support my appeal. Please look these over and give me any help you can.

Much Appreciation...

Kathleen M. Smoyer

KATHLEEN M. SMOYER

P.O. Box 2652

Fairbanks, Alaska 99707

(907) 456-7250



UNIVERSITY OF ALASKA. FAIRBANKS
Fairbanks, Alaska 99701

Smoyer, Kathleen

We are sorry to inform you that you are academically ineligible to receive the following financial aid at the University of Alaska-Fairbanks for the coming semester for the reason listed below:

TYPE OF AID

- | | |
|--|--|
| <input type="checkbox"/> Pell Grant | <input checked="" type="checkbox"/> Alaska Student Loan |
| <input type="checkbox"/> UAF Scholarship/Grant | <input type="checkbox"/> State Educational Incentive Grant |
| <input type="checkbox"/> McIntosh Estate Grant | <input type="checkbox"/> Tuition/Fee Waiver |
| <input type="checkbox"/> Alaska Native Scholarship | <input type="checkbox"/> BIA Grant-In-Aid |
| <input type="checkbox"/> State Room Scholarship | <input type="checkbox"/> Guaranteed Student Loan |
| <input type="checkbox"/> Athletic Grant | _____ |

REASON

- You were admitted/readmitted on academic probation.
- You did not meet program requirements for continued eligibility. (Since there are different requirements for various programs, you may be eligible for one type of aid and ineligible for another.)
- You received incomplete or deferred grade(s). These must be removed within 60 days after Registration or the aid will be cancelled.

Please contact our office in writing at least one week prior to Registration if you feel that an error has been made.

Sincerely,

Ida Greiner
Director, Financial Aid

UNIVERSITY OF ALASKA
 OFFICIAL GRADE REPORT FOR FALL
 COLLEGE OF ARTS & SCIENCES

SMOYER KATHLEEN M
 574-34-9200

82

12/29/82

COURSE NUMBER	COURSE TITLE	CREDITS	GRADE
J-B 102 001	BROADCASTING AND SOCIETY	3.0	A
J-B 203 001	BASIC PHOTOGRAPHY	3.0	B
J-B 215 001	AUDIO PRODUCTION	3.0	A
MUS 151MF 001	CLASS LESSONS - VOICE	1.0	B
MUS 161N 101	PRIVATE LESSONS - PERCUSSION	2.0	F
TOTAL			12.0

EXPLANATION OF GRADING	
GRADE	POINTS PER HOUR
A SUPERIOR	4
B ABOVE AVERAGE	3
C AVERAGE	2
D LOWEST PASSING GRADE	1
F FAILURE	0
AU AUDIT	0
P PASSING	0
S SATISFACTORY	0
DF DEFERRED	0
I INCOMPLETE	0
WF WITHDREW PASSING	0
WF WITHDREW FAILING	0
NS GRADE NOT SUBMITTED	0
W WITHDRAW	0

SMOYER KATHLEEN M
 P O BOX 2652
 FAIRBANKS

AK 99707

ADVISOR - D GOTTEHRER
 MAJOR - JOUR CLASS LEVEL - JUNR
 HRS ATT HRS ERN HRS GPA PTS GPA
 SEMESTER 12.0 10.0 12.0 36.0 3.00
 UA CUM 12.0 10.0 12.0 36.0 3.00

TANANA VALLEY COMMUNITY COLLEGE
 OFFICIAL GRADE REPORT FOR FALL
 TANANA VALLEY COMM COLLEGE

SMOYER KATHLEEN M
 574-34-9200

82

01/15/83

COURSE NUMBER	COURSE TITLE	CREDITS	GRADE
D M 183AT 901	CLASSICAL BALLET, DEG I	1.0	P
O O 146 902	FUNDAMENTALS DATA PROCESSING	3.0	A
TOTAL			4.0

EXPLANATION OF GRADING	
GRADE	POINTS PER HOUR
A SUPERIOR	4
B ABOVE AVERAGE	3
C AVERAGE	2
D LOWEST PASSING GRADE	1
F FAILURE	0
AU AUDIT	0
P PASSING	0
DF DEFERRED	0
I INCOMPLETE	0
NS GRADE NOT SUBMITTED	0
W WITHDRAW	0
NCR NO CREDIT RECEIVED	0
W GEN Continuing Education Unit	0

SMOYER KATHLEEN M
 PO BOX 2652
 FAIRBANKS

AK 99707

CLASS LEVEL - UCS
 HRS ATT HRS ERN HRS GPA PTS GPA
 SEMESTER 4.0 4.0 4.0 12.0 4.00
 TOT CUM 4.0 4.0 4.0 12.0 4.00

SMOYER KATHLEEN M
574-34-9200

COLLEGE OF ARTS & SCIENCES
SPRING 83

12/29/82

FREN 102	001	ELEMENTARY FRENCH II	5.0	0910-1010AM	MWF	GRUN 302	24473
				0940-1040AM	TR	GRUN 302	
J-B 303	001	INTERMEDIATE PHOTOGRAPHY	3.0	0400-0600PM	R	BUNL 014	27651
J-B 316	001	TELEVISION PRODUCTIONS	3.0	0150-0350PM	M	BUNL 15	27715
				0130-0530PM	W	KUAC	
J-B 400	001	ADVANCED MEDIA PRACTICUM	3.0	0100-0200PM	T	BUNL 14	27839
MUS 123 X	001	APPRECIATION OF MUSIC	3.0	0700-1000PM	W	MUS 309	31496
MUS 151MF	001	CLASS LESSONS - VOICE	1.0	HOURS	ARR		31763
MUS 161N	001	PRIVATE LESSONS - PERCUSSION	2.0	HOURS	ARR		32123

SMOYER KATHLEEN M
P O BOX 2652
FAIRBANKS

AK 99707

20.0 ADVISOR- D GOTTEHRER
MAJOR- JOUR CLASS LEVEL- JUNR

**University of Alaska
STATEMENT OF FEES**

Date Registered 1-19-83
11/15

SPRING 1983

Name SWANED KATHLEEN M U. of A. ID Number 57/23/0000 Birth Date 01/11/1962
LAST FIRST

Residency ALASKA RESIDENT Type 2 Major ICUE Campus FEDERALE CAMPUS

Phone _____ - FEES

Type of Fee	Code No.	Amount
Meal Ticket		
Residence Hall		
Graduate Fee - Hours		
Credit Hour Fee - Hours <u>30</u>	<u>DM</u>	<u>300</u>
Non-Resident Tuition Yes () No (X)		
Health Insurance Premium		
Health Center Fee		
Campus Activity Fee	<u>AP</u>	<u>24</u>
Parking Fee		
Music Fee	<u>100</u>	<u>25</u>
	<u>100</u>	<u>75</u>
Material/Lab Fee <u>0.75</u>	<u>77</u>	<u>00</u>
TVCC Material Fee		
Deferred Payment Charge		
Late Registration Charge	<u>11</u>	<u>17.00</u>

Assessor AS Total Fees 544.00
457.00 (50)

SCHOLARSHIP AND OTHER CREDITS

Description	*Account Number	Amount
1 005000	00000 0774 103010	00000 271
2		
3		
4		
5		

*Must be an FAS no. or an Agency ARID

Total Scholarships 50.00

Net Fee Due 407.00

Total Deferred Payment or (check requested) _____

Cash Received or (disbursed) 407.00

DEFERRED PAYMENT SCHEDULE

Date Due	Amount
1	
2	
3	

CHECK REQUEST MADE

_____ ()

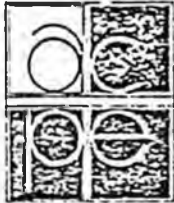
MEMO

Cash	<input type="checkbox"/>	_____
Checks	<input checked="" type="checkbox"/>	_____
Total		<u>407.00</u>
Net Fee Due		<u>407.00</u>
Overpayment		<u>30.00</u>
Change		<u>137.00</u>

Fee Statement Auditor

By _____
SIGNATURE OF STUDENT

_____ 5740 54
CURRENT MAILING ADDRESS Cashier No.



ALASKA STUDENT LOAN PROGRAM
REQUEST FOR WAIVER OF GOOD STANDING
 Requirements (20 AAC 15.040)

A. Student: <u>Kathleen M. Smoyer</u>		Social Security Number <u>574-34-9200</u>	
Current Mailing Address: Street <u>P.O. Box 2652</u>		City <u>Fairbanks</u>	State <u>Alaska</u>
Institution <u>University of Alaska - Fairbanks</u>		Zip Code <u>99707</u>	

B. I hereby request, for the reasons stated below, waiver of the good standing requirement for an Alaska Student Loan, as provided for in 20 AAC 15.040 (j), (k), and (l).

C. My loan was denied because of my failure to (please check):

1. maintain a cumulative C.P.A. of 2.0, undergraduate, or 3.0, graduate

2. maintain a term G.P.A. of 1.5, and/or

3. successfully complete a full-time student load the last term I borrowed under this program.

D. Reason for request (please check):

Medical disability

Death in the immediate family

Administrative error

Duress

Record upon which ineligibility is based is from an attendance period five or more years in the past

Other (Please explain)

Explanation attached.

E. Detailed explanation. Attach a detailed explanation of your justification for a waiver. Be specific. If you are appealing on a grade point average basis, include what your cumulative average is and how you have performed in the last couple of years (by term). If you are appealing for less than full-time attendance, include how many hours you did complete, how many you failed to successfully complete, and explain. If you are offering a time argument, include why you feel you are now more prepared for school than you were when you established your "ineligible" record. Include documentation. Transcripts may be required, doctor's certification will be required, evidence of administrative error will need verification.

F. SIGNATURE: My signature below certifies that in the absence of a Notary Public or other official authorized to administer an oath, I personally certify under penalty of perjury that the foregoing and accompanying documentation are true.*

Signed <u>Kathleen M. Smoyer</u>	Date <u>Jan 19, 1983</u>
Location: (City and State) <u>Fairbanks, Alaska</u>	

G. Keep one copy for your files, give one copy to your Financial Aid Office, and mail original to:

Alaska Commission on Postsecondary Education
 Division of Student Financial Aid
 Pouch FP
 400 Willoughby Avenue
 Juneau, Alaska 99811

* Under AS 09.63.020(b), a person who makes false sworn certification which he does not believe to be true, under penalty of perjury is

Alaska Student Loan Program
Pouch FP, 400 Willoughby
Juneau, Alaska 99811
ATTN: Director

January 19, 1983

This is to appeal the loss of my Alaska Student Loan for spring semester, 1983. It was denied on the grounds that I no longer meet the eligibility requirements. Fall semester, 1982 I took 12 credits at the University of Alaska-Fairbanks, earned 10 of those credits, for a semester GPA of 3.0. I also took 4 credits at T.V.C.C., earned those 4 credits, for a semester GPA of 4.0. I therefore, earned a total of 14 credits for the fall semester of 1982, with my total GPA being somewhere between 3.0 and 4.0

When I went to see the UAF Financial Aid officer, the explanation was I did not complete 12 credits to be classified as a full time student and therefore, could not receive my A.S.L.P. loan this semester. They stated UAF and T.V.C.C. are different and the credit I earned at T.V.C.C. does not count. It is true that I registered at two different places and received two separate grade reports. However, I paid only one tuition (that at UAF). This implies to me they are part of the same system.

With some research, I found that this division between UAF and T.V.C.C. is fairly recent and was told that notices of this were sent to all students, though I never received one. When I called the A.S.L.P. office in Juneau, I was told that they could do nothing unless the UAF Financial Aid office authorized me to receive the check. But when I went to Financial Aid they told me

they (UAF) didn't have the power to change the decision but that A.S.L.P. did. All I have encountered so far is this type of beaurocratic run-around and it is most confusing to me as a student. So I went to see George Winford (advisor and head of UAF Journalism department) who, by the way, supports my appeal. He informed me I could have my T.V.C.C. classes transfered to my UAF transcript, which I have done. It will now show that I have completed 14 credits for the fall semester of 1982.

Under Borrower's Responsibilities on my promissory note it states:

I must maintain good standing, as defined for this program, in order to receive disbursement of my loan under the Alaska Student Loan Program. Good standing is defined as enrolling and completing at least a full-time student load while maintaining a grade-point-average of at least a "C" for an undergraduate or "B" for a graduate student.

It is my interpretation that I did comply with this regulation as worded in Item #8 of promissory note signed 9/7/82, and as my transcript will show.

I have had to borrow the money to pay my fees for this semester but must pay that person back and have no money on which to live. I am an earnest college student and I need my A.S.L.P. loan to continue my education. Therefore, I request that you reinstate my Alaska Student Loan for the spring semester of 1983 on the grounds that I did meet the requirements: completion of 14 credits at a 3.0+ GPA in fall of 1982.

Please review my appeal and let me know immediately of your decision.

Thank you very much for your consideration...

MATHLEEN N. SMOTHER (574-34-9200)

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT.

ALASKA STUDENT LOANS

Background and Discussion Materials
for the Senate HESS Committee

CONTENTS

	<u>Page</u>
Program Description	1
Repayment Schedule	2
Current Status	3
Projections to 1988-89	6
Distribution of Loans by Institution	7
Sample Student Budgets	9
Fiscal Impacts of Changes	11
Commission Position on Loans	12

PROGRAM DESCRIPTION

PURPOSES

1. To provide Alaskans with access to postsecondary educational resources through low-interest loans to students.
2. To encourage an educated citizenry through initial access to education and training and through inducements to utilize that education and training in Alaska.

TERMS

1. Undergraduates and vocational students may borrow up to \$6,000 per year of full-time study.
2. Graduate students may borrow up to \$7,000 per year of full-time study.
3. Students may borrow for up to 5 years of undergraduate study, or up to 5 years of graduate study, but for not more than 8 years combined.
4. A student must be a two-year Alaska resident to borrow and must maintain full-time study in good standing to continue borrowing Alaska student loans.
5. Loans may be used for attendance at any approved institution.
6. Proceeds from loans may only be used for the costs of tuition and fees, room and board, and books and supplies.
7. Loan repayment begins one year after the student ceases to be a full-time student (except for approved periods of deferment).
8. Repayment is over a 10-year period with provision for extending to 15 years if necessary.
9. Interest charged on the loans is 5%.

FORGIVENESS

If, upon completion of the program of study for which the loan was granted, the borrower resides in Alaska, a portion of the loan, plus interest, shall be forgiven by the State. That portion, for up to a total of 50%, shall accrue as follows:

1. 2-3 years residence in the state, 10%
2. 3-4 years residence in the state, an additional 10%
3. 4-5 years residence in the state, an additional 10%
4. 5-6 years residence in the state, an additional 10%
5. Over 6 years residence in the state, a final 10%.

This residence must be continuous and must begin within one year of completion of program.

REPAYMENT SCHEDULE

IF YOUR STUDENT LOANS TOTAL:	YOUR MONTHLY PAYMENT FOR 120 MONTHS (10 YRS.) WOULD BE:	TOTAL TO BE REPAYED:		
		5% Interest	Principal	Total
\$1,000.00	\$ 10.61	\$ 273.20	\$1,000.00	\$ 1,273.20
2,000.00	21.21	545.20	2,000.00	2,545.20
3,000.00	31.83	818.40	3,000.00	3,818.40
4,000.00	42.43	1,091.60	4,000.00	5,091.60
5,000.00	53.06	1,363.60	5,000.00	6,363.60
6,000.00	63.64	1,636.80	6,000.00	7,636.80
7,000.00	74.25	1,910.00	7,000.00	8,910.00
8,000.00	84.95	2,182.00	8,000.00	10,182.00
9,000.00	95.46	2,455.20	9,000.00	11,455.20
10,000.00	106.07	2,728.40	10,000.00	12,728.40
15,000.00	159.10	4,092.00	15,000.00	19,092.00
20,000.00	212.13	5,455.60	20,000.00	25,455.60
25,000.00	265.16	6,819.20	25,000.00	31,819.20
30,000.00	318.20	8,184.00	30,000.00	38,184.00
35,000.00	371.23	9,547.60	35,000.00	44,547.60
40,000.00	424.26	10,911.20	40,000.00	50,911.20
45,000.00	477.29	12,274.80	45,000.00	57,274.80
50,000.00	530.33	13,639.60	50,000.00	63,639.60

1982-83 ALASKA STUDENT LOANS

1. Program Status (March 11, 1983)

<u>Student Level</u>	<u>Number</u>	<u>Amount</u>
Freshman	3,844	\$15,200,300
Sophomore	2,631	11,134,250
Junior	1,920	8,273,000
Senior	1,694	7,240,550
Vocational	1,580	7,982,100
Undergraduate	11,669	49,830,200
Graduate	1,137	6,110,550
TOTAL	12,806	\$55,940,750

2. In-State/Out-of-State Attendance by Level (March 11, 1983)

<u>Student Level</u>	<u>Alaska</u>	<u>%</u>	<u>Out-of-State</u>	<u>%</u>
Freshman	2,078	54.1	1,766	45.9
Sophomore	1,268	48.2	1,363	51.8
Junior	872	45.4	1,048	54.6
Senior	789	46.6	905	53.4
Vocational	1,157	73.2	423	26.8
Undergraduate	6,164	52.8	5,505	47.2
Graduate	277	24.4	860	75.6
TOTAL	6,441	50.3	6,365	49.7

3. Percent In-State Previous Year

<u>Year</u>	<u>Undergraduate</u>	<u>Graduate</u>	<u>All Loans</u>
1981-82	47.3	23.8	45.0
1980-81	45.3	17.9	42.3
1979-80	36.1	12.3	33.3
1978-79	35.1	12.0	32.3

4. States of Attendance by Student Level (March 11, 1983)

<u>Freshman</u>	<u>Sophomore</u>	<u>Junior</u>	<u>Senior</u>	<u>Vocational</u>	<u>Undergraduate</u>	<u>Graduate</u>
AK-2,078	AK-1,268	AK- 872	AK- 789	AK-1,157	AK-6,164	AK- 277
WA- 384	WA- 295	WA- 263	WA- 240	CO- 123	WA-1,276	CA- 166
OR- 289	OR- 255	OR- 172	OR- 144	WA- 94	OR- 906	WA- 156
CA- 198	CA- 137	CA- 89	CA- 87	AZ- 48	CA- 552	OR- 124
ID- 120	AZ- 81	AZ- 57	AZ- 50	OR- 46	CO- 366	CO- 33
AZ- 113	CO- 71	UT- 52	ID- 42	CA- 41	AZ- 349	MA- 32
HA- 102	ID- 69	HA- 51	HA- 36	OK- 17	HA- 265	HA- 24
CO- 98	HA- 68	CO- 40	UT- 35	HA- 8	ID- 265	UT- 22
UT- 55	UT- 54	MT- 35	CO- 34	FL- 7	UT- 198	TX- 21
MT- 42	TX- 39	ID- 33	TX- 28	MN- 5	TX- 150	NY- 19
<u>ZZ- 365</u>	<u>ZZ- 294</u>	<u>ZZ- 256</u>	<u>ZZ- 209</u>	<u>ZZ- 34</u>	<u>ZZ-1,178</u>	<u>ZZ- 263</u>
3,844	2,631	1,920	1,694	1,580	11,669	1,137

5. Age Distribution of Borrowers (January 18, 1983)

<u>Age</u>	<u>Number</u>	
60+	24	Age Range: 16-72
50-59	163	Median Age: 22.6
40-49	618	
30-39	2,421	
20-29	8,479	
16-19	<u>1,851</u>	
	13,556	

6. Residency (January 18, 1983)

<u>Student Level</u>	<u>2-Years</u>	<u>3-5</u>	<u>6-10</u>	<u>10+</u>	<u>Total</u>
Freshman	243	763	913	2,313	4,232
Sophomore	82	445	604	1,677	2,808
Junior	78	289	461	1,191	2,019
Senior	61	279	385	1,009	1,734
Vocational	87	339	305	850	1,581
<u>Undergraduate</u>	<u>551</u>	<u>2,115</u>	<u>2,668</u>	<u>7,040</u>	<u>12,374</u>
<u>Graduate</u>	<u>177</u>	<u>293</u>	<u>308</u>	<u>404</u>	<u>1,182</u>
<u>TOTAL</u>	<u>728</u>	<u>2,408</u>	<u>2,976</u>	<u>7,444</u>	<u>13,556</u>

% Breakdown

2 Years	5.4%	6-10 Years	21.9%
3-5 Years	17.8%	10+ Years	54.9%

7. Default: (Computed on June 30)

1971-72	N.A.
1972-73	N.A.
1973-74	N.A.
1974-75	80.0%
1975-76	44.6%
1976-77	24.9%
1977-78	22.3%
1978-79	19.3%
1979-80	14.5%
1980-81	11.5%
1981-82	9.2%

10. Loan Volumes, Collections, Forgiveness (see attached table)

STATE STUDENT LOAN ACTIVITY
 Projected to 1988-89
 (Current Program)

Year	Loan Awards	Loan Volume	Cumulative Total	Average Loan	Loan Collections	Federal Funds	Forgiveness	General Fund
1971-72	1,081	\$ 1,603,158	\$ 1,603,158	\$1,483	\$ -0-	\$ -0-	\$ -0-	\$ 1,603,158
1972-73	1,748	2,870,384	4,473,542	1,642	-0-	-0-	-0-	2,870,384
1973-74	1,665	2,986,176	7,459,718	1,793	-0-	-0-	-0-	2,986,176
1974-75	1,457	2,659,807	10,119,525	1,826	235,476	-0-	703	2,424,331
1975-76	1,719	3,382,997	13,502,522	1,768	465,530	-0-	44,233	2,977,467
1976-77	1,921	3,850,507	17,353,029	2,004	1,141,461	-0-	64,746	2,709,046
1977-78	2,265	4,604,167	21,957,196	2,033	1,191,851	-0-	314,306	3,412,316
1978-79	2,795	6,416,402	28,373,598	2,296	1,391,643	-0-	445,985	5,024,758
1979-80	3,918	9,373,949	37,747,547	2,393	1,603,436	-0-	409,501	7,770,513
1980-81	6,460	15,957,717	53,705,264	2,475	2,225,388	-0-	555,494	13,732,325
1981-82	9,898	40,559,493	94,264,763	4,098	2,779,900	1,000,000	785,769	36,819,599
1982-83*	12,500	56,250,000	150,514,763	4,500	4,604,046	1,200,000	(1,367,555)	54,563,309
1983-84	15,000	73,500,000	224,014,763	4,900	7,591,895	850,000	2,311,210	65,058,105
1984-85	17,741	99,349,600	323,364,363	5,600	11,187,099	675,000	3,458,423	87,487,501
1985-86	19,000	112,100,600	435,464,963	5,900	15,277,653	500,000	4,750,002	95,728,947
1986-87	21,100	124,490,000	559,954,963	5,900	20,742,021	350,000	6,432,819	103,397,975
1987-88	22,489	133,809,550	693,764,513	5,950	24,787,158	225,000	8,113,038	108,797,392
1988-89	24,365	144,971,750	838,736,263	5,950	28,423,931	150,000	10,617,441	116,397,819

*1982-83 through 1988-89 are projections

TABLE 1

DISTRIBUTION OF YEAR-TO-DATE ALASKA STATE LOANS
FOR STUDENTS ATTENDING IN ALASKA
(February, 1983)

*Continued
protection*

Institution	1982-83	
	No.	Amount
U of Alaska, Fairbanks	2,266	\$ 6,975,068
U of Alaska, Anchorage	1,560	4,611,230
Anchorage Community College	1,353	4,538,244
U of Alaska, Juneau	340	1,053,425
Kenai Peninsula Community College	326	1,191,593
Alaska Pacific U	198	680,400
Alaska Business College	198	943,887
Alaska Vocational-Technical Center	197	348,741
Tanana Valley Community College	195	731,450
Testing Institute of Alaska	167	761,361
Sheldon Jackson College	138	465,953
Matanuska-Susitna Community College	130	547,800
✓ New Anchorage Beauty School	115	549,450
✓ Gordon Aviation, Inc.	110	549,764
✓ Aero Technical Flight School	80	409,000
✓ Wilburs Flight Operation	53	286,300
✓ Fort Richardson Flying Club	49	249,000
Ketchikan Community College	46	124,250
✓ Trend Setter School of Beauty	42	191,500
Sitka Community College	36	114,400
✓ Headquarters Barber & Beauty Academy	35	171,000
? Hutchison Career Center	35	131,200
✓ Flight Training Devices	33	136,800
✓ Academy of Hair Design	32	126,600
Alaska Native Training Institute	29	112,200
✓ A.I.R. Center	24	129,000
Alaska Computer Training Center	21	97,150
✓ Anchorage Alaska School of Barbering	20	96,000
✓ Elmendorf Aero Club	20	90,871
St. Herman's Theological Seminary	19	62,000
Kotzebue Technical Center	19	44,250
Kodiak Community College	15	44,050
North Pacific Business Institute	14	55,050
Alaska Bible College	12	40,950
✓ Fairbanks Beauty School	14	58,100
Peninsula Institute of Welding Technology	11	44,950
✓ Peninsula Hair Styling Academy	11	43,750
Prince William Sound Community College	8	21,531
Kuskokwim Community College	8	18,550
✓ Alaska Piper Sales, Inc.	6	35,900
Birchwood Air Service	4	24,000
University of LaVerne	3	12,750
Chapman College	2	3,000
Far North Bible College	2	2,450
T&H Real Estate Institute	1	6,000
Northwest Community College	1	5,000
Charismatic Bible College	1	4,500
Bar Review	1	4,000
Delta Greely Rural Educational Center	1	3,000
Alaska Media Workshop	1	550
TOTAL	8,002	\$26,648,006

110
80
53
119
298

INSTITUTIONS AT WHICH AT LEAST FIFTY ALASKA
STUDENT LOAN BORROWERS ATTENDED 1982-83
(as of February, 1983)

Institution	No.	Amount
*University of Alaska, Fairbanks	2,266	\$6,975,068
*University of Alaska, Anchorage	1,560	4,611,230
*Anchorage Community College	1,353	4,538,244
*University of Alaska, Juneau	340	1,053,425
*Kenai Peninsula Community College	326	1,191,593
Oregon State University	241	1,189,956
University of Oregon	233	1,026,136
University of Washington	205	935,667
*Alaska Business College	198	943,887
*Alaska Pacific University	198	680,400
*Alaska Vocational-Technical Center	197	348,741
*Tanana Valley Community College	195	731,450
Western Washington University	177	767,542
*Testing Institute of Alaska	167	761,311
Brigham Young University (UT)	160	498,630
*Sheldon Jackson College	138	465,953
Arizona State University	135	615,025
*Matanuska-Susitna Community College	130	547,800
Washington State University	124	551,776
University of Hawaii, Manoa	124	381,811
*New Anchorage Beauty School	115	549,450
Gonzaga University (WA)	113	596,450
*Gordon Aviation, Inc.	110	549,764
University of Puget Sound (WA)	103	512,200
University of Hawaii, Hilo	100	276,175
University of Idaho	99	364,950
Willamette University (OR)	95	481,675
Northern Arizona University	90	308,942
Pacific Lutheran University (WA)	87	406,950
University of Arizona	86	329,600
*Aero Technical Flight Service	80	409,000
Seattle Pacific University (WA)	77	344,550
Central Washington University	77	334,900
American Diesel & Automotive School (CO)	77	320,573
Seattle University (WA)	73	333,134
Montana State University	69	254,088
Linfield College (OR)	67	305,100
Colorado State University	60	306,050
Ricks College (OR)	58	139,181
Denver Institute of Technology (CO)	56	204,056
*Wilbur's Flight Service	53	286,300
Eastern Washington University	53	255,267
University of Colorado	52	231,400

*Alaskan School

SAMPLE STUDENT BUDGETS
(1982-83)*

Budget Item	UAF On-Campus	UAF Off-Campus	UAA	UAJ	ACC	Kenai Penn. C.C.	APU On-Campus	SJC On-Campus
Tuition & Fees	\$ 788	\$ 788	\$ 648	\$ 624	\$ 632	\$ 632	\$3,190	\$3,100
Room & Board	2,100	4,800	4,096	4,650	4,608	4,608	3,050	3,000
Books & Supplies	400	400	270	300	270	270	270	250
Subtotal	\$3,288	\$5,988	\$5,014	\$5,574	\$5,510	\$5,510	\$6,510	\$6,350
Transportation	1,000	1,000	640	600	720	1,080	1,080	100
Personal	800	800	768	775	864	864	768	630
Total	\$5,088	\$7,788	\$6,422	\$6,949	\$7,094	\$7,454	\$8,358	\$7,080

Budget Item	Oregon State U On-Campus	U of Oregon On-Campus	Willamette U On-Campus	Linfield College On-Campus	Lewis & Clark College On-Campus	U of Washington On-Campus	Western Washington U On-Campus
Tuition & Fees	\$4,050	\$4,020	\$5,570	\$ 5,555	\$6,444	\$3,255	\$3,210
Room & Board	2,100	2,250	2,350	2,550	2,603	2,601	2,100
Books & Supplies	300	285	250	290	225	300	300
Subtotal	\$6,450	\$6,555	\$8,170	\$ 8,395	\$9,272	\$6,156	\$5,610
Transportation	1,240	1,126	1,800	1,850	1,560	1,525	1,500
Personal	1,320	990	530	715	575	1,041	600
Total	\$9,010	\$8,671	\$10,500	\$10,960	\$11,407	\$8,722	\$7,710

Budget Item	Washington State U On-Campus	Pacific Lutheran U On-Campus	U Puget Sound On-Campus	Gonzaga U On-Campus	Seattle U On-Campus	Arizona State U On-Campus	Northern Arizona U On-Campus
Tuition & Fees	\$3,256	\$ 5,280	\$ 5,480	\$ 4,700	\$ 4,725	\$3,250	\$2,750
Room & Board	2,200	2,370	2,580	2,420	2,493	2,320	1,770
Books & Supplies	330	330	400	330	330	288	275
Subtotal	\$5,786	\$ 7,980	\$ 8,460	\$ 7,450	\$ 7,548	\$5,858	\$4,795
Transportation	1,661	1,600	1,225	1,660	1,736	1,200	1,200
Personal	900	900	700	900	900	1,040	650
Total	\$8,350	\$10,480	\$10,385	\$10,010	\$10,184	\$8,098	\$6,645

*All budgets are for single full-time undergraduate students for a full academic year.

SAMPLE STUDENT BUDGETS
(1982-83)*

Budget Item	U of Hawaii On-Campus	U of Idaho On-Campus	U of Montana On-Campus	Colorado State U On-Campus	U of Colorado On-Campus	U of Denver On-Campus	Stanford U On-Campus
Tuition & Fees	\$ 481	\$2,516	\$2,241	\$4,109	\$ 4,711	\$ 5,790	\$ 8,220
Room & Board	2,837	1,870	2,000	2,700	2,286	2,649	3,423
Books & Supplies	316	300	200	300	230	375	350
Subtotal	\$3,634	\$4,686	\$4,441	\$7,109	\$ 7,227	\$ 8,814	\$11,993
Transportation	1,099	1,450	1,044	1,675	1,716	1,746	1,990
Personal	688	600	500	150	1,417	690	745
Total	\$5,421	\$6,736	\$5,985	\$8,934	\$10,360	\$11,250	\$14,728

Budget Item	Boston U On-Campus	Purdue U On-Campus	Northwestern U On-Campus	Dartmouth College On-Campus	Brigham Young U On-Campus
Tuition & Fees	\$ 7,275	\$3,800	\$ 8,085	\$ 8,190	\$1,100
Room & Board	3,400	2,200	3,060	3,255	1,740
Books & Supplies	310	270	350	1,033	340
Subtotal	\$10,985	\$6,270	\$11,495	\$12,478	\$3,180
Transportation	1,540	1,880	1,560	1,865	1,100
Personal	600	760	650	1,600	200
Total	\$13,325	\$8,910	\$13,705	\$15,943	\$4,480

*All budgets are for single full-time undergraduate students for a full academic year.

FISCAL IMPACTS OF CERTAIN CHANGES
TO THE LOAN PROGRAM

	Additional Interest Income	7%	8%	9%	10%	11%
FY 84		\$ -0-	\$ -0-	\$ -0-	\$ -0-	\$ -0-
FY 85		-0-	-0-	-0-	-0-	-0-
FY 86		62,300	93,450	124,600	155,750	187,225
FY 87		248,300	372,450	496,600	620,750	744,900
FY 88		1,041,850	1,562,775	2,083,700	2,604,625	3,125,550
FY 89		2,140,150	3,210,225	4,280,300	5,350,375	6,420,450

	Savings By Changing Forgiveness	To 20%	To 10%	TO -0-
FY 84		\$ -0-	\$ -0-	\$ -0-
FY 85		-0-	-0-	-0-
FY 86		214,200	285,600	357,000
FY 87		520,200	693,600	867,000
FY 88		930,000	1,240,000	1,550,000
FY 89		1,491,000	1,988,000	2,485,000

All changes would be reflected by reducing the amount of State General Fund money needed by the program. To obtain the result of any combination of the above, simply add the impacts for the appropriate fiscal years. (For example: raising interest to 11% and eliminating forgiveness completely would save \$8.9 million in FY 89.)