USE, DISPOSAL AND TRANSPORTATION OF SELECTED CONTAMINANTS IN YUKON



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LIST OF ABBREVIATIONS

Abbreviation	Interpretation
AES	Arctic Environmental Strategy
CNT	Canadian National Telegraph
CYI	Council for Yukon Indians
DFO	Department of Fisheries and Oceans
DIAND	Department of Indian Affairs and Northern Development [Indian and Northern Affairs Canada]
DND	Department of National Defence
DPW	Department of Public Works [Public Works Canada]
EA	Environmental adviser [for Yukon First Nations]
EP	Environment Protection [branch of Environment Canada]
LES	Laberge Environmental Services
OCs	Organochlorines
PCBs	Polychlorinated biphenyls
RCAF	Royal Canadian Air Force
REME	Royal Electrical and Mechanical Engineers
RMO	Resource Management Officer
UKHM	United Keno Hill Mines
ULV	Ultra low volume [spraying technique]
WP & YR	White Pass and Yukon Railway
YCGC	Yukon Consolidated Gold Corporation
YFN	Yukon First Nation
YTG	Yukon Territorial Government [Government of Yukon]

1.0 EXECUTIVE SUMMARY

Laberge Environmental Services [LES] was contracted by the Committee on Contaminants in Northern Ecosystems and Native Diets [the Contaminants Committee] to review a Yukon waste sites inventory in an effort to determine the status of the land on which the wastes are located and to study through archival research and interviews with knowledgeable Yukoners, the historic use, transport and disposal of certain substances in Yukon. For the contaminants research, emphasis was placed on the period 1940 - 1970 and the substances selected for study were pesticides, PCBs, mercury and lead.

Through researching mining and land records, the status of land on which AES waste sites are located was updated. Cleaned up sites and abandoned mine sites were deleted from the inventory. The updated inventory is included with this report in Appendix C and on diskette which can be obtained from the Chair of the Yukon Contaminants Committee.

The Project Team received the assistance of the elders from 10 First Nations in Yukon and northern B.C. and interviewed 25 long term residents of the Territory, as well as having numerous discussions with many other people. Approximately 83 sites were identified through the oral interviews [Table 3]. Eight of these sites were already on the AES inventory, 11 are in B.C., 18 within the City of Whitehorse boundaries and 4 are abandoned mine sites either already on the Public Works list of abandoned mines or are in B.C. Many of the sites date from the period of intense military construction projects in the 1940's.

The research undertaken by the project team suggests that the handling and disposal practises used during the military construction and post war era may have resulted in local organochlorine contamination from pesticides and PCBs. Four waste sites dating from this period are recommended for site characterization to confirm the presence or absence of contaminants. Furthermore, it is recommended that attempts be made to characterize the waste in any of these sites prior to disturbance or development.

It was found that pesticides, particularly DDT, were heavily used in the Whitehorse area and, to a lesser extent, in the other communities throughout Yukon. It is suggested that aerial spraying in the Whitehorse area is a significant factor contributing to DDT contamination in Lake Laberge.

It is clear that there has been some use of PCB's for transformers, capacitors and a variety of applications in Yukon but no high concentration spills or disposal sites were identified. However, where site specific developments are planned at sites where PCBs were used, site characterization should be carried out due to the possibility of local soil contamination.

The research also indicates that sources of lead such as concentrates and lead based paints are widely distributed throughout the Territory. Special attention is given to transshipment points for lead concentrate from the mines.

Of the four substances studied, mercury is the only one whose use is not highly regulated or banned in the 1990's. The considerable use of mercury by placer miners during the gold rush has lead to the existence of pockets of mercury in placer streams throughout the Territory and in the Atlin area. It is not clear to what extent this mercury has entered the aquatic ecosystem.

For further information regarding this report, the reader should contact Mark Palmer, Chair of the Yukon Contaminants Committee, DIAND, Whitehorse, Y.T. at 667-3272 regarding contaminants; and to contact the Manager of Field Operations, DIAND, Whitehorse, Y.T. at 667-8071 concerning the waste site inventory.

2.0 SCOPE OF WORK

This study documents the historical use, transportation, and disposal of selected contaminants in Yukon Territory between 1910 to 1980; with particular emphasis on the period 1940 to 1970. The transportation of heavy metal ores was studied from the perspective of potential contamination. Research was carried out into the current status of ownership, and other relevant information concerning waste sites on inventory. Previously undocumented sites of potential contamination were also a target of the study.

2.1 Background

In the autumn of 1990, some rather unexpected results were obtained from the analysis of fish samples taken in 1989 from Lake Laberge during a general survey of conditions in the Yukon River downstream of Whitehorse. High concentrations of organochlorines were found in samples of burbot liver and the flesh of lake trout. Pending further study; a health warning, counselling against the consumption of burbot livers, and advising limited intake of trout flesh was immediately issued by the Yukon Department of Health and Social Services. A working group, consisting of representatives of various federal and territorial departments, First Nations, and the Yukon Conservation Society, was formed to consider what further actions should be taken.

During this same period the Federal Government announced its' Arctic Environmental Strategy [AES]. This program included a number of environmental initiatives to be carried out "north of 60" over a five-year period, later extended to six years. These were grouped under four sub-programs:

1] a water quantity and quality monitoring component;
2] a waste site clean-up component;
3] an environmental action program for community groups; and
4] a contaminants component.

In order to coordinate the activities of all parties working under, or affected by, the Contaminants component of the strategy, the Laberge working group was reconstituted as the Committee on Contaminants in Northern Ecosystems and Native Diets [the Contaminants Committee]. At present, the Committee consists of representatives of the following groups:

- Indian and Northern Affairs Canada [DIAND] [the Chair and one representative];
- Environment Canada;
- Fisheries and Oceans Canada;
- Health and Welfare Canada;
- Health and Social Services [Yukon];
- Renewable Resources [Yukon];
- Council for Yukon Indians;
- Yukon Conservation Society; and
- Yukon College.

The Committee's activities to date have focused largely on obtaining a fuller understanding of the extent of the problem of contamination in Yukon [with emphasis on the southern lakes] and on isolating possible sources of contamination. The emphasis on the southern lakes reflects the importance of these waters to the native food fishery and the high level of concern expressed by First Nations in the area regarding the contamination of this resource.

The analyses of further samples taken from Lake Laberge in the late fall of 1990 resulted in a more complete characterization of the organochlorine problem; toxaphene, with its lower permissible daily intake level, became the substance of major concern; levels of PCB's, though lower than originally feared, were still unusually high and levels of DDT were confirmed. After an assessment of the data, Health and Welfare Canada issued a formal health advisory on May 8, 1991, confirming the earlier warning. The analyses of fish samples taken from Bennett, Tagish and Atlin Lakes in 1991 resulted in a health advisory being issued on March 17, 1992, regarding the consumption of burbot livers from Atlin Lake. Eleven other lakes were sampled in 1992. A snow quality monitoring program and a large volume air quality monitoring program were set in motion to investigate the possibility that the contamination is the result of long range transport of airborne pollutants. A series of fact sheets on contaminants for the use of the general public was drawn up and a reference library was established at Yukon College. The present study was commissioned with the objective of accounting for local sources of contamination by conducting research into the historical use, transportation and disposal of contaminants. Additional objectives were to identify previously undocumented potentially contaminated sites and to research the current status of ownership of wastes on the AES waste site inventory.

2.2 Objectives and Methodology

Two meetings were held with the Contaminants Committee at the beginning of the project in order to identify contaminants of concern, to further specify certain tasks and methods, and generally to focus the scope of the work. The primary contaminants of concern identified for the study were; pesticides, PCBs [Poly Chlorinated Biphenyls], mercury, and lead.

The study was broken up into three tasks. Task One was to research the ownership status and other relevant information regarding waste sites on inventory. Task Two involved conducting oral interviews with First Nations elders in cooperation with the CYI and First Nations representatives, and oral interviews with other knowledgeable persons according to methods devised by the Project Team. Task Three consisted of a literature/archival search of relevant government and private records to be carried out concurrently with the other research as required.

Objectives and methodology for the three specific tasks are described below.

2.2.1 Task One: AES Waste Site Inventory Research

In recent years, DIAND Field Operations has developed a coded inventory of waste sites on lands under their jurisdiction. The Yukon Branch of Environmental Protection, Environment Canada [EP], used this information as the basis for a recent characterization of waste sites [AES Waste Management Program; Yukon, Internal Report, EP, Oct. 1992]. The resultant computerized database was provided to the Project Team for use in this component of the study. Additions and modifications to this database were made using Dbase III software. The objectives of this task can be summarized as follows:

[i] Determine if the waste sites are truly abandoned, or if they still have a current owner with some form of tenure [mineral claims, leases, land use permits, land claims etc].
[ii] Document any relevant information concerning past owners and/or users of the site.
[iii] Document any information relevant to the use of contaminants arising from this aspect of the study.
[iv] Delete cleaned up sites from the AES inventory.
[v] Delete all mine sites from the AES inventory using a list provided by Public Works Canada, which has responsibility for these sites under a separate AES effort.
[vi] Update the data base with any new miscellaneous information obtained from communication with the district Resource Management Officers [RMO].

The methods used to carry out this part of the study were as follows:

[i] Communicate with RMO's in all districts to collate their most recent information on ownership status, clean-ups, and additional site information to be added to the database.
[ii] Where the waste site was connected with mineral exploration and development, carry out a mineral tenure search to determine which sites are located on claims with a current owner, and where practical, find out which company or individual owned claims covering the site in the past. This effort was done by the Project Team for the sites in the Whitehorse Mining Recorder District, and by the mining recorders in Dawson, Mayo and Watson Lake Mining Recorder Districts.
[iii] Document addresses, claim numbers, instrument of record numbers, or other forms of tenure as required.
[iv] Maintain a list of all sites deleted from the inventory due to recent clean-up, or by falling under Public Works Canada's list of abandoned mines.
[v] Update the waste site inventory with all new relevant information as required.

2.2. Task Two: Oral Interviews

The contract stipulated that two categories of people should be canvassed for information regarding the use, transport and disposal of the substances under consideration: persons who might be expected to be knowledgeable of these matters because of their long term involvement with some aspect of the economic life of Yukon; and First Nations elders who, because of their knowledge of the natural ecosystems and their long familiarity with the Territory, would be able to give a perspective on the activities of various groups and their observations of changes over time. As it turned out, there was considerable overlap between these two groups. However, the methods used for the two groups differed somewhat and thus will be discussed separately below.

2.2.2.1 Non-Native Persons

Early in the project, the contractor was provided with an initial list of thirteen persons known to the members of the Contaminants

Committee, who, it was believed, would be able to provide valuable information for the study. This list was later supplemented by further suggestions from Committee members, by persons known to the contractor and by persons recommended by the initial interviewees. Of the thirteen persons originally identified, eight were interviewed; three resided outside the Territory and were not contacted; one declined to be interviewed; and one was deceased.

It soon became apparent that the main difficulty would be to limit the number of persons to be interviewed, given the constraints of time and money. In selecting prospective interviewees, the following factors were taken into account:

- the length of time that the person had been in Yukon [the period 1940 - 1970 was to be concentrated upon, according to the contract];
- the area in which the person had worked [the southern lakes area was the chief region of concern];
- the type of activity engaged in [a representative mix of industrial activities was sought];
- the present place of residence [persons residing in Yukon were approached in preference to those living outside]; and
- the present health of the individual [since most interviewees were well advanced in years, an attempt was made to ascertain their general level of health before they were approached].

In this category, formal interviews were conducted with twenty-five people [with, in several cases, the participation of spouses]. In most cases, interviews were conducted in the homes of the interviewees, but other venus included a restaurant and the interviewee's work site. Summaries of relevant information gained from these interviews are presented in Appendix A. Others were also contacted and many of these provided valuable leads or background information, though formal interviews were either impossible or deemed unnecessary. These persons are included in the reference section. For completeness, it should be noted that the contractor has an equally long list of persons who, though they may well have valuable information, were, for one reason or another, not contacted during the course of this study.

Wherever possible, [and with the consent of the interviewee], a tape recording of the interview was made. Sometimes, due to back ground noise, problems with equipment or the preference of the interviewee, written notes had to suffice.

A questionnaire [see Appendix D] was drawn up as a guide for the interviewer. Following a general explanation of the purpose of the research, the interviewee was asked to describe, in general, his/her work history. Either during this narration [which could easily take two hours] or after it, more specific questions about the substances of concern were posed. Although the questionnaire provided some structure for the conversation, it was considered very important, both for the quality of information and for the well being of the interviewee, that the dialogue be allowed to flow naturally. It was borne in mind that these elderly persons were being asked to give of their own time to talk to a relatively young stranger about matters that they may not have thought about for years. In some cases, those matters may, if not treated properly, prove uncomfortable for the interviewee, given the present climate of concern about environmental contaminants. Every effort was therefore made to put the interviewee at ease and this often involved discussions of matters not directly relevant to the study. This conversational style of interview is evidenced by the rather rambling nature of some of the summaries in Appendix A.

2.2.2.2 First Nations Elders

The contractor was advised that the appropriate method for obtaining First Nations input was to deal through the CYI representative on the Contaminant Committee who recommended that the Project Team manage directly with the environmental advisers from each Yukon First Nation. A list of those advisers was provided to the contractor on December 3, 1992. At this time, CYI held a meeting with the advisers. It is understood that an explanation of the study was given and the willingness of the bands to participate in the project was canvassed in a general way. In the following two weeks, each of the environmental advisers was contacted by the contractor to ascertain the band's willingness to be involved. A meeting between the Project Team and the environmental advisers, originally scheduled for December 17, 1992 was eventually held on January 8, 1993. A summary of the project with information about the substances of concern was drawn up and distributed to each band. A number of modalities for YFN participation in the project were suggested. Following the meeting, each band was again contacted by the contractor and further written clarifications of the project and the type of information sought were distributed. These dis-

cussions led to the following results:

- five First Nations invited the Project Team to a meeting with selected elders to receive their input;
- one First Nation suggested an elder that the contractor should contact individually [in the event, the elder in question was unavailable, but recommended another person who agreed to be interviewed];
- four environmental advisers carried out the work themselves under subcontract, interviewing elders according to guidelines set out by the contractor, and reporting results; and
- five First Nations were unable to participate in the study due to other commitments.

Because of the important role of Atlin Lake and surrounding areas in the Yukon watershed, and the close ties between the economic and social life of Atlin to that of Yukon, the contractor met with the elders of the Taku River Tlingit in Atlin, BC.

Summaries of relevant information from ten First Nations are given in Appendix B.

2.2.3 Task Three: Literature/Archival Search

Background information and follow up research on issues identified through interviews, were collected in a number of ways.

The Yukon Archives provided valuable information in several areas. The years 1938, 1954 to 1966 inclusive, and 1970, of the Whitehorse Star were reviewed in detail. Corporate and governmental [municipal, territorial and federal] files were studied, including old maps. Several rolls of microfilm of the US Army records were examined.

Also, past and recent files were studied at the offices of Fisheries and Oceans, Environmental Protection and Communities and Transportation Services.

Many reports and articles, past and recent, were located [and ordered when necessary], and reviewed. In many instances these are referenced in the text.

Several reports, letters and diaries were borrowed from the Yukon Anniversaries Commission which proved to be very interesting and helpful.

A great deal of relevant data was gleaned through these sources, as well as providing the Project Team with a greater understanding of the era the project was to focus on.

Several incidents raised by interviewees could not be substantiated with available information; nonetheless, several interviewees confirmed each other by independently raising the same issue[s]. Where practical, an archival/literature search was carried out on specific issues and incidents raised in the interviews.

3.0 HISTORICAL OVERVIEW

The following paragraphs give a summary of the historical context in which the transport, use and disposal of contaminants are considered in this report. Emphasis is placed on those events which may have involved the use of the substances under consideration. For this reason, an entire section is devoted to the military and industrial construction projects of the 1940's.

3.1 Yukon Economic Development

Archaeological evidence indicates that the aboriginal peoples of Yukon used its renewable resources for many thousands of years. This activity was largely for subsistence purposes, although some trade was carried on with residents of the Alaska coast. The technologies employed changed very slowly over time and the impact on the resource and indeed on the entire ecoregion, was minimal.

With the arrival of non-native traders in the mid nineteenth century, and more particularly of the non-native hunters, trappers, fishermen and outfitters, the pace of change sped up considerably. New technologies: rifles, log and frame building, snowmobiles, steel traps and even airplanes were introduced and the emphasis shifted from a subsistence to a cash economy. The concept of outfitting [arranging a hunting, fishing or wilderness observation experience for a client in exchange for cash] was developed and government licensing and regulation of all these activities was imposed. Nevertheless, the impacts of these activities lie largely outside the subject matter of this report, both because they have made little use of the chemicals under consideration here and because they have tended to be relatively small business ventures, depending more on the labour of a few individuals than on the horsepower of mechanized equipment.

With some notable exceptions, industrial activity in Yukon has been characterized by brief periods of intense activity followed by long periods of stagnation, the classic "boom and bust" phenomenon. Naturally, the "booms" have been accompanied by massive influxes of population, new technologies and attitudes and by many desperate schemes to profit from the momentary availability of easy money. They have been followed by the withdrawal of workers, and the onset of a climate of restraint or even recession. As will be noted in the following discussion, this cycle has been a significant factor in the management of the contaminants studied in this report.

The first "boom" in Yukon resulted from the discovery of placer gold on Henderson Creek in 1896. The ensuing rush of gold seekers led not only to the construction in just over a year of the White Pass and Yukon Railway, but also to the establishment of regular riverboat service on the Yukon River; to the excavation of the Yukon Ditch which brought water to the Klondike Valley from the Ogilvie Mountains for the purpose of mining; and to the installation of the North Fork power plant for the electrification of the dredges in the area. In the space of three or four years, the junction of the Klondike and Yukon Rivers became the hub of an industrial district and of a major transportation corridor.
The impact of this first "boom" was, of course, immediate and enduring. In terms of the use of chemicals, it should be noted that the haste with which many miners operated, haste engendered by the stiffness of the competition, the shortness of the mining season, the lack of water and the need to pay off creditors; often led them to use large amounts of mercury in order to maximize gold recovery [see Section 4.3].

As the gold rush dwindled and many miners departed, more and more claims were bought up by the Yukon Gold Corporation [later the Yukon Consolidated Gold Corporation YCGC]. Their larger holdings made it feasible for the company to operate dredges. This it proceeded to do, in the process becoming the largest and most stable private sector employer in the Dawson area over the next sixty years. The power requirements of the dredges were supplied by the North Fork plant. High voltages were used, and a step-down transformer was required at each dredge. As discussed in Section 4.2, the equipment largely predated the advent of PCBs [aroclors] and as a result, the total amounts of PCB associated with this project were limited.

The period 1900 - 1940 may be described as a period of relative industrial stagnation. Yukon Gold Corporation gradually consolidated its hold on the major gold bearing creeks in the Klondike area and continued to operate its dredges. A number of short-lived hardrock mining ventures in the southern lakes area such as Engineer and Conrad, provided "mini booms", but did not produce

the Yukon began in 1926 [Belton, 1989]. In the early 1920's, Whitehorse was becoming a tourist resort and Eric Hearle was invited to advise the Community on methods for dealing with the hordes of mosquitoes. He found that Whitehorse's problem was caused by snow pool mosquitoes and recommended systematic oiling of pools containing larvae [Hearle, 1927]. This forms a film over the surface which blocks the oxygen supply to the mosquito larvae. Mr. John Scott [No.16] stated during our interview with him, that used motor oil was commonly spread on the local ponds for insect control. This technique to control larvae and pyrethrum to control adults was probably used until the end of the Second World War. Other methods of control were smudges [No. 25, No. 3], head nets [No. 25], bed nets [No. 16], and citronella [No. 19]. Screening on windows and porches was no doubt common.

Due to the development of effective and persistent synthetic insecticides, studies were conducted in the late 1940's regarding their use for black fly control. In July 1948, van Steeburgh and Twinn [unpublished report referred to in Hocking, 1950], applied five drums of 5% DDT [in kerosene] directly into the Lewes River [now Yukon River] from the dam at Marsh Lake. Fourteen hours later several known infested areas were re-examined 15 and 20 miles below the site of application. All larvae had disappeared from grasses and vegetation in the swift water and only the pupae remained. This was the largest river that had been successfully treated by ground application in Canada up to that time [Hocking, 1950].

In 1949, Hocking [1950] conducted field experiments on a number of streams between Whitehorse and Carcross for controlling black flies in the larval stage using technical grade DDT, parathion, gamma benzene hexachloride, methoxychlor aldrin, dieldrin and 1,2,4-trichlorobenzene. DDT, in oil solution, which was applied to the Watson River near Robinson on the Carcross Road, was found to be the most satisfactory insecticide. Experiments were also conducted to determine the effects of the various insecticides on other aquatic arthropods and it was concluded that the insecticides were not selective to black fly larvae only. Crustaceans appeared to be the most resistant although toxic effects were noted. DDT, benzene hexachloride and parathion were also tested on fry and adults of several local species of fish. They discovered an absence of any immediate permanent effects at the dosage required to kill black fly larvae, and found this fact very encouraging for future applications of these insecticides [Hocking, 1950].

In the summers of 1949 and 1950, an entomologist, Colin Curtis of the Medical Entomology Laboratory in Kamloops, B.C., was invited to Whitehorse to study the biology of the local mosquitoes. In conjunction with this, experimental aerial spraying with DDT to control mosquitoes was carried out at the Royal Canadian Air Force [RCAF] stations of Whitehorse and Watson Lake in 1949 and 1950 [Sharp, 1952]. In 1949, Twinn et al [1950] conducted aerial spraying with DDT concentrating on larvicide applications. A Douglas Dakota aircraft was used to apply the DDT and domestic fuel oil solution. In Whitehorse, 3125 acres were sprayed with an average dosage of 0.22 pounds of DDT per acre. In Watson Lake, 6400 acres were sprayed with an average dosage of 0.25 pounds of DDT per acre. Mortality of mosquito larvae in the sprayed areas averaged 91%. Where pupae were present, many survived. The effect of spraying on other insects was noted: water beetles and their larvae, water boatmen, and immature dragonfly and mayfly nymphs, suffered heavy mortality. However, many of the more mature nymphs of dragonflies and mayflies survived.

In 1950, two applications of DDT were made in Whitehorse, June 13 to 15 and June 30 to July 1. An area five miles long, with the Lewes River [now called the Yukon River] on the east boundary, extending approximately 2 miles west was sprayed, treating an area of 11 square miles [Figure 1]. To guide the pilot on his runs, fluorescent panels were held up on two poles in open areas, and in treed or obstructed areas, smoke bombs or smoke puffs were set off. A tear shaped turn was made at the end of each run and it can be assumed, although it is not specified in Sharp's report, that emission of DDT would be stopped during this manoeuvre and started once the plane was over the appropriate marker. However, with wind and drift it can also be assumed that some amount of DDT would fall directly into the Yukon River during these applications. Also run off from contaminated soils would enter the Yukon River.

The Watson Lake RCAF Station was sprayed once in 1950 on June 21 and 22 treating an area of 12 square miles. The lake of Watson Lake was in the centre of the area sprayed. The sections of the run occurring over the major portions of the lake, were not sprayed with DDT. However, the west area of the lake

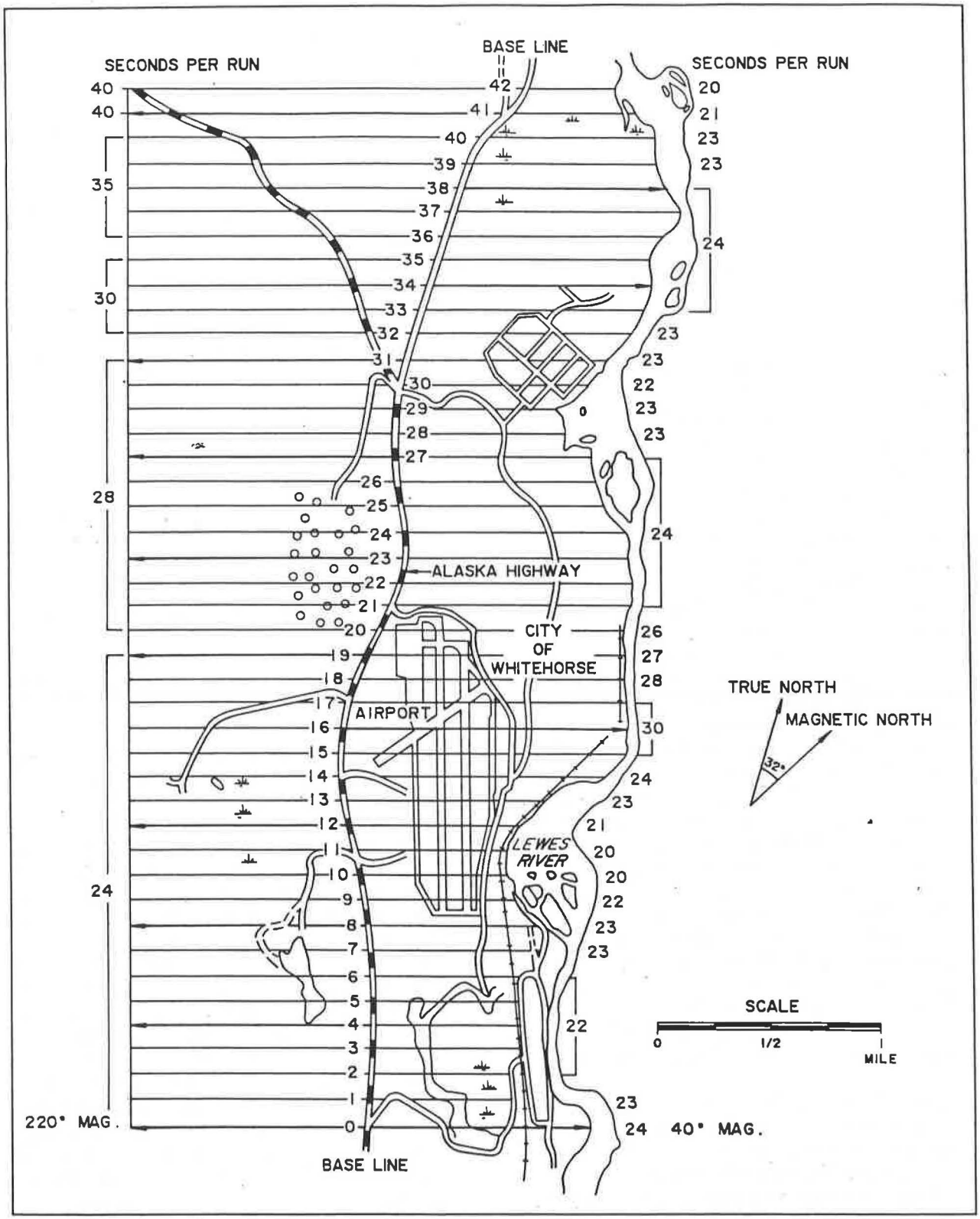


Figure 1 : Whitehorse area spray plot layout showing the marker numbers and the direction and emission period of each run. Taken from Sharp, 1952, page 285.

was included in the spraying program. Again it can be assumed that due to drift, some DDT would also directly enter the lake, as well as through surface run off.

Both spraying programs were regarded as a success as mosquitoes were not a problem after the applications. An average dosage of 0.23 pounds of DDT per acre was applied.

The RCAF continued this mosquito control program from 1951 to 1963 providing two aerial applications of DDT each season to areas around Whitehorse and Watson Lake [Belton, 1989].

No Department of National Defense [DND] files could be located to determine amounts used, number of acres sprayed, and when or if other communities were included in the spraying program during the years 1951 to 1963. There may be some files available in the National Archives in Ottawa pertaining to the spraying program. Limited information was obtained from issues of the Whitehorse Star. For example, in the May 26, 1960 issue, a headline reads "**Hurray! RCAF to Chase Pesky Bugs**". The article goes on to say that the Air Force would bring up a specially equipped plane to spray areas from the Boy Scout camp on Marsh Lake to McLean Lake and north as far as the Fish Lake Hydro site. Notice would be given over the radio to warn residents to cover up cars or boats which could be spotted by the DDT spray. Likewise, when ground fogging was to be conducted, announcements of the time and areas to be sprayed were made to enable residents to bring in their laundry, cover up their vehicles [No. 9, YFN-6] and to keep their children indoors [No. 4]. Children were to be kept indoors not because the fog was toxic, but because the driver's visibility would be affected from the fog preventing a clear vision around the vehicle. Nonetheless, children would always run after the fogger [No. 3].

Generally, the public was very supportive of the DDT spraying program but a letter appeared in the Whitehorse Star on June 24, 1963 protesting the aerial spray program. A Whitehorse resident asked on whose authority insecticides were being sprayed over his house when he had not given anyone his permission. He also wanted to know what chemical mixture was used for the mosquito spray and was concerned that numerous applications may have a cumulative effect which could be harmful.

In 1962, DDT was accidentally sprayed on to McLean Lake and a partial fish kill resulted [Walker et al, 1973].

DND officially turned over operations to the Department of Public Works [DPW] on April 1, 1964. With this went the responsibility for the aerial spraying program for insect control, which the RCAF had been conducting since 1951. Money was not allocated in that year's Yukon Territorial budget for insect control and it was announced that no spraying would occur in Yukon for the spring/summer of 1964 [Whitehorse Star June 1, 1964]. However, ground fogging would be continued in certain areas as DPW had one fogging unit. Forty thousand Tossits [gelatin covered capsules containing a DDT and Lindane mixture] were purchased and given to the Yukon Forest Service for use as a larvicide in stagnant ponds. The City of Whitehorse also distributed their share of Tossits on stagnant ponds in the Whitehorse area.

Commissioner G.R. Cameron stated in the Whitehorse Star, June 1, 1964, that special care was being exercised in using the capsules, which cover 750 square feet of water, as they are toxic to fish. Mr. G.I. Cameron [No. 2] and Mr. Kennedy [No. 14] recalled using Tossits capsules on stagnant ponds as part of their jobs.

The public reacted unfavourably to the cancellation of the aerial spray program and hundreds of protests were phoned into City Hall and many editorials were written in several issues of the Whitehorse Star. Arrangements were made with DPW to rent their fogging unit and the City would be fogged twice a week until the end of August to try and keep the swarms of mosquitoes under control. After receiving a report from the Yukon Chief Medical Health Officer Dr. Dave Kinloch, stating that many people are allergic to multiple mosquito bites, [two young children were hospitalized due to infected bites] and that therefore spraying is a necessity, Commissioner G.R. Cameron decided to spend the required money to conduct the aerial spraying program. Airspray Limited of Edmonton Alberta received the contract to spray the DDT and diesel fuel mixture to the communities of Whitehorse, Watson Lake, Teslin, Carcross, Haines Junction, Beaver Creek, Carmacks, Mayo and Dawson City [Whitehorse Star, June 18, 1964]. The solution was 1/12 DDT and 11/12 #2 fuel oil applied at a rate of 1 gallon per acre [Nelson, 1977].

In 1965 Elsa, Keno and Calumet were added to the communities to be sprayed. Twenty-

eight thousand Tossits were ordered for use by the Yukon Forest Service. The Canadian Wildlife Service advised against the use of Tossits because of the possible environmental contamination by the two active ingredients, DDT and Lindane. Commissioner Cameron cancelled the Tossit program in May 1965 [Nelson 1977]. Concerns were raised by the Federal Department of Fisheries of the use of insecticides in and near lakes that the Fisheries Department had stocked with fish. Concern for the preservation of wildlife was raised by the Yukon Fish and Game Society indicating that the use of DDT should be abolished in Yukon Territory.

In 1966, Baytex was introduced as a larvicide for use in and near fish bearing waters. DND forbade the use of Baytex on their property and allowed only 10% DDT to be used as a larvicide. DDT was used mixed with fuel oil for the adulticiding program.

A bill to ban DDT was introduced in the U.S. Senate in July 1966. The U.S. Forest Service was to discontinue the use of DDT in forest insect control operations in 1966 and other chemicals such as malathion, zectrar and pyrethrins were to be tested [Yukon Archives file #YGRI, insect control].

The new town site and mining areas of Faro were sprayed in 1967. Also, 335 acres at Marsh Lake were added to the program. Old Crow was shipped a swing fog fogger and 65-20 Mathane Fogging oil concentrate to help combat their mosquito problems. The RCMP detachment accepted responsibility for the fogging operations. In June, the lake margins of Wye Lake were inadvertently sprayed with DDT which killed 75,000 rainbow trout eggs that were in incubation boxes in the lake [Walker et al, 1973].

In 1968, the community of Clinton Creek was added to the list of areas to be aerially sprayed. Due to the growing controversy surrounding the use of DDT and Baytex, the new commissioner Jim Smith contacted the Canadian Department of Agriculture to determine the feasibility of using the less persistent organophosphates Abate and Malathion for their aerial control program. Larvaciding using one ounce of Abate 4E per acre mixed with water was aerially applied in May. After a concern was raised about the possibility of Malathion damaging automobile paint, it was replaced with DDT for adulticiding. Both the Carmacks [YFN-8] and Laberge [YFN-6] bands commented on the fact that vehicle paint peeled after spraying had occurred. It is not known if the spray on these occasions was DDT or malathion. Dead song birds were reported in Dawson after spraying insecticide that summer [YFN-2].

In 1969, Abate 4E was applied on the first aerial application in May. The second application was a 15% solution of DDT in diesel oil. In November 1969, the Canadian Wildlife Service announced that the use of DDT would be discontinued for future mosquito control programs in Yukon Territory.

The above data regarding amounts of DDT applied and the areas aerially treated, are presented in Table 1. During the years 1949 to 1963, 35,148 pounds of concentrated DDT were sprayed onto Yukon lands, mostly in the Whitehorse area, and during the years 1964 to 1969, 4,508 gallons of concentrated DDT were sprayed over Whitehorse and other communities of Yukon. In metric terms this is equivalent to 15,817 kilograms and 20,511 litres of DDT respectively. These figures do not take into account the amount of DDT that was applied through ground fogging methods as that material is not available. It is not known whether the areas sprayed from 1955 to 1963 could have increased over the years. The Ta'an Kwach'an Dun [YFN-6] indicated that spraying in the 1950's did go as far as Shallow Bay, but no information on the number of acres sprayed could be obtained.

In 1970, Abate 4E and Cythion [95% technical grade malathion] were used. The Cythion was applied at a rate of 3 undiluted ounces per acre over populated area and 5 ounces per acre over unpopulated areas, using the Ultra Low Volume [ULV] technique. The Yukon Territory was the first major user of the ULV technique in Western Canada [Nelson, 1977].

From 1971 to 1985, Abate and Malathion were used in various forms [liquid and granules]. Vectobac, a microbial insecticide, was introduced in 1985 on an optional basis as a larvicide. The bacteria *Bacillus Thuringiensis israeliensis* [Bti] is impregnated on crushed corn with a paraffin coating. When consumed it causes toxic effects and is very efficient at destroying mosquito and blackfly larvae. It appears to have no hazardous effects to humans, animals, birds, bees, fish or to predatory or parasitic insects [Adams, 1990]. However, Vectobac [Bti] has been shown to cause significant reductions in the populations of Corynoneura, a genus of the family Chironomidae [Morrow Engineering Ltd, 1984]. These small organisms [less than 1 mm long] are one of the most important food

TABLE 1
ESTIMATIONS OF DDT AERIALLY APPLIED IN YUKON

Year	Amount Used/Acre	Total Acres Sprayed DDT Applied	Amount of Concentrated
1949	0.235 lb	9,525	2,287.5 lb
1950	0.23 lb	21,660	4,981.8 lb
1951	?		
1952	?		
1953	?		
1954	?		
1955	0.22 lb	14,080	3,097.6 lb
1956	0.22 lb	14,080	3,097.6 lb
1957	0.22 lb	14,080	3,097.6 lb
1958	0.22 lb	14,080	3,097.6 lb
1959	0.22 lb	14,080	3,097.6 lb
1960	0.22 lb	14,080	3,097.6 lb
1961	0.22 lb	14,080	3,097.6 lb
1962	0.22 lb	14,080	3,097.6 lb
1963	0.22 lb	14,080	3,097.6 lb
1964	8.3% DDT / 1 gal	13,109	1,088.05 gal
1965	10% DDT / 0.25 gal	13,940	348.5 gal
1965	15% DDT / 0.2 gal	13,940	418.2 gal
1966	10% DDT / 0.25 gal	14,342	358.5 gal
1966	15% DDT / 0.2 gal	14,342	430.3 gal
1967	10% DDT / 0.25 gal	15,842	396.1 gal
1967	15% DDT / 0.2 gal	15,842	475.3 gal
1968	15% DDT / 0.2 gal	15,842	475.3 gal
1969	15% DDT / 0.2 gal	17,240	517.2 gal

Note: In the years 1964 to 1969 DDT was mixed with #2 fuel oil

Assumptions: the acreage from 1955 to 1963 did not increase

The above information is taken from Sharp (1952), Nelson (1972),Nelson (1977) and Yukon Archives File # YRGA 59 V 4 F 7

items in the early feeding of coho, chinook and trout fry [Mundie, 1985]. Consequently, DFO has requested that Vectobac not be applied to any water bodies or tributaries to water bodies that support fish populations.

The use of Vectobac gradually increased [use of Abate decreased] until in 1992 Vectobac was the only larvicide used in the mosquito control program. Abate is still in stock at the YTG mosquito control storage facility and can be applied on request. Vectobac is a good larvicide but if the larvae are older, Abate is more effective and sometimes a combination of the two are applied [J. Janzen, pers comm]. Malathion [organophosphate] and/or Propoxur [carbamate] were used as the adulticide throughout this period. Malathion has been replaced by Propoxur in recent years due to concerns raised by DFO regarding the sensitivity of fish to Malathion [J. Janzen, pers comm]. Adulticiding is usually conducted on a per request basis, providing that the participating community has a certified applicator to do the spraying. The ground fogging equipment and insecticide would then be issued.

As well as insecticide application to communities, it was also available to other users. DDT was readily available in drug and hardware stores in the 1950's and 1960's and could be purchased in liquid form for household and garden use [No.4, No. 17] applied in a hand held sprayer. Elders with the Liard First Nation [YFN-5] said that the public health nurse would issue DDT for the treatment of lice. DDT was routinely supplied to the highway maintenance camps [No. 16]. It would be ordered when lube oil, etc was ordered and would arrive in the same shipment. It came premixed in barrels, 5% DDT with kerosene, and would be applied with foggers, truck mounted and hand held [No. 16].

Cecil McLennan [No. 17] said that DDT was used to spray tents in survey and construction camps when he was involved with the building of the Robert Campbell and Dempster Highways. However, it was not supplied and had to be purchased from local drug and hardware stores. They also used a substance called Buhac which was a brown powder. A tablespoon was placed into a used tobacco tin, for example, and lit. The resulting smoke killed the mosquitoes, similar in use as mosquito coils today. Ed Whitehouse [No. 25] remarked that a yellow powdered insecticide was used at Ogilvie camp, which smouldered on a stove. No information could be found on the chemical composition of these substances.

Ground fogging could also be done on a request basis and areas such as Camp Yukon, Marsh Lake and the sites of fishing derbies would be treated [No. 4, YFN-7].

4.1.1.2 Transportation

In 1949, one 45 gallon drum each of DDT concentrate, which was prepared in the laboratories of the Defense Research Board Suffield at Ralston, Alberta and at Ottawa, Ontario, were shipped to Watson Lake and Whitehorse. At each of the airfields, the DDT concentrate was mixed with 455 gallons of domestic fuel [Twinn et al, 1950].

In the early spring of 1950, a 30% [by weight] DDT concentrate in Velsicol AR-50 was shipped in 45 gallon drums to Whitehorse and Watson Lake to be used in the experimental aerial spraying program [Sharp, 1952]. There are no records of how many barrels were shipped to each site, or the mode of transport, or from where they were sent. It is assumed they would have been shipped via ground transport up the Alaska Highway. As Mr. Marvin Taylor [No. 22] indicated in his interview, there were no dangerous goods transportation rules then and any such material would have been classified as general freight. It would be next to impossible to hope to obtain any waybills that reveal how many barrels of DDT were shipped to Yukon every year from 1949 to 1969.

Mr. Ed Chambers [YFN-5] had his own trucking service and recalls hauling insecticide which was to be sprayed around the Whitehorse area in roughly 1974 or 1975.

4.1.1.3 Disposal

Prior to the known detrimental effects of organochlorine insecticides, the disposal practises consisted of depositing any unused portions into the local community dump. DDT was regularly disposed into the Range Road Dump and commonly to the Yukon River [No. 4]. On occasion, leftovers in the forty-five gallon drums would be dumped onto the ground at the site of 17 Works, which was located behind Whitehorse Elementary School [No. 4].

As an indication of the potency of pesticides, a letter dated October 10, 1972 from Fisheries to the Whitehorse Planning Board, Garnet Jones, the District Supervisor of Fisheries complained about the McIntyre Creek diversion constructed in the fall of 1971 at the Range Road Dump, as not being sufficient to go around the garbage. He stated that if even

one can of flea powder for domestic pets were to come into contact with McIntyre Creek, every fish in McIntyre Creek could be killed as well as the fish in a good portion of the Yukon River to Lake Laberge [YA Vol 978, File 2].

It is not known what the DDT disposal practises of the RCAF were in the years 1951 to 1963, but it can be assumed that any DDT that was not saved for the following year was deposited into the Range Road Dump, and/or one of their military dumps [Granger, Hillcrest].

At present, there is only one known dump of several barrels containing DDT. This was brought to the attention of Bob Allan, Environmental Protection, Whitehorse, in November 1992. A retired military person, formerly in charge of the Alaska Communications System was responsible for closing the Compressor Station at Rainy Hollow in the late 1960's. During closure a trench was excavated on the downstream end of the airstrip. [The airstrip is within 150 feet of Kluhini River.] The trench was approximately 10 feet deep and 15 feet wide. He noticed approximately 20 to 30 units of 2.5 gallon olive coloured metal containers of DDT in the trench. He took 2 or 3 of these for his personal use. Two new drums of unknown contents were also in the trench. Garbage and other camp waste may also have been dumped here. The trench was subsequently buried at some later date and apparently the site has revegetated. This information is contained in File 4330-1 at Environmental Protection, Environment Canada, Whitehorse. This parcel of land was transferred to B.C. Lands several years ago and the B.C. Ministry of Environment has been notified and will be investigating this site in the summer of 1993.

It is rumoured that barrels containing DDT are in Watson Lake. Fraser Burrard Diving Ltd. of Richmond, BC was contracted to survey Watson Lake including the existing barrel dump. No testing of any contents of barrels was made, so it is unknown what substances may be contained in any of the barrels [EP file # 4186-3-21].

During 1988, Environmental Protection sponsored a hazardous waste collection day. The public and private companies were encouraged to drop off any hazardous materials they may have had in storage, which would then be properly disposed of. Forty-seven one gallon metal cans containing Tossits [12.5% DDT, 4.5% Lindane] were collected from the City of Whitehorse. These probably were the Tossits which were ordered in 1965 but were never used when the Canadian Wildlife Service advised against it. These tossits were then packaged appropriately and transported properly to Tricil Environmental Management in St. Catherines, Ontario in December, 1988 and were safely disposed.

Generally, any left over stocks of insecticides [Abate, Malathion, Propoxur, and Vectobac] are stored in the YTG Whitehorse Storage facility and used the following season. In the late 1970's and early 1980's, unused insecticides were stored in the communities, in their maintenance garages, warehouses, or calcium storage sheds.

It states in the Mosquito Control Program reports of 1986 [Morrow] and 1988 [D.G. Regan and Associates Ltd] that old stocks of insecticides were incinerated in the waste oil furnace at Highway's Maintenance Shop in Marwell. A memorandum from Environmental Protection [dated May,1985] approved this disposal practice. [EP File # 4428-1.] Presently there are old stocks of 5% malathion mixed with diesel at the Mosquito Control Storage Shed which are gradually being disposed of by burning in the waste oil furnace [R. Lamb, pers comm].

In the past several years, due to the high cost of insecticides, all unused stocks are stored and used the following season [J. Janzen, pers comm].

4.1.2 Herbicides

4.1.2.1 Use

There is scant documented use of herbicides in Yukon. Small quantities of herbicides were/are used regularly in garden and agricultural practises [White, 1986]. No attempts were made to quantify this.

Presently, Yukon Electric Company is the main herbicide user. For the past 20 years, Urebor and Monobor Chloride are used once a year to treat their 14 substations for weed and grass control. The herbicide acts as a super fertilizer. Three to 4 weeks after treatment the growth at the substations is very green, then the vegetation quickly dies off [No. 8].

Northwestel uses mechanical means for brush control at their microwave sites. Spike was used on one occasion at one location in 1980 as a trial run but the continued use was abandoned. Otherwise no herbicides have been used in the past 15 years [A. Ilsuk, pers

comm]. No brush control is required at the remote microwave sites as these locations are usually barren.

In 1988, Environmental Protection received approximately 180 litres of 2,4,5-T from Northwestel [EP file # 4663-8-1, Vol 2]. It was surmised that this was probably left over from the original days of CNT and the Alaska Highway in the early 1950's [A. Ilsuk, pers comm].

CBC used Roundup six years ago at the Whitehorse repeater site as a trial. Roundup should be applied two years in a row to prevent plant growth but there was not enough money for it to be done the following year. By the next year the brush had grown considerably and had to be brushed out before Roundup could be applied again. But the year following this, again there was no money so the program was cancelled. Initially the idea was to use Roundup at all of the 13 repeater sites of CBC North. Once the brush was killed, the sites would be replanted with a grass mixture which would hopefully keep the brush choked out. At present all sites are mechanically cleared [E. Garret, pers comm].

Several people interviewed, [No. 7, YFN-1, YFN-5, YFN-6, No. 16, No. 14], claimed that herbicides were used for brush control on the Alaska Highway right-of-way in the 1950's. No documentation could be located to substantiate this. Mr. Magnuson [No. 16] said the equipment was at Highways when he started in 1960 but was never used during his time. This piece of equipment was used for brush control, but diesel fuel was sprayed from the boom, which is an effective brush killer [J. Janzen, pers comm]. Apparently at some point in the 1950's a unit, probably from the military base at Fort Nelson, sprayed herbicides for brush control along the length of the Alaska Highway as a "one shot deal" [A. Porsild, pers comm]. No documentation on this activity could be located and Mr. H. George, a senior employee with the Department of Highways during the 1960's, could not confirm the practice. Mr. Gordon Eftoda of Communities and Transportation Services does not think herbicides were ever used on the highway right-of-ways. They did an in-depth study recently on the use of herbicides for brush control as part of their maintenance program but after careful consideration, decided not to use chemical means.

Elders with the Liard First Nation [YFN-5] indicated that the Yukon/BC border was sprayed with herbicides some time in the 1960's but no documentation could be found to validate this.

White Pass has historically used mechanical means to control brush along the tracks and the pipeline right-of-way from Skagway to Whitehorse. Some herbicides have been used occasionally on the American and B.C. portions, but 1992 was the first time herbicides were used on the Yukon section. Roundup was applied from the B.C.-Yukon border to Cowley with Yukon's permission and following the B.C. rules and regulations for pesticide handling and application.

Herbicides have been used on the Haines-Fairbanks pipeline. In a letter dated April 9, 1968, Col. Raymond P. Rugani of the U.S. Army in Alaska requested Yukon's permission to use Fenuron for brush control on the Canadian section of the Haines-Fairbanks pipeline right-of-way, as they were unable to procure 2,4-D or 2,4,5-T due to the war in Vietnam. Mr. J.B. Fitzgerald, Director of Fish and Game responded saying they would prefer 2,4-D to be used, however if it could not be obtained they had permission to use Fenuron [YA file YRGI,S9,F4]. Rod Tait [No. 21] said that Bennett Airways out of Fairbanks, Alaska, was contracted to apply growth retardant along the pipeline. He thought 2,4,5-T was the herbicide used. Mr. Johnson [YFN-3] found documentation in the archives in Anchorage, Alaska on the use of 2,4,5-T on the pipeline and Alaska Highway right-of-ways. However, DIAND believes that Tordon 101, was the only herbicide used on the Haines-Fairbanks pipeline right-of-way [L. Gay, pers comm]. Tordon, active ingredient Picloram, is very persistent in soils [a number of years] especially in cool dry areas, but it has a low toxicity to fish and wildlife [Adams, 1991].

Mr. Tait [No. 21] thought it was likely that 2,4-D was used in the 1950's at the experimental farm near Haines Junction. Herbicides were not applied during his time at the farm during the 1960's. He also believes that 2,4,5-T was applied on a pasture at Mile 1017.5 some time in the late 1940's.

The herbicide 2,4,5-T, applied by an individual with a hand pump, was used to keep the brush down along the North Fork Ditch near Dawson [No. 24].

4.1.2.2 Transportation and Disposal

Little information on the transportation and disposal of herbicides could be procured. It was assumed that discarded containers would have ended up in local garbage dumps.

4.1.3 Piscicides

4.1.3.1 Use

Piscicides were used on a limited basis in Yukon to kill resident fish stocks in selected lakes so that they could then be restocked with desirable sports fish, usually rainbow trout. The substances used were toxaphene and rotenone (Walker et at, 1973). Rotenone is a botanical made from the roots of several members of the pea family and is the only registered piscicide at present [Adams 1990]. Table 2 presents data on the lakes, chemicals and amount used [where known] and dates applied.

Prior to the days of electro shocking equipment, rotenone was also used as a sampling technique. During studies conducted by Fisheries in May 1959, rotenone was applied to side channels of the McClintock River to a distance of 1.5 miles upstream of the Alaska Highway bridge. In June, 1959, all suitable side channels of McClintock River were sampled with rotenone to a point 1,000 yards upstream of the confluence with Michie Creek. Sampling was also conducted to approximately 0.5 miles downstream from the outlet of Michie Lake [DFO report, 1960]. The rotenone would kill the fish which would then be caught, identified and sampled for scales, etc.

Rotenone was also used as a sampling technique in Jackson Lake [then known as Louise Lake]. It was applied just above the control gate at the outlet of Jackson Lake in July, 1960, which killed over 200 fish between the outlet and 500 metres downstream [DFO report, 1960].

These are the only known uses of piscicides in Yukon [B. Lister pers comm, DFO files].

Toxaphene was used extensively in British Columbia in the 1950's and early 1960's as a fisheries management tool. Between the years 1950 and 1963 inclusive, 74 lakes were treated with toxaphene. Thirteen of these lakes were treated twice, several years apart [Taylor, 1993].

An article in the August 25, 1960 issue of the Whitehorse Star marvels at the wonders of this chemical toxaphene which was proving to be such a great lake rehabilitation device. **"It is effective and inexpensive [a fraction of the cost of rotenone]..... and within minutes of application the coarse undesirable dead fish begin to bob to the surface."**.

The primary use for toxaphene was as an insecticide applied topically to cotton plants and also to a lesser extent, to soybeans and peanuts. Prior to its ban in 1982 in the U.S., toxaphene was the most heavily used insecticide in the United States and many parts of the world. Toxaphene is still used in Africa, Mexico, South America and other countries. Toxaphene has a relatively high solubility when compared with the other organochlorines and could be present in run off from agricultural land where it was used.

TABLE 2

PISCICIDES USED IN YUKON LAKES

Lake	Date	Chemical	Amount
McLean	1960	Rotenone	170 litres
Hansen	1963	Toxaphene - lake	approximately 100 gallons of 0.006 ppm Copper Tox
		Rotenone: inlet & outlet	unknown
Wye	1966	Rotenone	6,959 lb of 5% Rotenone

Toxaphene is very persistent in soils and in lake sediments. It is similar to DDT in that it is soluble in lipids and accumulates in the fatty tissues of organisms. Toxaphene concentrations are higher in bottom feeding fish as they are relatively fatty fish who live and feed near contaminated sediments, increasing the potential to accumulate fat soluble contaminants.

Toxaphene has been found in burbot livers in Lake Laberge and in Atlin Lake in concentrations high enough that a health advisory was issued in May 1991, and March 1992, respectively. The next highest levels of toxaphene were found in fish sampled from Bennett, Marsh and Tagish Lakes. Levels were low in Fox, Teslin, Schwatka and Watson Lakes [J. Eamer, pers comm].

The high volatility of toxaphene allows it to be carried great distances by wind and is deposited as dry fall out or as precipitation. This is known as long range atmospheric transport. Zell and Ballschmiter [1980] discovered that toxaphene had been bioaccumulated by biota inhabiting regions hundreds and thousands of kilometres away from toxaphene usage. They have concluded that toxaphene contamination of fish is a global problem and the level of contamination in remote areas may exceed that of PCB contamination. Toxaphene has often been mistaken for PCB in the past due to similar results obtained when analyzed using low resolution gas chromatography. Rappaport and Eisenreich [1986] showed that atmospheric inputs of toxaphene are 2 to 4 times those of PCB's and DDT respectively.

The concentrations of toxaphene found in the fish from the lakes of concern were considered to be greater than levels that would have been anticipated from long range atmospheric transport.

A possible explanation of the higher levels of toxaphene in Lake Laberge is that sometimes toxaphene was another active ingredient in DDT insecticides [Saleh, 1991]. DDT was widely used in the Whitehorse area for 20 years [see section 4.1.1], and through run off and disposal practices, would eventually makes its way to Lake Laberge. However, this does not explain the high levels of toxaphene in Atlin Lake in conjunction with the low levels of DDT found in the fish here [unpublished data]. Further research is required to examine this complex issue.

4.1.3.2 Transportation and Disposal

There was no disposal of toxaphene from its only use at Hansen Lake. Careful calculations were made for the surface area of Hansen Lake and all of the product was applied [B. Lister, pers comm]. The toxaphene was ordered from the eastern U.S. and shipped to Yukon. Mr. Lister was also involved in the rotenone applications. This was purchased in powdered form from South America and shipped to Yukon. He does not remember by what means it was transported to Whitehorse.

4.2 PCB [Poly Chlorinated Biphenyl]

PCBs are a ubiquitous global contaminant. They were first prepared in 1881, but commercial manufacture began in the 1930's by chlorinating biphenyl under electrophilic conditions. In North America PCBs were exclusively made and distributed by Monsanto Chemical Company under the trade name Aroclors. Monsanto made 600,000 tonnes of Aroclors before PCBs were banned in 1975. They were marketed as a wonder chemical, for a variety of industrial applications [see Figure 2]. This includes many known and likely applications in Yukon Territory.

4.2.1 Use

How much PCB was used in Yukon before it was banned in 1975? In an attempt to answer this question, persons were selected for oral interviews who were involved in prewar, military, and postwar industries where PCB applications were likely used. In addition, Environmental Protection, Environment Canada [EP] files on PCB investigations and inventories were reviewed. Envirochem Special Projects Inc, was engaged to carry out a literature search and provide advice on possible PCB sources and pathways in Yukon. The research clearly showed that prewar use of PCBs in Yukon was very limited. The substance was not likely used in significant quantities until the wartime construction era.

The use of PCBs is discussed below in the context of its specific applications.

4.2.1.1 Electrical Transformers

Approximately 25%, or 110,000 tonnes of the PCBs manufactured in North America was used in electric transformers [Envirochem, 1993]. The trade names of PCBs used in

FIGURE 2





FOUND! Three industries that can't use Aroclors

Makers of Persian rugs, hand-made silver ornaments or Indian pottery haven't much use for Aroclors.* But, it's much simpler to list the few industries that *can't* use these products of Monsanto Chemistry, than it is to name the many industries that *can* use them.

Eighteen years ago, when Monsanto developed the first Aroclor, it was just a curiosity in a chemical laboratory. Today, the Aroclors comprise a series of more than 25 chemical compounds, serving scores of industries in hundreds of profitable applications.

Aroclors are heavier than water . . . possess great adhesiveness, especially on smooth surfaces . . . have remarkable penetrating power . . . are water repellent and flame resistant. Their ability to withstand extreme pressure is unusual . . . some have exceptional lubricity . . . all possess interesting electrical characteristics.

Pictured here are just a few of the ways Aroclors are being used by many manufacturers. As you study these applications, we hope you will ask yourself: "How can the Aroclors benefit *me?*" Then, we'd like the opportunity to help you find the answer.



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HERE ARE JUST A FEW OF THE INDUSTRIAL APPLICATIONS OF MONSANTO AROCLORS:



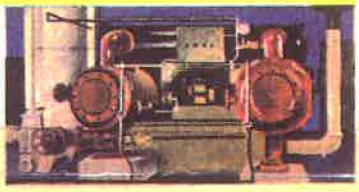
dhesive Coatings . . . Aroclors give unusu- l smooth-surface adhesiveness to pres- re-sensitive industrial and masking tapes.



Heat Transfer Medium . . . Aroclors do not separate at extreme pressures at high temperatures in liquid heat transfer equipment.



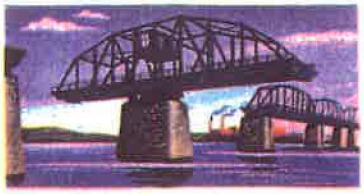
Power Transmission . . . Aroclors furnish unusually high torque power transmission in fluid drives for trucks, buses and ships.



High-Temperature Lubrication . . . Nonflammability of Aroclors is ideal for governor systems and heavy-duty air compressors.



reme-Pressure Lubrication . . . Use of Aro- rs in rolling stainless steel and chrome iron, prevents surface seizure and scoring.



Submerged Lubrication . . . Heavier than water, Aroclors are stable lubricants for bridge rollers and under-water equipment.



Flame Resistance . . . Used in combination with other materials, Aroclors impart flame resistance to cloth, paper, wood, asbestos.



Moisture Proofing . . . Aroclors combine readily with waxes, oils, resins, to produce moisture-resisting impregnating compounds.



yl Cellulose . . . **Nitro Cellulose** . . . Aroclors part weather resistance, luster, adhesion, xibility and decrease in burning rate.



Vinyl Resins . . . Compatible with all the vinyl resins, Aroclors are used to add many desired properties to finished products.



Rubber . . . **Rubber Substitutes** . . . Milled into rubber, Aroclors impart permanent tackiness and adhesion; also reduce brittleness.



Chlorinated Rubber Finishes . . . Used as plasticizers for chlorinated rubber, Aroclors add both toughness and flexibility; resist acid.



lastic Mold Lubricant . . . Use of Aroclors pro- ces great improvement in ease of molding; so in appearance of finished products.



Paints . . . **Varnishes** . . . Aroclors contribute excellent durability and varying degrees of flexibility or hardness in quick-drying paints.

What's YOUR problem?

This partial story of the Aroclors is typical of the way countless product developments have been furthered with the help of the many hundreds of Monsanto Chemicals and Plastics. . . . If you have ANY problem involving chemicals or plastics, just write or call the nearest Monsanto Office.

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MONSANTO
CHEMICALS—PLASTICS

transformers were Pyranol [GE], Inerteen [Westinghouse] and Askarel [Sprague]. This heavily chlorinated material was very viscous, and was therefore blended with trichlorobenzene to reduce viscosity and enhance convection circulation in the transformer. This use of a "cutting agent" made PCB transformer oil useful as a machine parts cleaning solvent and was sometimes salvaged for that purpose. PCB transformers varied in size and contained large volumes of free liquid with concentrations of PCB in the order of 650,000 to 750,000 ppm. They could contain up to 4000 kilograms of PCB. The Aroclors used was either 1254 or 1260 [54% and 60% chlorine by weight] [Envirochem, 1993]. A typical PCB transformer of this type is shown in Figure 3. It is known that many transformers of this type were used in Yukon because of the thorough auditing that has been done by the Yukon Electric Company and Environment Canada following the introduction of PCB regulations [Wilson, 1982]. The total population of PCB transformers that were not inventoried by Environment Canada would be made up of equipment used and subsequently demobilized by the military in the period 1941 circa 1946. This population will likely never be known.

The oral interviews suggest that the most likely places where the military would have used PCB transformers was in Whitehorse in connection with the large power demands of the Canol refinery, and possibly at Teslin and Watson Lake [No. 16]. PCB type transformers may also have been used in connection with the Haines Junction Asphalt refinery. Based on interviews with persons familiar with transformers in the 1940's and 1950's, it is reasonable to assume that the population of PCB transformers not under control in Yukon is very small.

Aside from PCB transformers, there is a problem with PCB contamination of transformers that were not designed to use PCB. This second type may be referred to as mineral oil transformers because they were designed to use mineral oil as a dielectric, not Aroclors. Mineral oil transformers could contain as much as 20,000 litres of oil. A typical mineral oil transformer is shown in Figure 4. This equipment was sometimes contaminated with PCB during manufacture.

Most of the transformer companies produced both PCB and mineral oil transformers, depending on the customers specifications and use. PCB was generally used in indoor applications and areas where fire or sparks were a concern.

Because the manufacturers built both kinds of transformers at the same time, there was inadvertent contamination of mineral oil with PCB and vice versa which occurred through common piping from the bulk tanks of PCB and mineral oil during filling [Envirochem, 1993]. As a result PCB contaminated thousands of mineral oil transformers and, quite possibly, the bulk oil that was designated to fill empty transformers at the point of delivery. It is estimated that 10% of all mineral oil transformers built before 1979 contained PCB levels over 50 ppm of PCB [Envirochem, 1993]. It has been found that such contamination ranges from 50 to 10,000 ppm PCB [T. Finnboguson, pers comm]. Thus a contaminated mineral oil transformer might have contained anywhere between 1 to 200 kg of PCB, as opposed to perhaps, 200 to 4000kg of PCB in PCB transformers.

The Project Team looked into the large population of transformers used on the North Fork/YCGC system. The oral interviews [No. 24, No.10] revealed that the equipment almost entirely predated Aroclors, and mineral oil transformers were in the vast majority. EP did find some PCB contamination in oil soaked soil at a transformer "bone yard" at the Bear Creek compound. The concentrations observed were consistent with the lower levels of PCB associated with contaminated mineral oil. Four true PCB transformers were recovered from inside dredge No. 11, but no other PCB transformers were found in the Klondike area [EP files, No. 10, Wilson, 1982].

4.2.1.2 Electrical Capacitors

Approximately 50% of all PCB manufactured in North America, or 300,000 tonnes, were used in power convection capacitors [Envirochem, 1993]. This included large units containing up to 35 kg of PCB [Figure 5]. Smaller capacitors, such as those used in transmitter equipment and fluorescent ballasts, contained quantities in the range of 0.02 to 0.45 kg of PCB [Figure 6]. Any fluorescent ballast made before 1979 can be assumed to have a PCB capacitor. Capacitors were used in all forms of electrical application and cut across all industrial categories, but it is likely that military applications were again the first major user of this PCB application in Yukon.

The clean up of DEW Line sites has revealed apparatus not normally found in industrial applications [Figure 7]. The U.S. Signal Corps installations along the Alaska Highway would likely have used PCB type capacitors.

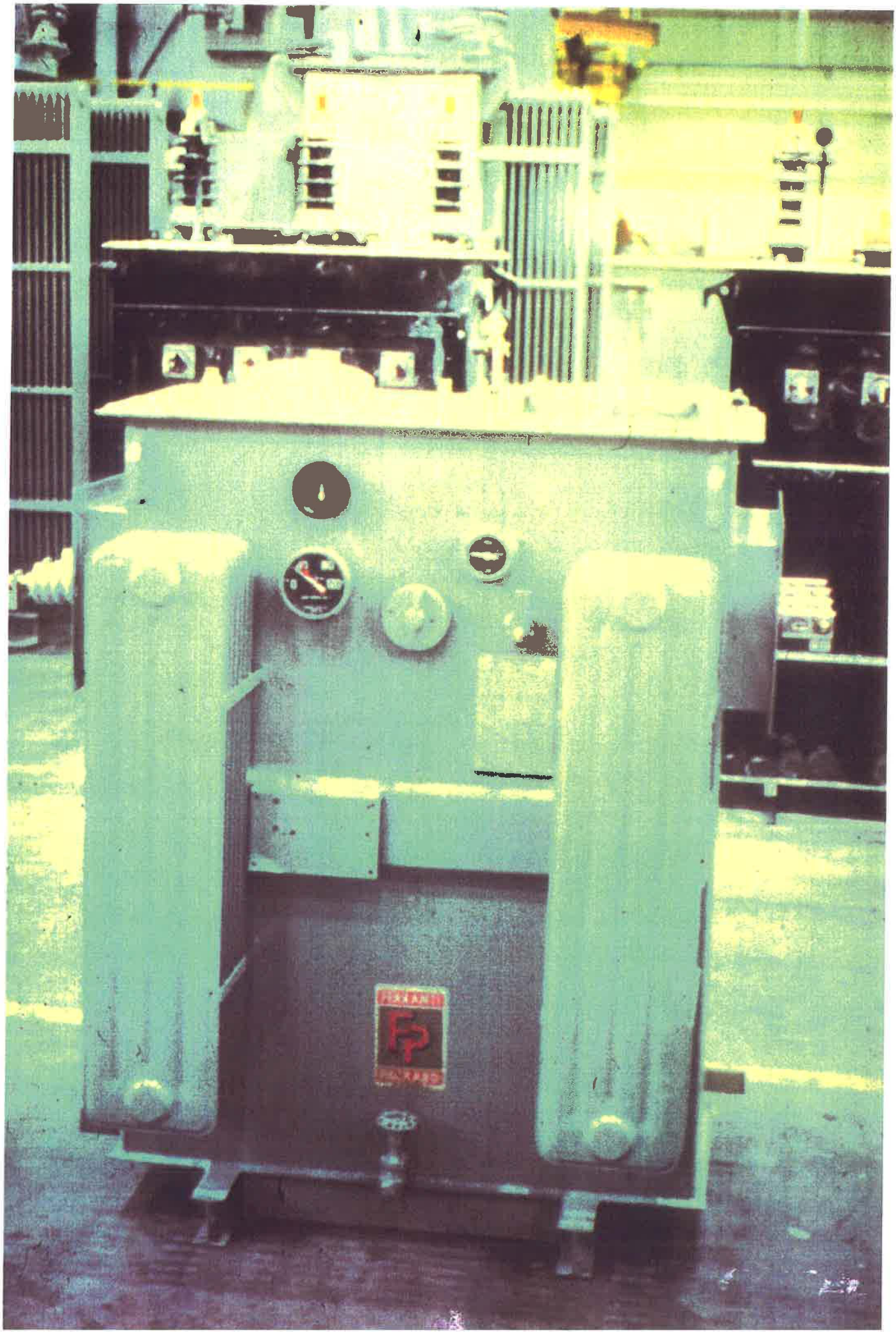
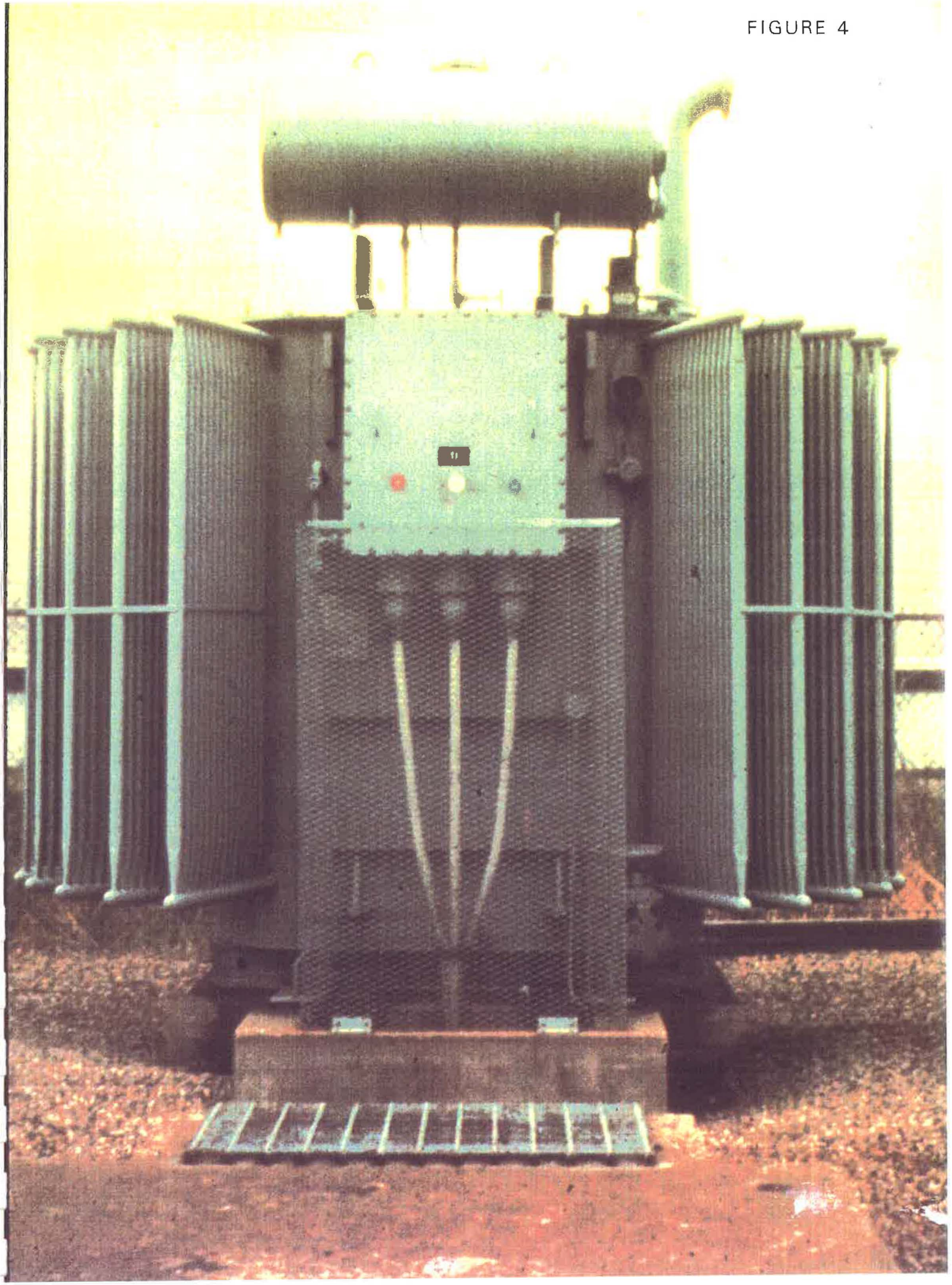


FIGURE 3

FIGURE 4



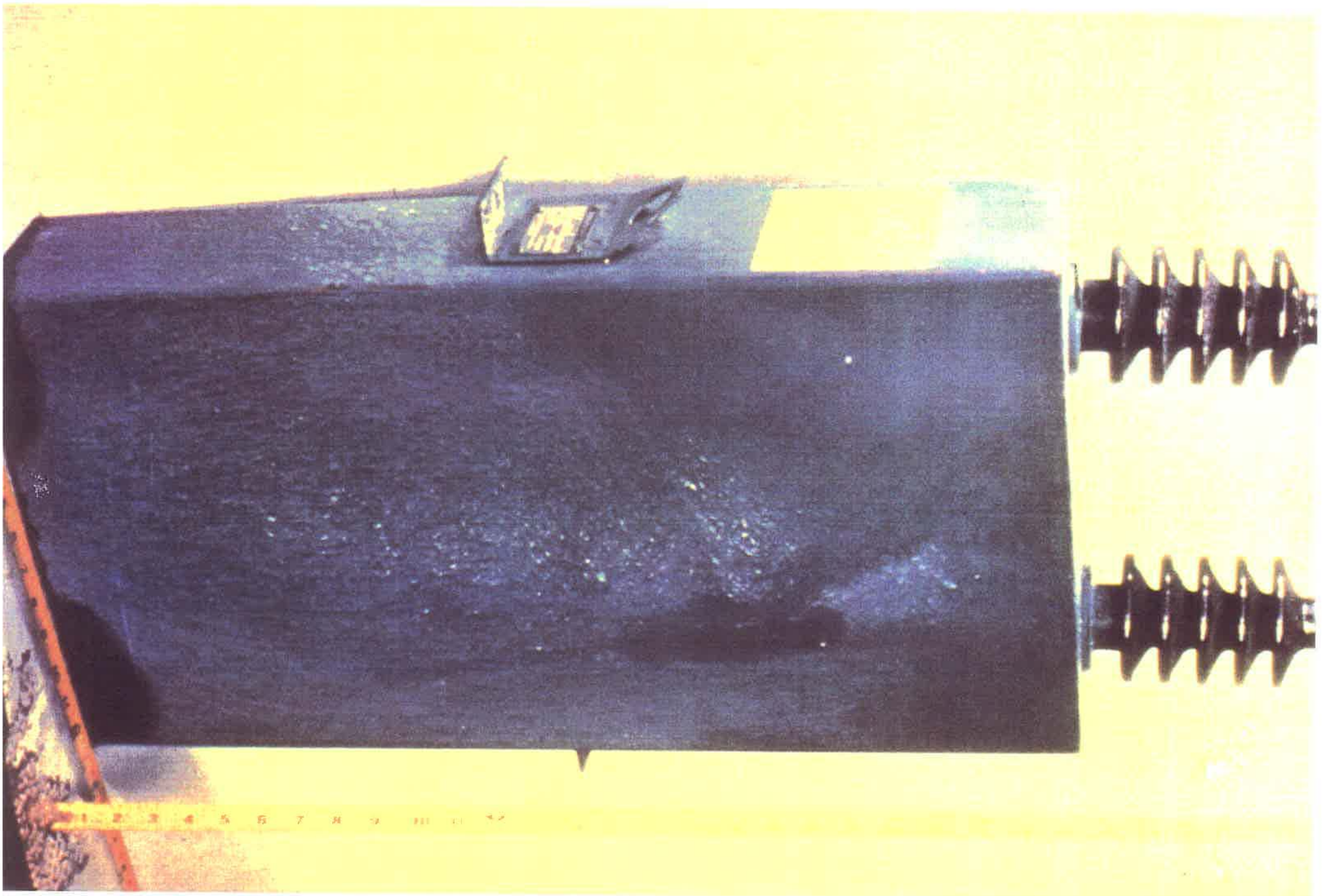


FIGURE 5

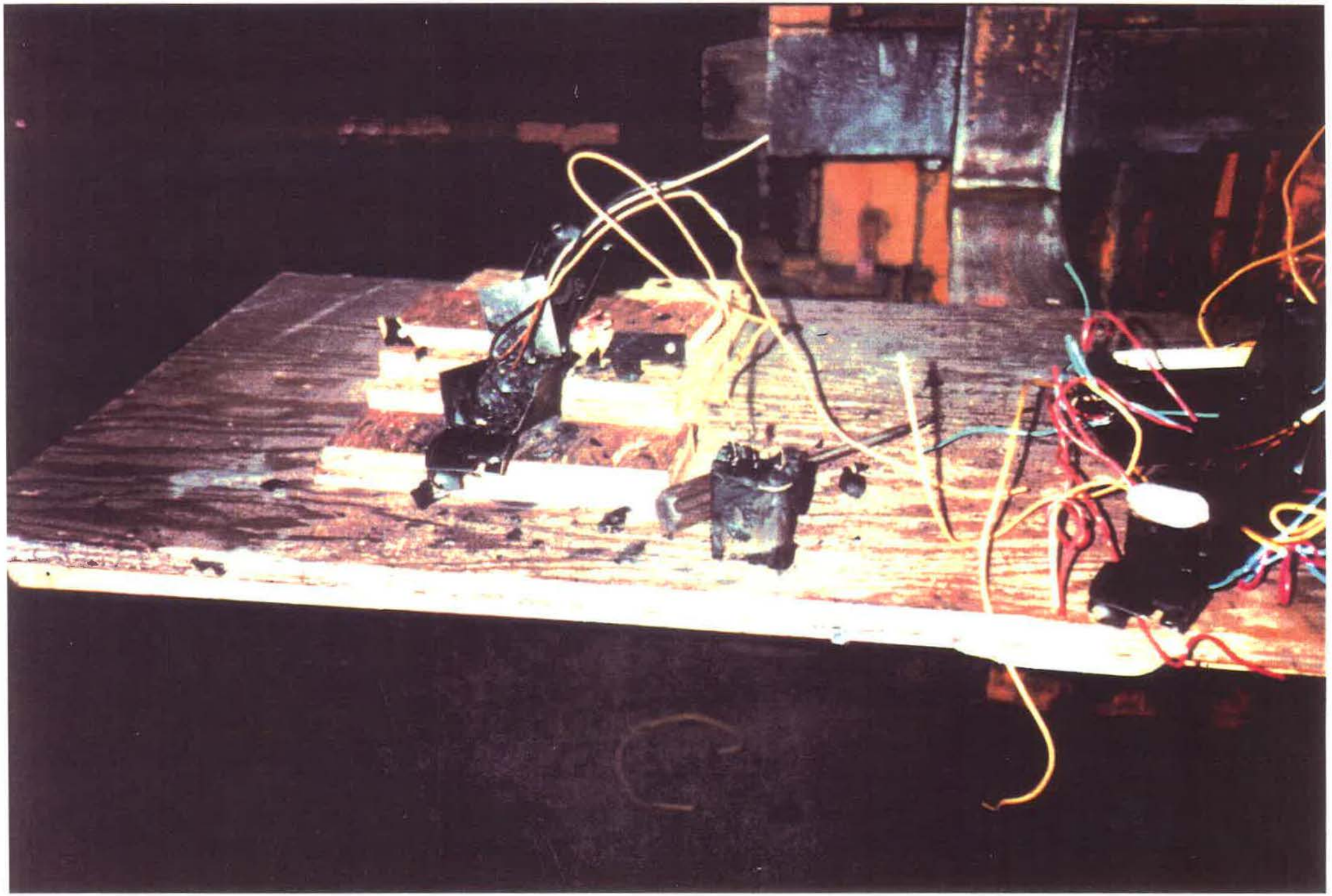


FIGURE 6



FIGURE 7

The Aroclors used in such capacitors was mainly 1242 [42% chlorine by weight]. Note that PCB in capacitors was impregnated into the paper and foil windings and was not usually free liquid. Therefore, significant releases to the environment from these sources were unlikely.

4.2.1.3 Hydraulic Fluid

Ten percent of all PCB manufactured in North America, or 60,000 tonnes, were used in the production of hydraulic fluids and heat transfer fluids [Envirochem, 1993]. No specific documentation could be found, but it is reasonable to assume that significant quantities of PCB hydraulic oil, which was known by the trade name Pydraul, could have been used in the Territory.

4.2.1.4 Other Uses

Fifteen percent, or about 90,000, tonnes of all PCB manufactured in North America were used in "open ended" uses such as plasticizers, adhesives, paints, ink, carbonless copy paper, cutting oils, and pigments [Envirochem, 1993], and dust control products such as Dustbane [No. 3]. These uses were universal and can be assumed to have been applied in Yukon.

4.2.2 Transportation

PCBs were transported in Yukon mainly along the Alaska Highway land route, and by rail via the White Pass. Bulk shipments of PCB oil were reported to have been transferred into empty transformer hulls at the Whitehorse docks behind the fire hall in the immediate post war years [No. 19]. All open ended applications would have been transported by the same route, as well as any PCB contaminated hydraulic or heat transfer fluids.

4.2.3 Disposal

Uncontrolled disposal of PCBs in Yukon prior to 1977 would have occurred through general garbage disposal practices, spillage of PCB oil during salvage or filling of transformers and possibly through waste oil handling.

The oral interviews suggest that some PCB applications such as open ended uses and electrical applications were discarded in garbage dumps. Some of these dumps were on or very near water bodies, so some PCB was certainly lost in this manner. However, many of the applications dumped at landfills primarily semi solid capacitors and most open ended uses, would not easily release PCB into the environment. Unless the garbage dump in question was associated with known dumping of PCB applications such as transformers and if the site continues to produce leachate, then it is likely that abandoned garbage dumps do not represent a significant PCB contamination problem.

The loss of oil from PCB transformers and contaminated mineral oil prior to 1977 likely represents the largest contribution of PCB to the Yukon environment. PCB contaminated soil found at the transformer "bone yard" at Bear Creek, and anecdotal accounts of dumping oil to salvage copper from individual transformers [No. 5] suggests that a few isolated spills occurred in the Klondike, but such spills were likely not concentrated PCB oil. Also, transformer oil was salvaged and sold for reuse as hydraulic fluid during the YCGC salvage operation [YFN-2], thus potentially releasing some PCB to the waste oil stream in this way. Again, this would have been mineral oil with associated low level contamination risks.

In the Whitehorse area, there is some evidence to suggest that the military discarded PCB equipment. The discovery of PCB in soils at the Granger site likely dates from military dumping. Also, it is possible that the U.S. military discarded PCB oil when it dismantled the Canol refinery at Whitehorse. Some transformers were likely shipped to other locations in the dry, and the fate of the oil is unknown. The Royal Mechanical and Electrical Engineer [REME] shop area was cited as a location where electrical equipment and supplies were buried [YFN-6]. Also, it was suggested that Teslin, Watson Lake and Aishihik may have been sites where PCB transformers were either used or discarded during demobilization [No. 9, YFN-5]. It was undetermined conclusively whether the radio relay stations used PCB transformers but it is likely that some PCB equipment was used at these sites.

It is probable that other PCB electrical applications such as capacitors were dumped at camps along the highway and pipeline corridors, but such uses were semisolid, and as such do not pose a high risk of contamination. This does not rule out emptying of PCB transformers at some of these sites.

PCBs may have entered waste oils through reused contaminated oils from hydraulic fluid, discarded PCB oil reused for solvent because of its trichlorobenzene content, and discarded

used PCB hydraulic oil [Pydraul] or PCB heat transfer fluid. These may have been joined by episodic direct disposal of PCB transformer oil into waste oil sumps, although this was probably unlikely.

Two significant applications of waste oil in the Whitehorse area may have released PCBs from the above sources into the local ecosystem. Firstly, waste oil was mixed with "lamp black" which was in turn used for opening a navigation channel through the ice on Lake Laberge. The oil [crankcase and diesel] was added to keep the day's melting process from freezing at night. A strip 60 feet wide would be applied the length of Lake Laberge [Whitehorse Star, April 29, 1938]. It is possible that during the last few years of applications, some PCB contaminated oils may have been present.

Secondly, large volumes of waste oil were applied to Whitehorse streets and roads for dust suppression. Air photos from 1946 and 1963 clearly show extensive oiling on the streets. This practice almost certainly added PCB to the local environment but this amount would be impossible to quantify.

In summary, there have been known and likely losses of PCB to the Yukon environment. The oral interviews suggest that such losses would have been relatively small due to the low total population of PCB applications. The military use and disposal of PCBs remains largely unknown, but certainly represents losses of PCB to the environment. No significant ongoing contamination of the aquatic environment from local sources was discovered. Rather, there were likely many small contributions over time which are now widely dispersed. In addition, there may well be local soil contamination problems associated with the disposal of PCBs.

The total volume of PCB lost to the Yukon environment is pale in comparison to what is already in the global PCB "sink". However, this is not to suggest that local point sources of contamination are not potentially significant. It is very important to control known sources of PCB and not allow them to contribute to existing contamination caused by bad management of PCBs in the past.

4.3 Mercury

The consideration of the use of mercury in this study is limited to the use of elemental mercury in placer gold recovery. Other uses that occur in Yukon, including uses in laboratories and dental offices, are believed to be relatively minor from an environmental contamination point of view. This is confirmed by Osler [1983] who reports an estimated total of 1.7 kilograms of mercury released to the environment in 1982 from the Whitehorse hospital and the Whitehorse Dental Clinic, of which an estimated 0.4 kilograms would enter the aquatic environment through the sewer system. With the decreased use of mercury thermometers over the past ten years, it is likely that this figure is decreasing. By contrast, placer miners interviewed by Osler anticipated both the extraction of mercury from the environment and a discharge of mercury to the environment [mostly to the atmosphere], the former unquantified and the latter estimated, to be about nine kilograms during 1982. The release of mercury compounds to the atmosphere as the result of the combustion of hydrocarbons, though no attempt has been made to quantify it, is considered to be so widespread a phenomenon as to be beyond the scope of this study.

Concerns regarding mercury relate both to the safety of persons using it and its effects as an environmental contaminant. In its liquid form, it is readily absorbed through the skin and as a vapour it is absorbed through the lungs. Such exposure can lead to numerous health problems including nervous disorders and disruption of the digestive system. Mercury and its compounds in the aquatic environment can be toxic to fish at very low concentrations. When not present at toxic levels, it nevertheless accumulates in fish and can be biomagnified in predator species to the point where their consumption can be harmful to humans.

4.3.1 Use

Historic and present day uses of mercury in placer mining relate to its specific gravity [though not as heavy as gold, it is heavier than many naturally occurring minerals] and to its affinity for gold. Because of its weight, mercury, added to a mix of materials such as the material processed in a placer operation, sinks to the bottom where the gold is also found. Because of its affinity for gold, mercury coats the gold particles and tends to amalgamate fine particles, so that they may more easily be removed from the unwanted material. In practice, mercury has been added to the process at three stages:

1] In the early days, mercury [or quicksilver as it was often called] was poured into the mining cut [No. 5]. The mineable material, including the mercury, was then ground sluiced directly

into the sluicebox where the mercury aided the gold retention.

2] More commonly in the early days, mercury was poured into the riffles of the sluicebox [No. 11]. Material was then processed in the normal way and mercury again aided with gold retention.

3] Both in the early days and still today, mercury may be used at the final gold recovery stage to amalgamate fine gold, so that it may be removed from black sand.

In all three of the above cases, the mercury is finally removed from the gold through the application of acids or heat. Where acids are used, the resulting mercury compounds must be disposed of. Where heat is used, the vaporized mercury is either dissipated to the atmosphere or retorted, cooled and liquified ready for reuse.

A number of problems immediately present themselves when one tries to estimate the extent of historical and present usage of mercury. Firstly, it is only in very recent years that any regulations have been applied to the use of mercury. The regulations that are currently in place do not require reporting of the transport, possession, sale, or use of the substance. However, any person transporting more than 2.5 litres of mercury in Yukon must have documents on hand certifying that he/she has been properly trained to handle it safely [R. Thompson, pers comm]. Any Yukon placer operator using mercury at the work site must ensure that mercury vapour in air is less than 0.5 milligrams per cubic meter and that mercury concentrations in effluent do not exceed 0.005 milligrams per litre. Obviously these regulations do not allow for any assessment of the amounts of mercury in use.

Secondly, records of the sale of mercury are either nonexistent or difficult to interpret. In his 1983 study, Osler did establish figures for the sale of mercury to combined B.C. and Yukon placer mining customers by Canadian sources for 1980 and 1981, but these figures are erratic, do not distinguish Yukon miners from the major assay laboratories in Vancouver and do not include quantities purchased by Yukon miners in the U.S.

The most reliable snapshot of the extent of mercury use was taken by Osler when he approached Yukon and Atlin area placer miners in 1982 and asked them directly about quantities on hand and their intentions regarding its use. Of 260 operations canvassed, 36 reported that they would use mercury in 1982 and had a total of 217.5 kilograms on hand and 24 operations had a total of 109.2 kilograms of mercury on hand but did not intend to use it during that season. It was estimated that a total of 9 kilograms of mercury would be lost to the environment during the year, mostly to the atmosphere in the form of vapour. No mention was made of any use of mercury other than for final clean-up.

Osler observes that **"The art of using mercury for amalgamating appears to be dying."**. He cites environmental and safety concerns, the increased cost of refining gold contaminated with mercury and the availability of alternative technologies as reasons for this projected decline in mercury use. This view is supported by the fact that very few water licence applications received by the Yukon Territory Water Board in the past eight years have indicated that the applicant intends to use mercury. However, inspectors with the DIAND placer mining unit report that mercury use continues to be widespread and that mercury's relatively low price makes its use the preferred clean-up technique in areas of fine gold, with recovery practices infrequently utilized.

It must also be added that the final clean-up is a very private matter where only the operator and perhaps a trusted employee are involved. This, together with the "bad press" that mercury has received over the past twenty years, may account for a general reluctance detected by the interviewers during this study, with which miners dealt with the question of mercury.

Similar problems confront the researcher attempting to quantify historical use of mercury. Several interviewees stated that it was widely available in hardware stores [No. 23, No. 24] and pharmacies, but this research did not uncover any merchant's records of the ordering or sale of mercury.

Consultation of the voluminous YCGC files in the National Archives in Ottawa may prove fruitful in this regard. As in the present, there was no need to identify a shipment containing mercury and White Pass reports that no records of cargoes shipped by boat or train were kept beyond their immediate usefulness. Mr. Fry [No.11] confirms that mercury use was extensive during the Klondike Gold Rush for "crowding the box", but states that by the 1930's it was virtually a thing of the past, except for the YCGC gold room. J. Gould [No. 13] concurs with this dating of the major period of use.

Osler identified the major historical use areas, again by consulting the miners as to what they find on the ground. He distinguished between significant amounts [more than one percent of gold covered with mercury] and incidental amounts [less than one percent of gold coverage]. Based on his sample of 260 operations, he identified twenty-five operations where significant amounts of mercury were found and thirty-three operations where incidental amounts were found. Several operators reported the phenomenon that Cyr had already noted in 1940; because of the mercury on the gold, their stocks of on hand mercury actually increased during the season. In the Atlin district for example, nineteen out of the twenty-four operators contacted reported finding mercury on the gold; of these, several reported an increase in on hand mercury of as much as 9.1 kilos; this compares to the total stock of 140.8 kilos in the Atlin district. The five operators who did not find mercury in association with the gold described their operations as being in "virgin ground". Heaviest contamination was reported in Pine Creek in the Atlin area, Bonanza Creek and its tributaries, Fourth of July and Burwash Creeks in the Burwash area and the Sixty Mile River. In each of these areas, among the reports of "significant" amounts of mercury, there were reports of 100 percent coverage of gold and of "buttons" of free mercury [Osler, 1983].

Osler remarks that there are cinnabar deposits in the Sixtymile area which may contribute to the quantity of mercury found there. A general survey that revealed elevated [though not dangerous] levels of mercury in a few locations in Yukon [Atkins Baker, 1977] offered a similar conclusion. However, no studies have been done in placer areas that would enable a distinction to be drawn between naturally occurring mercury and that which is used or mobilized during placer mining. Studies on mercury levels in a very limited number of fish samples from placer areas do not indicate a problem, but these remain to be confirmed by a broader sampling program.

4.3.2 Transportation

As noted above, there are no regulations in Yukon regarding the transportation of quantities of mercury less than 2.5 litres [approximately 34 kilos]. From the figures given by Osler for mercury on hand at each site, it appears that most of the mercury in the Territory falls below this limit and its transport is therefore unregulated. From this, it seems likely that the containers used are informal, i.e., whatever comes to hand and has a good seal, i.e. a jar, a bucket with lid, etc.

Historically, mercury was probably brought to Yukon in small quantities by individual miners at the time of the gold rush. A Parks Canada historian states that it was part of the standard kit that each miner was expected to carry [D. Neufeld, pers. comm.]. Given the large number of mishaps that befell the early miners on their way to the Klondike, it may be assumed that some quantity of mercury was lost to the environment during these trips. Later, it may have been shipped to Yukon as general cargo by the White Pass and Yukon Railway and the river steamers. As noted above, no records of such shipments have been found.

The standard container for mercury was known as a "flask". This was a metal cylinder with a cap on each end which would contain seventy-six pounds [approximately five litres] of mercury. Osler reports finding seventeen of these flasks in a scrap iron dump on Bonanza Creek. The term "flask" was used by several interviewees, but it seems to mean any small jar or bottle in which mercury was kept. Because it could be used over and over, such a small quantity would be sufficient for many miners and prospectors.

4.3.3 Disposal

Both historically and today, a miner's stock of mercury is generally only depleted through loss to the tailings, loss to the atmosphere during the "burning off" process or loss through accidental spill. Otherwise, the same stock of mercury will serve a miner for many seasons. If the mercury is no longer needed, it has been the practice to sell or trade small quantities of it between miners [No. 11, No.25, YFN-7]. One may assume that there were also occasions where it was simply disposed of into a convenient dump, tailings pond or creek, but no instances of this have been documented.

4.4 Lead: Sources, Transportation and Disposal

The major sources of lead contamination would be from the handling and shipping of lead ore concentrate and from lead based paints. Lead alkaline batteries were also considered a source but the concern here would be associated with dump sites and would present a minimal leachate problem.

Lead based paints were applied annually to the steam boats at the shipyards every spring

[No. 3, No. 19], during their years of operation. Lead based paint was applied to the metal bridges in Yukon [No. 7, No. 18]. The paint containers probably were disposed of into local community dumps. Prior to the 1940's or 1950's, paint had to be mixed on site using linseed oil, pigments, and powdered lead. Therefore, it can be assumed that powdered lead [shipped in sacks] would frequently be transported to Yukon for use in paint on government buildings, dredge hulls and steamboats [D. Neufeld, pers comm] and probably represents a substantial quantity of lead.

Lead-silver concentrate was transported from United Keno Hill Mines [UKHM] to Skagway by various routes since the 1920's. At the mill in Elsa, 135 pounds of the mud like concentrate would be placed into paper lined burlap sacks [No. 19]. These sacks were stockpiled on the Mayo river front where they dried out waiting for shipment on the boats and barges. They would be stockpiled here throughout the winter and by the time spring arrived, many tons of concentrate would have accumulated. Inevitably, those sacks on the bottom that had been there the longest disintegrated, ripped and broke, scattering their contents on the ground and in the immediate area, possibly into the Stewart River [No. 19]. As these sacks contained an economical quantity of silver, the concentrate was considered valuable and would be resacked whenever possible [No. 19]. It was usually the S.S. Keno which transported the concentrate down the Stewart River to a site near a slough behind Stewart Island where it was stockpiled. This was accessible to barges and were later picked up when a larger stern wheeler went by. In the early 1920's, the steamers had a difficult time barging tons of concentrate upriver, consequently the concentrate was shipped to Nenana, Alaska [YA WP&YR, COR 751]. From here they were transported on the Alaska Railway to ports near Anchorage [No. 19]. Later the concentrate was barged upriver to Whitehorse, where it was loaded onto rail cars at the WP&YR depot [No. 19].

After the Klondike Highway was built to Mayo in the early 1950's, the concentrate was transported by truck to Whitehorse. In early September, 1954, a truck containing eleven tons of lead concentrate from UKHM over ran the ferry deck and landed in the Pelly River [Whitehorse Star, Sept 17, 1954]. This accident was also mentioned by a member of Little Salmon/Carmacks First Nation [YFN-8]. Apparently the truck was removed but there was no indication if the concentrate was recovered. As the concentrate was contained within the jute sacks and as this would represent a substantial amount of money, it is assumed that every effort was made to retrieve as much of the concentrate as possible.

On April 1, 1956, UKHM commenced using returnable plywood containers instead of jute sacks to hold the concentrate during shipping. Ten thousand of these containers were in use with a 2 ton capacity each [Debicki, 1982]. The trucks unloaded their cargo to rail at a spur line which extended to the area behind the present day Klondike Inn which was known as the "PE 10" area [No. 20, Midnight Arts, 1993].

From 1969 to 1982, lead and zinc concentrate was transported in bulk in containers by truck from Faro to the Utah transfer yard which is located on the Alaska Highway south of McCrae. The containers were transferred from the trucks to the rail cars. WP&YR operated both the trucking and rail service.

During a strike in 1969 or 1970, approximately 2,000 tons of lead-zinc concentrate was stored in bulk at Utah for a short period [Eamer, 1989]. When the Faro mine reopened in 1986, the concentrate was transported by truck from Faro to Skagway, with storage sites located at Faro and Skagway only.

In 1988, Environmental Protection, Yukon Branch, conducted soil testing at the Utah transfer site and at several locations along the tracks. Generally the results showed that metal contamination is relatively low but widespread, with hot spots in the Utah transfer area. Since cadmium and copper are also found in typical samples of lead concentrate, the high levels of cadmium and copper found in the hot spots are believed to result from lead concentrate. The contamination at Utah could have resulted from spills, tracking of concentrate around the site by trucks and machinery, loss of concentrate during transfer from truck to rail and stockpiling [Eamer, 1989].

The levels of metals at Utah allow this property to be used for industrial purposes only [No. 22]. A major clean up involving removal of all contaminated soils would have to be undertaken before the property could be used for commercial, recreational or residential purposes.

Norecol Environmental Management Ltd. [1991] collected surface and near surface soil samples from the Taga Ku site, which once was the major WP&YR freight yard located in downtown Whitehorse. Results demonstrated

that unacceptable levels of arsenic, cadmium, lead and zinc were mainly distributed along the railway right-of-way indicating probable areas of handling the concentrates. They found that the site was also contaminated with petroleum hydrocarbon products. Morwijk Enterprises Ltd. of Vancouver, reviewed this report and estimated that there may be one or more ground water contaminated plumes in the northern half of the site extending towards the Yukon River.

In 1991 the first several inches of the site were excavated and piled in the north western corner of the site. This contaminated mound has been the subject of controversy over the past several months and has yet to be removed.

Norecol also tested the freight yard that was the transfer site for UKHM but the results of this testing were not made available to the Project Team [No. 20]. It can be assumed that hot spots probably exist at this site as well.

Mr. Taylor [No. 22] indicated that all of the WY&YP properties, including the tracks from Whitehorse to the border, have been tested and proved to be safe for the Company's purposes.

4.5 Other Substances of Concern to Those Interviewed

During the course of the oral interviews, several substances were raised as concerns that were not within the scope of the study. These included salt applied to roads, carbon tetrachloride for solvents, fire retardant, asphalt, poison used for wolf control and as a trapping practise, asbestos, fuel spills and fuel dumping practises, arsenic, zinc, copper, cadmium, human sewage and hazardous materials left and/or leaking at abandoned mine sites. Several of those listed above should be researched while the others are inert or would not cause a problem unless dumped directly into a water body. As mentioned in section 2.2.1, research on waste sites at abandoned mines is being conducted by Public Works Canada under a separate AES effort. Investigation should be conducted into the use and disposal of the organochlorine carbon tetrachloride. This toxic substance has a high potential hazard and is potentially carcinogenic. During combustion [thermal decomposition] the hazardous gas phosgene forms. The Kluane First Nation [YFN-3] indicated that the military used large quantities of carbon tetrachloride in the 1940's. It can be assumed that some discarded supplies may make up part of the unknown quantities of waste materials abandoned during demobilization of the military projects. Also, the use and disposal of pentachlorophenol in Yukon should be researched. It was used at the tie plant in Carcross in the 1950's and possibly at the various sawmills throughout Yukon. This wood preservative is highly toxic to fish.

4.6 AES Waste Site Inventory Research

The database used in this part of the study evolved from the DIAND Field Operations inventory of waste sites and is therefore almost completely focused on Crown Lands. This would usually exclude sites located within municipal boundaries, Commissioner Lands and Lands Set Aside [Indian Reserve]. Waste sites identified through the other portions of the study are documented separately in Section 5.0 of this report.

Appendix C, consisting of a database report in hard copy and diskette, contains the results of research into ownership status, past ownership, and other updated information on the AES waste site inventory. It should be kept in mind that this database is constantly evolving as tenure changes, sites are cleaned up, and new information is determined about the sites.

The database report is called AESINVEN.FRM on the diskette and does not contain all of the fields on the database provided to the Project Team by Environment Canada. This diskette is available at the office of Mark Palmer, Chair of Yukon Contaminants Committee, DIAND, Whitehorse, Yukon.

The AES waste site inventory database, originally compiled by EP, now contains the following fields:

- FACI_CODE -- EP site identifier.
- YUKON_CODE -- called "SITE CODE" in Appendix C, is an alphabetical/numeric identifier by RMO district and site number.
- FACI_NAME -- called "SITE NAME" in Appendix C, is the common name for the site.
- OPER_PRIV -- called "CURRENT OWNER" in Appendix C, indicates the present ownership status of the land where the site is situated. Where there was no tenure of any kind, it was assumed the site had reverted to the Federal Crown and this is shown by the initials "DIAND".

- LATITUDE -- coordinates of waste site.
- LONGITUDE
- SITE-USE -- the predominant use of the site prior to abandonment.
- LAST_INSPE-- not shown in Appendix C, the date of the last on site inspection by any agency.
- RANKING -- called "EP RANK" in Appendix C, is a numerical ranking of environmental hazards derived from information provided to EP by the RMO's.
- #0 No risk of hazards.
- #1 Hazards or possible risk of hazards, low risk, further inventory required, may have been fly over inspection.
- #2 Moderate risk of hazards, may be public safety concern, hazards may be impacting surrounding environment [eg. fuel drums in water], inventory may be incomplete.
- #3 High risk of hazards identified, hazards could be both public safety and environmental, requires further assessment and characterization prior to remediation.
- COMMENTS -- a general column of anecdotal information from RMOs, usually consisting of partial site inventory and recommendations for clean up.
- ACTION -- Not included in Appendix C, is the EP recommended follow up, by agency, concerning further actions required regarding the site.
- DR_H20 -- Not included in Appendix C, indicates whether or not drums have been reported in or very near water bodies.
- OWNERSHIP -- called "OWNERSHIP PAST AND PRESENT" in Appendix C, lists names, addresses, or mineral claim record numbers of persons or companies who owned or occupied the site in the past, up to and including the current owner. May also show what industry occupied the site in the past, eg. military uses.

Appendix E is a listing of all sites deleted from the inventory because of recent clean-ups or because they were in the Public Works list of abandoned mine sites.

4.7 Military Derived Contaminants

4.7.1 Use

The types of contaminants used by the military in the construction and demobilization period [1941 to 1946] were likely limited to carbon tetrachloride for solvent purposes, pesticides for camp use, and PCB contaminated electrical applications and possibly PCB contaminated hydraulic oil. Mention is made of "chemical warfare supplies" in one inventory [Committee on Roads, 1946] but the specific applications could not be determined. Herbicides were used along the Haines-Fairbanks pipeline corridor.

4.7.2 Disposal

By the fall of 1943, the U.S. military had mobilized a vast array of construction equipment, ordinance, and other supplies all along the route. At this time, the Alaska Highway construction phase began demobilization, and work continued on the Canol project. This is the time period when rumours began to circulate about rampant waste, theft, dumping, and abandonment of equipment and supplies. The literature contains many anecdotal accounts of the military wasting and abandoning construction equipment and supplies [Coates, 1984, Remley, 1976]. By 1945, after the demobilization of the Canol project, the rumours had reached the White House and the U.S. Congress commissioned a Committee on Roads to investigate the Alaska Highway [Committee on Roads, 1946].

The U.S. Army did not receive conclusive detailed orders concerning the final disposition of assets until late 1944 [Thirty Third Recommendation, Dec. 20, 1944]. Prior to this time, massive amounts of equipment and supplies were being shifted from place to place all along the route. Many large construction camps were evacuated to staging areas where bottlenecks occurred. Memoranda, minutes and correspondence from the period 1944 to 1946 reveal the haste and confusion surrounding demobilization efforts [YA US Army records]. It is reasonable to assume that some amount of supplies that contained contaminants were discarded and left in situ during this period. The question arises as to what type and amount of contaminants would have been lost to the environment during the demobilization period. Firstly, there is the likelihood that PCB contaminated oil products and electrical equipment may have been either left in stockpiles or dumped in refuse areas. Much of the contaminated oil would

then have been salvaged in subsequent years. Left over supplies of pesticide may have been dumped or abandoned already mixed with oil, which would have likewise been salvaged for its heating value.

Secondly, there was likely deliberate and accidental loss of cargoes through ice or into unfrozen lakes and rivers. Losses of equipment into Quiet Lake, Teslin Lake, Atlin Lake, Watson Lake, Little Atlin Lake, Target Lake, and possibly Sheldon Lake and Lake Laberge were mentioned during the interviews [No. 7, No. 14, YFN-7, YFN-5]. It was not clear whether these losses were of machinery or inert material only, or if substantial cargoes that could have contained contaminants were lost at the same time.

The Committee on Roads [1946] found that some 30,586 pieces of equipment were used on the Alaska Highway/Canol projects and 635 pieces could not be accounted for. The Committee's report also itemized surplus returned to the U.S. On this list are over 6,000 tons of petroleum products and 47 tons of chemical warfare supplies. Documentation was not detailed enough to determine how much of these items contained contaminants. Detailed supply lists could not be found which would have listed the amounts and types of pesticides, solvents, electrical equipment, or PCB type hydraulic oil supplied to the projects.

It is likely that major construction camps that were demobilized in this era contained some quantities of abandoned materials containing contaminants. Materials such as premixed insecticides and unused quantities of PCB contaminated oils would have been salvaged in subsequent years. Other unknown quantities may have ended up in garbage dumps or burned on site with other combustibles. Thus, the abandoned military sites constitute a possible source of contaminants which would be impossible to quantify without extensive and invasive sampling. Such sampling is likely not warranted unless specific developments are planned for the site, or if is obviously on permeable soils or contacted by surface water. The locations of former military construction and maintenance camps, and pipeline facilities are well documented. A Compilation of Listing of Known and Probable Abandoned Waste Disposal Sites Throughout Yukon Territory prepared for Environment Canada in 1983 [Reger,1983] contains detailed information on the location of virtually all the military sites in the highway corridors.
Three separate surveys were conducted in the 1970's to document abandoned military sites along the highway and pipeline corridors and recommend clean up procedures. The Alaska Highway-Haines Road Clean-up Assessment Study by C.E. Edey [1976], Canol Road Clean-up Assessment Study by Synergy West [1975], and Haines-Fairbanks Pipeline, Yukon Territory by DIAND, Whitehorse, were the basis for a clean-up program along the routes. Because these assessments predated the development of PCB regulations and the discovery of pesticides in native diets, little effort was made to examine the waste left behind for organochlorines. As a result it may be assumed that some of the materials buried on site during clean-up operations may contain contaminants. It is likely, however, that the majority of waste burn and burial sites are isolated from water and thus represent only localized potential soil contamination. The clean up operations of the 1970's are documented in a series of memos to file within DIAND.

Twenty waste sites of military origin remain on the AES inventory to date and others were identified during the study. Some of these are still exposed enough to permit examination for the use and disposal of contaminants [Million Dollar Falls, Haines Junction/Pine Creek, and Aishihik Airstrip are some examples]. Such characterization may be useful to extrapolate to other military waste sites. Also, sites identified through the oral interviews within the present City of Whitehorse may warrant further study due to the shallow ground water and permeable soils encountered beneath their former locations.

5.0 WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Eighty-three waste sites were identified during the oral interviews. Eight of these are already on the AES Waste Site Inventory, eleven are located in the province of B.C. [Atlin area], eighteen are within the present City of Whitehorse municipal boundary, and four are abandoned mine sites either already on the Public Works list of abandoned mines, or in B.C.

Given that the study is focused on the four contaminants of concern, some of the locations described are outside the scope of the report, ie; they likely contain only metal waste or inert debris that poses no environmental effect other than aesthetic nuisance or terrain hazards.

An attempt has been made to identify the type of contaminants that are, or were, used or disposed of at each site. The identification of a particular contaminant with any given site was a highly subjective exercise. Therefore it must be emphasized that these sites are **NOT NECESSARILY CONTAMINATED**. In many cases the site may only represent a known area where a given contaminant was used and not necessarily spilled [eg; Fire hall area transferral of PCB oil into transformers].

The vast majority of sites date from the military megaproject era and immediate post war period. For this reason alone, they are sometimes associated with possible contaminants given the use and disposal practises described above. No attempt has been made to rank each site as to the relative likelihood of contaminants being detectable today, other than some editorial comments arising from corroboration from other research. For example, the identification of the R.E.M.E. shop area as a place where equipment was buried was noted as a possible site for PCB contamination because information on the likely use of PCB there was obtained through other research.

Table 3 is a compilation of all locations cited during the oral interviews. A concise description of the site is provided along with the corresponding interview number[s], and the aforementioned potential contaminants that may have been used or disposed of at or near the site.

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	PotentialContaminants or Other Waste
2,6,4,14	McIntyre Creek/Range Road dump, reference to river-side dumping.	N/A	P,M,O
6,14,YFN-6	Northland Trailer court, excavated trench garbage dump.	N/A	M,O
6	Present Granger subdivision, garbage disposal area behind Hillcrest, used by RCAF, military, local residents; known presence of PCB.	N/A	PCB,M,O
Pers. Comm. R. Ronaghan	Baxter Gulch, located at north end of Whitehorse air strip, military dump site.	N/A	PCB,M,0
Z,6,YFN-6,20	Baxter Slough, at present locations of Beaver Lumber yard and Canamet Sales, former boundary of town of Whitehorse, general and military garbage dump, landfill of slough.	N/A	P,M,O

P = Pesticides
PCB = PolyChlorinated Biphenyls
M = Metal waste, including vehicles and barrels
O = Other debris
Unknown = Not enough information to indicate potential wastes

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	Potential Contaminants or Other Waste
14	"Paddy's Pond", slough behind Hillcrest where barrels and unknown debris are sunken into mud and buried with landfill.	N/A	P,M,O
19	Ore transfer area on Whitehorse waterfront where bagged lead-silver-zinc concentrates were transferred from steamships to railcars.	N/A	Pb, other metals
19,20	Ore transfer area along railway in large lot behind Klondike Inn, formerly known as "PE-10".	N/A	Pb, other metals
14	Slough adjacent to Kishwoot Island bridge, general garbage and dumping along water's edge.	N/A	M,O
19	Behind old fire hall building immediately south of Whitepass station, transfer of PCB oil into transformers.	N/A	PCB
YFN-1	Present site of Acklands Ltd., metal waste uncovered during ground preparation.	N/A	N1, unknown
YFN-6	Slough, parallel to Yukon River, across from present day SAAN store, as far north as Ft. Yukon Hotel, general garbage dumping.	N/A	M,O
YFN-6	Royal Electrical and Mechanical Engineers [REME], shop location near present day Canadian Tire store, adjacent burial of unknown equipment, electrical.	N/A	PCB,M,O
6,YFN-6,23	McCrae area, behind Gold Rush Auto Sales, military dump site.	N/A	M,O, PCB [slight]
6,YFN-6	McCrae area, east side of Alaska Highway, south of Whitehorse Copper access road, military camp and scattered debris. *	N/A	M,O,PCB,P
23	McCrae area, on the road to the old Fox Farm, just east of the Alaska Highway [may be same as * above].	N/A	M,O,PCB,P
14	Old ammunition dump, mile 1.5 Carcross Road [Noted in C.E. Edey, 1976].	N/A	M,O

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Unknown = Not enough information to indicate potential wastes

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	Potential Contaminants or Other Waste
19 [other locations]	A small pot hole lake with high steep banks, on the S.E. side of the Alaska Highway at McCrae and popular military dump site.	N/A	P,PCB,M,O
2,19,FN Taku	Johnsons Crossing staging area for Canol Project evacuation, unknown specific locations. May have been cleaned-up after Synergy, 1976 assessment.	N/A	M,O
YFN-6	Lake LaBerge barrel dump, on east shore south of Laurier Creek, barrels with unknown substance.	N/A	Unknown
YFN-6	Plane wreck, north of Richthofen Island. Lake LaBerge, unknown cargo.	N/A	M, Unknown
YFN-6	Barge wreck, "just off the island at the end of Mile 8 road near Andy's wood camp", Yukon River, unknown cargo.	N/A	M,O, Unknown
YFN-6	Atlin Lake, 6x6 truck went through ice, 1950's; just off Labrador Point, unknown cargo.	N/A	M, Unknown
6	Squanga Lake, military camp and dumpsite, just west of lake near water's edge [may have been cleaned-up pursuant to C.E. Edey, 1976].	N/A	M,O, Unknown
7	Quiet Lake, cat train[s] through ice, likely only heavy equipment but unknown cargoes also possible.	N/A	M, Unknown
7	Brooks Brook, large military camp, other uses [was cleaned-up pursuant to C.E. Edey, 1976 assessment].	N/A	P,PCB,M,O, Unknown
14	Cracker Creek, large military camp and dumpsite [cleaned-up pursuant to C.E. Edey, 1976 assessment].	N/A	P,PCB,M,O
14	Million Dollar Falls, Takhanne River, Approximately mile 100, Haines Road, large military dumpsite, has receded into soils in gully, named because of extravagant construction and supplies.	HJ 10	P,PCB,M,O

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M = Metal waste, including vehicles and barrels
O = Other debris
Unknown = Not enough information to indicate potential wastes

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	Potential Contaminants or Other Waste
21	Haines Junction Airstrip/Pine Creek dumpsite near the end of the old military strip and downstream along Pine Creek. Several localized dumps and piles of old equipment.	N/A	P,PCB,M,O
21	Marshall Creek dump near confluence of creek and Dezadeash River, on bank of river, scattered debris dating from large military camp.	HJ 11	M,O, Unknown
21	Marshall Creek Sawmill, on north side of highway, large abandoned sawmill dating to military use.	N/A	M,O
21	"Bear Creek Summit", at location of former Haines Fairbanks pumping station, exact location not specified.	N/A	M,O
23,YFN-3	White River, "3 or 4 miles east of the river between the pumping station and the bridge, on the south side of the highway", military camp/ dump, also described as "a gravel pit, a mile past the bridge [east], YFN-3.	N/A	P,PCB,M,O, Carbon Tet.
23	Mile "73 or 74 on the Haines Road, in the bed of a river emerging from a glacier, on the far side of the road from the glacier", military dumpsite.	N/A	O, Unknown
Pers. Comm. Bob Allan	Mile 48, Haines Road, "Rainy Hollow", Haines Fairbanks pump station and Shakwak construction camp, discarded DDT containers.	N/A	P,M,O
23	Mile 86, Haines Road, "between two streams, both sides of the road", military dumpsite.	N/A	M,O, Unknown
9	Haines Junction Asphalt Refinery, on pioneer road near Champagne Aishihik offices.	HJ 01	M,O, Unknown
17	Nakonake Lake, debris and punctured oil containers, 104/N1; 59°; 133°; B.C.	British Columbia	M,O
17	Simpson Lake, same as above; '105A/11; 60°; 44'; 129'; 15	British Columbia	M,O
17	Discovery town site, near Atlin, mercury in sediments.	N/A	Hg

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M = Metal waste, including vehicles and barrels
O = Other debris
Unknown = Not enough information to indicate potential wastes

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	Potential Contaminants or Other Waste
4,YFN-7	Camp Yukon and nearby farm, insecticide and possible herbicide use.	N/A	P
5	Near Whitehouse Cabins, Dawson City, town garbage dump off ramp into river.	N/A	M,O, Unknown
5	Callison industrial area, Klondike Valley, short term use as garbage dump.	N/A	M,O, Unknown
5	TNTA helicopter pad, Dawson City, site of large transformer salvage; 1960's.	N/A	PCB
5	West Dawson Shipyards, abandoned paddlewheel wrecks.	DA 063	O
3,18	"Parkin Airstrip" about 10 km west of Eagle Plains, staging area for Dempster Oil and Gas, other uses.	N/A	M,O
25	Chapman Lake, large Socony Oil base camp,oil and gas exploration, partially cleaned up.	DA 111 DA 70	M,O
YFN-7	Atlin Silver Mine, last operated 1986, barrels of chemicals rolled down embankment for fun by visitors, drains to McDonald Lake.	British Columbia	O, Unknown
YFN-7	Present Atlin dump, across road from Como Lake, concerns about potential contamination via groundwater.	British Columbia	Unknown
YFN-7	Frank Slims related to Jackie Williams, U.S. military dumping onto ice at Lake Laberge [not substantiated by Ta'an Kwach'an].	N/A	M, Unknown
YFN-7	Border Lake, above Telsaqua, mining camp, left over drill additives and fuel, approximately 56° 21' 130° 42'.	British Columbia	M,O, Unknown
YFN-7	Kennicott Lake, on small island at mouth of main creek feeding lake, abandoned rusting drums.	N/A B.C.	M
YFN-7	Little Trapper Lake, mine camp debris, 58° 29' 132° 36'.	British Columbia	M,O

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O = Other debris
Unknown = Not enough information to indicate potential wastes

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	Potential Contaminants or Other Waste
YFN-7	Spruce Creek, 59° 35' 133° 39'. Abandoned large excavator full of oil and lubricants, on edge of bank.	British Columbia	M,O
YFN-7	Little Atlin Lake, unknown amounts and types of military equipment and garbage. Local guide struck by a "big army gun" just beneath surface.	N/A	M,O, Unknown
YFN-7	Kuthai Lake, scattered fuel drums on shore, 59° 14' 133° 15'.	British Columbia	M,O
YFN-7	Engineer Mine, untreated effluents discharged for years, 59° 29' 134° 14'.	N/A	M,O, Unknown
YFN-7	Army Camp, junction of Atlin Road and Tagish Road, [may have been cleaned-up pursuant to C.E. Edey, 1976].	N/A	P,PCB,M,O, Unknown
Various Pers. Comm.	Carcross, Nares Lake, Railroad tie treatment plant.	N/A	Pentaphenol
YFN-1	Whitepass barrel wash plant, Marwell industrial area, Whitehorse, suspected source of petrochemical residues.	N/A	PCB, Unknown
YFN-1	Aishihik Airstrip, scattered debris and localized garbage, repeater station debris, suggested as representative of military refuse.	HJ 03	P,PCB,M,O
YFN-8	Jackfish Lake, apparent change in lakeshore vegetation, white discolouration on trees and shoreline shrubs.	N/A	CaCl
YFN-8	Dump at "Little River" site of old lodge and military camp, just north of Takhini River Crossing on old Dawson Trail.	N/A	P,PCB,M,O
YFN-8	Dump at Little Braeburn Lake, site of old lodge on Dawson Trail, may be same as CA 01.	CA 01?	M,O
YFN-8	Barrel cache on shore of Round Lake, south side of Hansen Road, appeared to be leading a rust coloured plume.	N/A	M,O

P = Pesticides
PCB = PolyChlorinated Biphenyls
M = Metal waste, including vehicles and barrels
O = Other debris
Unknown = Not enough information to indicate potential wastes

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	Potential Contaminants or Other Waste
YFN-8	McCabe Creek, km 424 Klondike Highway, garbage dumps.	CA 08	M,O, Unknown
YFN-8	Mt. Nansen Mine Site, various concerns including rumours of transformer salvage.	DPW	N/A
YFN-8	Ore truck crash into Pelly River, UKHM ore concentrate, 1950's [confirmed by news article, Yukon Archives].	N/A	Pb
14	Location of old Shamrock Oil tank farm, near McIntosh Lodge, exact location not determined.	N/A	M,O
YFN-5	Moon Lake, dead fish reported, no recovery of stocks, barrels on shore.	N/A	Unknown
YFN-5	Target Lake, along Campbell Highway, military discarded barrels dumped into lake, believed to have contained gasoline, no fish in lake since.	N/A	M
YFN-5	"Transformers, barrels, DDT and other things" dumped and buried at Radio Range on Alaska Highway past Watson Lake Airport, military.	N/A	PCB,P,M,O
YFN-5	Upper Liard, 2 mile, 2 1/2 mile, Watson Lake Airport and pipeline near 2 mile; all military dump sites. Airport site believed to contain chemicals, may be same location as above, required ground truthing.	N/A	PCB,P,M,O
YFN-3	Alaska Highway North, camps and sawmills where military had garage, storage area and dumps; Silver City, Sheep Mountain, Congdon Creek [sawmill], Destruction Bay, Duke River, Burwash Creek [sawmill and camp] and south side of Donjek River. These sites were simply listed; most of them have been cleaned up. Potential contaminants are not specified but likely same as other military sites.		Unknown
YFN-3	Long's Creek, mile 1156 Alaska Highway, on right hand side under a bluff, large military dump.	N/A	P,PCB,M,O

P = Pesticides
PCB = PolyChlorinated Biphenyls
M = Metal waste, including vehicles and barrels
O = Other debris
Unknown = Not enough information to indicate potential wastes

TABLE 3

SUMMARY OF WASTE SITES IDENTIFIED THROUGH ORAL INTERVIEWS

Interview No.	Site Description	AES Site #	Potential Contaminants or Other Waste
YFN-3	"Between White River Lodge and Koidern Lodge", army garage on left side of highway going north, concrete pads show where buildings were located, dump site exact location not known.	N/A	P,PCB,M,O
YFN-3	Account of military excavating hole in White River bar, dumping barrels and vehicles, location not known.	N/A	P,PCB [slight]
YFN-3	Snag airstrip, barrels and other debris abandoned by military, contents drained.	BC 2	M, Unknown
YFN-3	Beaver Creek Haines-Fairbanks pump station, large dump, buried material.	BC	P,M, Unknown
YFN-3	"Behind Livesey's Store in Beaver Creek", account of finding full barrels partially buried, and old army vehicles.	N/A	P,M,O, Unknown
YFN-3	Mile 1220, old army camp, buried waste.	N/A	Unknown
YFN-3	"Dry Creek Hill, right on top of hill on the 1202 side, army buried a bunch of stuff there."	BC 09?	P,M,O, Unknown

Note: YFN-3, Kluane and White River First Nations have accompanying site sketches; available upon request.

P = Pesticides
PCB = PolyChlorinated Biphenyls
M = Metal waste, including vehicles and barrels
O = Other debris
Unknown = Not enough information to indicate potential wastes

6.0 RECOMMENDATIONS

The task before the project team was largely one of information gathering. Because of the nature of the sources of that information [incomplete archival records, personal recollections of selected individuals] the information is suggestive rather than conclusive. It was found during oral interviews that Native elders and people who have lived and worked in Yukon for decades are an invaluable source of previously undocumented information about contaminants. There are no doubt many more individuals still to be interviewed who could provide new insights into the matter, although it is to be expected that further work in this area would tend to corroborate what was originally gleaned.

The archival and literature search yielded relevant data on the historic use of all contaminants, particularly pesticides. This is a vast area of research and it may be useful to investigate some of the following sources:

- the YCGC files at the National Archives in Ottawa regarding purchases of mercury;
- DND files for the period 1951 to 1964 regarding shipments and use of DDT;
- archives in Anchorage regarding herbicides used on the Haines-Fairbanks pipeline and Alaska Highway right-of-ways;
- information on manufacturers and suppliers regarding the use of toxaphene in conjunction with DDT; and
- archives in Washington regarding the supply of PCB oils and pesticides to the U.S. military and the Public Roads Administration.

The following recommendations are presented in individual sections representing the various areas of concern.

6.1 Organochlorines

Aerial spraying of DDT over the Whitehorse area for 20 years [1949 to 1969] probably contributed to the high levels of organochlorines discovered in the fish in Lake Laberge. As there are occasions when PCBs and toxaphene have been ingredients in insecticides, their high levels encountered in Lake Laberge fish also may be associated with the DDT spraying. Studies done by Muir et al [1990] and Rappaport and Eisenreich [1986], have shown that organochlorines are transported through the atmosphere, with toxaphene often occurring in the highest concentrations. Further study is required and some possible plans of action are listed below:

[1] Take advantage of the known dump at Rainy Hollow which contains full barrels of DDT and sample the DDT for PCBs and toxaphene.

[2] A great deal of the sediment load in the Yukon River is dropped at the inlet of Lake Laberge. Lake sediment samples should be collected here in stratified cores so that concentrations of DDT over time could be documented. No OCs were found in samples collected from the Yukon River near the Range Road Dump [Stanley Associates Engineering Ltd. 1992] but this is probably because that after 22 years, the bed load here has been moved downstream and replaced with other sediment.

[3] Lake sediment samples should also be collected from Watson Lake. [EP did collect some samples here in 1991 although they were not analyzed for OCs.].

[4] Studies on air and snow monitoring to determine atmospheric loads of OCs should be continued and expanded.

[5] The fish sampling program should be continued with repeat sampling from the southern lakes [Tagish, Bennett, Marsh] to increase the sample size of the target species fish, burbot. Burbot are well suited for monitoring lipophilic pollutants because of the high lipid content of their liver and their position at the top of the aquatic food chain and their tendency to be sedentary.

[6] Further study of fish population dynamics and pathways of OCs within lake ecosystems, particularly Lake Laberge, is recommended to better understand the process by which the target species have become contaminated.

6.2 Mercury

The continued presence of mercury in the pay dirt of certain creeks and the reports of the use of large quantities during the gold rush indicate that mercury contamination, while not proven at this time, remains a possibility that should not be overlooked and the following are recommended:

[1] Attempt to quantify the amount of mercury used annually by placer miners and the amount that is released to the environment when mercury is burned off or vaporized.

[2] Conduct tissue analyses for mercury on resident fish in streams draining placer mined areas and resident fish in areas of natural occurring mercury.

6.3 Lead

The main source of contamination from lead was through the shipping and handling of lead concentrate. It is clear from the descriptions of lead concentrate handling practices that any transshipping points are likely "hot spots" and should be treated accordingly. The following is recommended:

[1] Conduct soil testing on the Mayo river front, in the Stewart River at Mayo, at Stewart Island and along the river front in Whitehorse [between the tracks and freight yards and the river] for lead content.

6.4 Waste Site Inventory Research

[1] While no proven point sources were found, site characterizations should be done at Million Dollar Falls, Aishihik Airport, Haines Junction Airstrip/Pine Creek, Haines Junction Refinery and other military sites along the highway that are still exposed enough to search for evidence of contaminants. The information from such work would be valuable in assessing the liability posed by other military sites that may be buried or otherwise unaccessible.

[2] It was apparent through the interviews that a large number of the waste sites identified were not on Federal lands. All sites should be included in the AES inventory independent of their jurisdiction [municipal, territorial, federal, land claims]. There is a need for overall coordination of the AES inventory because it is very dynamic. New information is coming in all the time as sites are characterized, cleaned up or change ownership status. Such coordination may be provided through the offices of DIAND or some other agency.

[3] Sites on Table 3 may require follow up to determine the exact location and further potential contaminant information. The sites in the Whitehorse area should be verified by holding a workshop with some of the interviewees who were very knowledgeable of the early days of Whitehorse. This would involve group examination of air photos, maps, and photographs, followed by a field trip accompanied by the aforementioned. A member of the Contaminants Committee plus technical persons should also attend the workshop. Any other sites where development is planned, such as those along the Shakwak project corridor, should be verified by site visits with the appropriate interviewee, and decisions made as to characterization after the site has been pinpointed.

7.0 ACKNOWLEDGEMENTS

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8.0 REFERENCES

Adams, Robert, W. Ed. 1990. Handbook for Pesticide Applicators and Dispensers, Fifth Ed. Pesticide Control Branch. B.C. Environment.

Allan, Bob. Feb 17, 1993. Head, Enforcement and Emergencies Division Environmental Protection, Whitehorse, Y.T. pers comm.

Belton, Peter. 1989. Control Strategies for Yukon Mosquitoes. presented at 1st Annual Conference on Science Yukon Water, 1989, Whitehorse, Y.T.

Bidleman, T.F., G.W. Patton, M.D. Walla, B.T. Hargrave, W.P. Vass, P. Erickson, B. Fowler, J. Scott and D.J. Gregor. 1989. Toxaphene and Other Organochlorines in Arctic Ocean Fauna:Evidence for Atmospheric Delivery. Arctic Vol. 42, No. 4, P. 307-313.

Coates, Kennedy, Ed. 1985. The Alaska Highway Papers of the 40th Anniversary Symposium. U.B.C. Press.

Cohen, Stan. 1988. The Forgotten War - A Pictorial History of WW II in Alaska and Northwestern Canada. Pictorial Histories Publishing Co., Montana, USA.

Cohen, Stan. 1992. Alcan and Canol A Pictorial History of Two Great World War II Construction Projects. Pictorial Histories Publishing Co., Montana, USA.

Committee on Roads. 1946. The Alaska Highway - An Interim Report. prepared for the House of Representatives, U.S. Congress. Report No. 1705.

Curtis, Colin L. 1953. Observations on Mosquitoes at Whitehorse, Yukon Territory, Diptera: Culicidaes. Can. Ent. 85:353-370.

Debicki, R.L. Ed. 1982. Yukon Mineral Industry 1941 to 1959. DIAND QS-Y008-000-EE-A1.

DFO Report. 1960. Whitehorse Rapids Power Development 1960 Assessment Program. Fisheries office, Whitehorse, Y.T.

D.G. Regan and Associates Ltd. 1988. Government of Yukon 1988 Mosquito Control Program. prepared for Government of Yukon, Whitehorse, File No. 0188.

Eamer, Joan. 1989. Heavy Metals Contamination of Soils Through Concentrate Transport in the Yukon. prepared for Environmental Protection.

Eamer, Joan. Feb 18, 1993. Biologist, Environmental Protection, Whitehorse, Y.T. pers comm.

Edey, C.E. 1976. Alaska Highway-Haines Road Clean Up Assessment Study 1976. prepared for Land Use Section, DIAND.

Eftoda, Gordon. Feb 17, 1993. Western Areas Superintendent, Transportation Maintenance Branch, YTG, Whitehorse, Y.T. pers comm.

Envirochem Special Projects Inc. 1993. PCB Sources and Pathways in Yukon. prepared for Laberge Environmental Services, North Vancouver, B.C.

Environment Canada. 1991. Toxic Chemicals in the Great Lakes and Associated Effects, Synopsis. Cat. No. En 37-94/1990E.

Finnbogason, Tom. Jan 1993. Environmental Scientist, Envirochem. North Vancouver, B.C. pers comm.

Janzen, John. Feb 15, 1993. Municipal Services Officer, Municipal Engineering, YTG, Whitehorse, Y.T. pers comm.

Garret, Ed. Feb 17, 1993. Senior Maintenance Technician, CBC, Whitehorse, Y.T. pers comm.

Gay, Lorne. Jan 18, 1993. Manager of Field Operations, DIAND, Whitehorse, Y.T. pers comm.

Guenzi, W.D. Ed. 1974. Pesticides in Soil and Water. Soil Science Society of America, Inc. Wisconsin, USA.

Harris, C.I., E.A. Woolson and B.E. Hummer. 1969. Dissipation of Herbicides at Three Soil Depths. Weed Sci 17: 27-30.

Hearle, E. 1927. Mosquito Control Activities in Western Canada. Ann. Rep. Ent. Soc. Ont. 58: 45-50.

Huntley, T.A. and R.E. Royall. 1945. Construction of the Alaska Highway. prepared for Washington, USA.

Ilsuk, Alex. Jan 25, 1993. maintenance, Northwestel. Whitehorse, Y.T. pers comm.

Lamb, Randy. Feb 19, 1993. Biologist. Whitehorse, Y.T. pers comm.

Lister, Brent. Jan 25, 1993. Biologist, Sardis B.C. pers comm.

Midnight Arts. 1993. Edge of the River, Heart of the City, A History of the Whitehorse Waterfront. prepared for the Yukon Historical & Museums Association, Whitehorse, Y.T.

Morrow Engineering Ltd., 1984. Draft. A Field Trial to Assess the Effects of Vectobac A.S. on Stream Organisms. Prepared for Abbott Laboratories, North Chicago, Illinois.

Morrow Engineering Ltd., 1986. Yukon Mosquito Control 1986. prepared for Government of Yukon, Whitehorse.

Muir, Derek, C.G., Cathy A. Ford, Norbert P. Grift, Don A. Metner, and W. Lyle Lockhart. 1990. Geographic Variation of Chlorinated Hydrocarbons in Burbot [*Lota*] from Remote Lakes and Rivers in Canada. Arch. Environ. Contam. Tosicol. 19, 530-542.

Mundie, H. 1985. Memo to S. Samis, Habitat Management Division, Nanaimo, B.C. Report on Bacillus insecticide.

Nelson, J. 1972. Mosquito Control Study. Yukon Archives 628.96 NE.

Nelson, John Alfred. 1977. Mosquito Control in the Yukon Territory, Canada. 1972 and 1973. Thesis paper to Pestology Centre Dept, Simon Fraser University.

Neufeld, D. Feb 24, 1993. Historian, Parks Canada. Whitehorse, Y.T. pers comm.

Osler, Tim R. 1983. Study of Mercury Usage in Placer Mining Operations in Yukon Territory and Northwestern British Columbia. Prepared for Environmental Prot. Serv. DSS file # 032B.KE603-2-0155.

Porsild, Axel. Jan 26, 1993. Retired, Highways maintenance, Whitehorse, Y.T. per comm.

Rappaport, R.A. and S.J. Eisenreich. 1986. Atmospheric Deposition of Toxaphene to Eastern North America Derived from Peat Accumulation. Atmos. Environ. 20: 2367-2379.

Reger, M. 1983. Compilation of Listing of Known and Probable Abandoned Waste Disposal Sites Throughout the Yukon Territory. Environmental Prt. Ser. DSS File No. 06SB.KE603-3-0282 (3 Vols).

Remley, D.A. 1976. Crooked Road The Story of the Alaska Highway. McGraw-Hill Book Co., New York.

Saleh, M.A. 1991. Toxaphene: Chemistry, Biochemistry, Toxicity and Environmental Fate. Springer-Verlag, New York Inc.

Sharp, J.F. 1952. Adult Mosquito Control by Airspray in Northern British Columbia and Yukon. Can. Ent. 84: 281-289.

Snider, Grace. 1989. An Inventory of Inactive Industrial Waste Sites in the Greater Kluane Planning Region. prepared for Yukon Land Use Planning Office, Whitehorse, Yukon.

Stanley Associates Engineering Ltd. 1992. Range Road Dump Detailed Subsurface Investigation. prepared for DIAND Technical Services, Whitehorse, Y.T.

Synergy West Ltd. 1975. Canol Road Clean Up Assessment Study. prepared for Environmental Prot. Serv. Contract No. 019.

Taylor, G. 1993. Fax from B.C. Ministry of Environment, Fisheries, Victoria, B.C.

Thompson, R. Feb 19, 1993. Community and Transportation Services, Whitehorse, Y.T. pers comm.

Twinn, C.R., A.W.A. Brown, and H. Hurtig. 1950. Area Control of Mosquitoes by Aircraft in Sub-Arctic Canada. Proc. 37th Ann. Meet. New Jersey Mosquito Exterm. Assn. pp. 113-140.

Walker, C.E., J.E. Brown, and R.F. Brown. 1973. Rainbow Trout Planting and Lake Survey Program in Yukon Territory 1956 - 1971.PAC/T-73-12. Pacific Region.

White, R. 1986. Inventory of Pesticide use in the Yukon 1986. prepared for Environmental Prot. Serv. Whitehorse, Y.T.

Wilson, D.M. 1982. Inventory and Assessment of Polychlorinated Biphenyl (PCB) Use in British Columbia and the Yukon Territory.

Zell, M., and K. Ballschmiter. 1980. Baseline Studies of Global Pollution II, Global Occurrence of Hexachlorobenzene (HCB) and polychlorcamphenes (PCC) in biologic samples. Fresenius A. Anal. Chem. 300: 387-402.

References from Yukon Archives:

WP&YR Series II-10, COR 751, Waybills and Freight Register for Navigation Route, 1921-1925.

City of Whitehorse, Vol 978, File 2. Letter to Secretary of Whitehorse Planning Board from Garnet Jones District Superintendent of Fisheries, Oct 10, 1972.

YRGI Series 9, Vol 4, File 7, Insect Control, 1965-1968.

City of Whitehorse, Vol 1120, Files 5,6 & 7, Insect Control.

A-46, Alaska Highway Survey of Abandoned Camps, Alaska Highway, 1955-1959.

CR 82/456, Whitehorse Chamber of Commerce, 1945-1974.

U.S. Army Records Roll #3, Minutes-Canol Road Conference, Northwest Service Command, March 26, 1945.

U.S. Army Records Roll #3, Minutes - Staff of Northwest Service Command Meetings, Jan 31, 1994, Feb 21, 1944, April 10, 1944, April 17, 1944.

U.S. Army Records Roll #4, Report of the Canol Pipeline, J. Fordon Turnbull and Sverdrup and Parcel Architect - Engineers, March 26, 1944, 61 pages.

U.S. Army Records Roll #4, Memorandum for General Lutes, Feb 1944.

U.S. Army Records Roll #4, Memoranda concerning evacuation of materials and turn-over to Canadian Army, Feb 1945.

U.S. Army Records Roll #5, Demobilization Canol Project, memoranda concerning evacuation of materials, Northwest Service, 1944.

Appendix A

Non-Native Interviews

This appendix contains, in alphabetical order, summaries of twenty-five interviews conducted by members of the Project Team with non-native Yukoners.

Most of these interviews were quite lengthy (from one to three hours), so that it was considered neither useful nor convenient to take verbatim transcripts of the conversations. Instead, information provided by the interviewee that was considered relevant to the study or to the historical context has been summarized and is presented as accurately as possible. The Project Team takes no responsibility for any errors in the information presented by the interviewee.

Occasional notes have been inserted in the text by the interviewer, but all other material represents what was said by the interviewee.

No. 1 TRIG BAKKE

December 2, 1992

Mr. Bakke has been in Haines Junction since 1958. His uncle operated a generator in town in the 1940's.

No transformation equipment was used in the early days due to short runs. The Yukon Electrical Company installed a new plant in 1958, and has recently replaced any equipment that had PCB oil in it.

Mr. Bakke mentioned the same abandoned waste sites as Mr. Tait.

No. 2 G. I. CAMERON

November 9, 1992

Biographical Note

Initially, Gordon Cameron came to the Yukon in 1925 as a constable with the Northwest Mounted Police. After spending a period of time in Ottawa, he returned to a posting at Fort Selkirk in 1935. In 1950, he joined Yukon Territorial Government as a Health Officer and Liquor Inspector until his retirement in 1970.

Mr. Cameron described the attitude toward garbage disposal in the early days: It did not matter very much where they got rid of the garbage, so long as it was out of the way. It went into a dump or into the river. In Dawson there was a ramp right over the river for dumping. On the dredges garbage went into the dredge ponds.

He was Health Officer for the Territory from 1950 on. Each community had a little dump, usually at the bottom of a bank where they could push dirt over it. Whitehorse had two big dumps and each military camp had a dump.

At the Health Office they had little capsules that one could put in stagnant water. These would form an oil on the surface to kill the mosquitoes. In the communities in the 1950's and 1960's, they sprayed from the air. Mr. Cameron was not sure whether or not the Army used foggers around the camps. He could not recall the names of the products that were used.

All the old Health Office files on things like insecticides were taken to the basement of the old Federal Building. "Now you can not even find the building, let alone the files."

Mr. Cameron believed that White Pass used sprays along their railway to keep the brush down - as all the railways across Canada did. He understood they wanted to do it again recently, but they were not permitted to do so. The highways were never sprayed for weed control.

White Pass used lamp black to cut a channel in the ice of Lake Laberge. This was the soot obtained when lamp oil or kerosene was burned. He never heard of them using coal dust.

The Canol project was even a bigger project than the Highway and when the word came to stop, they dropped every thing and left within the hour - water in the taps, food on the stove, machines running. Then as long as the road was maintained, people started salvaging things. Two partners, someone and Hyde, got the contract to salvage the pipe. There was a big staging area at Johnsons Crossing, across the river, which should be checked.
The camps were big: Some would have as many as a thousand men with kitchens, machine shops, bunkhouses, fuel tanks, etc. But most of them can not be found any more. Some years ago, Mr. Cameron went with a man who had been a civilian contractor during the construction period, to try to find the old camps. Most of them could not be found because the road has been re-routed and the bush has grown up. There was a telephone line that followed the pipeline. Mr. Cameron tried to get them to remove the wire, because he has seen moose with the wire tangled in their antlers and going right through their mouths and it kills them. But no one would touch it.

Note: There followed a tangential discussion on the history of the Yukon telegraph.

There were some big farms in Yukon in the early days, but they never used any pesticides.

Mr. Cameron supposes the miners would have used mercury, but he does not recall much about that.

The Whitehorse oil refinery operated for perhaps a year: that was the only thing remotely akin to manufacturing. They also built a refinery in Haines Junction in 1959, but it only processed a couple of experimental batches. There were a couple of breaks in the pipeline (Haines-Fairbanks) and there have been a number of breaks in the Skagway-Whitehorse line. The original idea was to bring oil from

Norman Wells to Whitehorse and on to Skagway with a branch line serving all the airports as far as Watson Lake. When that did not happen, the line was reversed from Skagway to Whitehorse and the rest of the pipe was removed. The Haines-Fairbanks line has also been torn up.

No. 3 IONE CHRISTENSEN

November 9, 1992

Biographical Note

Mrs. Christensen spent her childhood at Fort Selkirk and moved to Whitehorse with her family in 1949. As well as holding many other positions, she has been mayor of Whitehorse, Commissioner of Yukon and chair of an inquiry into the disposal of special wastes in Yukon.

In the early days aviation fuel was brought down the river on barges, to be delivered to various airstrips. White Pass had strips at Carmacks, Selkirk, Mayo and Dawson, as well as other unofficial landing places along the River. One barge sank just above Selkirk and many barrels were dumped into the River. Ms. Christensen and her mother made five dollars per barrel, for every barrel they retrieved from the river and rolled up on to a bar. People often found barrels floating in back eddies or sloughs. Usually, they were not leaking.

After 1942, the army spread used oil on the streets in Whitehorse twice a week all summer until the mid-1950's. It was extremely dusty in Whitehorse, dust was everywhere.

In the 1950's there was a cat train route [a winter road] from Flat Creek above Dawson [where there was a major staging area] through the Ogilvies toward Eagle Plains. There was another major camp five or six miles west of Eagle Plains which may have been the Parkin airstrip.

The major user of lead-based paint would have been White Pass. They must have painted the riverboats every year or so, because they always looked nice and white when they came down in the spring. Repair work [tar and oakum] and painting was done at Moccasin Flats. White Pass used to run the stern wheelers which exclusively used wood. The docks at Whitehorse and Dawson had creosote pilings. Probably the treated logs were brought up.

There was a survey done along the Yukon River for a proposed railway to Fairbanks and there were big survey crew camps along the route.

Fuel oil was mixed with DDT and somehow made to smoke to create a fog and this would be spread from a truck that would go up and down the streets in the City. Frequent warnings were made to the residents when this would occur. It was always a big event and children would run out and chase the truck. Before the war, no DDT or other chemicals were used. Head screens and standing in smoke from fires were the methods used to keep mosquitoes away from a person.

Dustbane is a pellet which used to contain PCB oil because it attracts dust. It's use was wide spread in the 1940's and 1950's in stores and schools. The dustbane would be spread out then swept up, put in the garbage, and then taken to the dump at the Yukon River [Range Road dump].

If there are contaminants in Atlin Lake, they must be from an airborne source, because, apart from placer mining, there was no military or industrial activity in the area.

Mrs. Christensen does not think the minutes of the meetings of the inquiry on special waste disposal would reveal any additional information on past waste disposal or contaminated sites. Meetings were held in Watson Lake, Mayo, Faro and Dawson [as well as Whitehorse] and, apart from Whitehorse, were primarily attended by members of the local council.

No. 4 HARRIS COX

January 21, 1993

Biographical Note

Mr. Cox came to the Yukon in 1958. He started working for the Canadian Army in 1959 and was transferred to Public Works in 1964. He has worked for this organization to the present, which has now been devolved to YTG.

Mr. Cox was involved in the DDT program. He operated the fogging units; truck and hand-held. The concentrated DDT came in 8 ounce, 16 ounce and 1 gallon dark brown glass bottles and in 5 gallon drums, labelled DDT with a skull and crossbones symbol. The DDT was mixed with diesel fuel. Forty-five gallon drums of the mixture were used in the trucks. He can not remember the ratio of the mixture. Prior to ground fogging and spraying

over, he was made foreman with twenty-four mechanics working under him.

In 1947, he took a leave of absence and went to work for O'Sullivan of Calgary, who was a sub-contractor on the Canol Pipeline retrieval project. Their job was to assess the vehicles and equipment left behind by the U.S. Army when they left the pipeline and to remove any that could be made to run under their own power. Every seven miles along the line, there were vehicles and mountains of fuel barrels. Some equipment had been demolished by the crews in an effort to prevent theft; others had been already scavenged for parts; and some had been stolen by the crews themselves, written off as lost and hidden away in the bush for future retrieval. [Mr. Finster himself found a brand new dump-truck buried on a hill side near Stony Creek and two cats near Mile 1156.] The equipment was needed, because all during the war and even for some time after, the military had the right to all the equipment and spare parts that the factories could produce. Civilian equipment had worn out and there was no chance of getting replacements.

He was assigned to a camp at Mile 280 [from Norman Wells] and he found that the entire inventory of spare parts [a whole warehouse full] had been stolen by means of aircraft which landed on a nearby lake. So with six or eight men he worked there all through the winter of 1947-48. There was a big compound for equipment at Johnsons Crossing and people came from all over the world to bid on it. In the spring they sent a convoy of repaired equipment out to that compound. It was the same situation as when the American Army withdrew from the pipeline: The Pelly ice bridge was breaking up as they moved across it, so the last cat [which he was driving] went across by itself, while he took the foot bridge.

The pipe was being removed at the same time. There was a great demand for pipe in Alberta, so it sold very quickly. Initially, they were removing it in twenty foot sections, but these were very hard to move by hand. In some places the pipe was as much as three miles from the road, so they had to find strong men who could carry it that distance. There was still oil in the line, so there were frequent fires during the cutting process. Then [at Mr. Finster's suggestion] they began hauling the pipe out to the road in long sections, using cats. Then they could cut the pipe [which by this time would have discharged all its oil] and load it directly on to trucks.
Mr. Finster's next job was servicing the heavy equipment at each of the airports of the Northwest Staging Route, except those that had shops of their own. In Yukon he had Snag and Aishihik.

Each of the airports also had two Buda diesel generators and there were five each at Whitehorse, Watson Lake and Fort Nelson.

Then he went back into the shop at Whitehorse and soon transferred to the power-house. That building is still used as a shop on the road to Porter Creek. Originally, the Army power-house was across from where the "big M" is now, where the laundromat is located.

After his stint in Fort Nelson, he eventually went to Haines Junction, where a big generator had been installed in anticipation of the oil refinery operating. Super crude thick oil was shipped from Texas to Haines, Alaska, to Haines Junction. Of course, the refinery never operated, so the machine was badly under-used, not to mention all the wasted effort and expense of extra heavy lines, transformers and safety devices. The tanks still contain oil from the few shipments that were brought in for testing. The oil was so thick that they had to pass steam around the tank before it would flow.

There is probably quite a mess around that refinery site and also at the dump which at that time was about two miles along the old highway toward Marshall Creek on the right - just alongside the river.

He had not been there long when the Company [Yukon Electrical] moved him back to Whitehorse. It was taking over responsibility for power generation in several communities, so Mr. Finster had to assess the equipment that was already in place, mostly military. There had been civilian plants at Haines Junction and Watson Lake. At this time they were closing down every second highway maintenance camp - Mile 1156, 956, Brooks Brook, Marsh Lake, etc. Plants were also added to the system - Ross River, Pelly, eventually Old Crow.

If a transformer was not working or had blown, we just junked the whole thing; we did not service them. We did not remove the oil when we sent them to the dump.

The dust was so bad in Whitehorse in those days that they poured oil on the streets regularly. Taylor Chev would dump their oil from servicing onto the road between them and the river. Garbage went originally into

long trenches going from about where Mountainview Drive crosses Range Road to Northland Trailer Park. Later we started dumping over the bank near McIntyre Creek. There are two barges sunk in the river just off shore at that point, but they must be completely silted in now.

Every night during the mosquito season, they drove through Whitehorse with the "tiffa machine". A liquid [coal oil, he thinks] was fed on to a hot body and turned to steam or fog. It may have had something else in it. It made you choke if you breathed it in. They also sprayed from airplanes - you had to bring in your laundry before they flew over - that was virulent stuff. When they did the aerial spraying there were markers around the perimeter and men waving white flags.

Note: There follows some tangential conversations about the Canol Project and adventures on the Alaska Highway.

Mr. Finster had not heard of PCBs until a few years ago. When they got transformers from the outside, they were empty. Of course, when they were moved - say, from Whitehorse to Carcross - they would be serviced in Whitehorse and filled before shipping. He also put a plant up the mountain to serve the Venus Mine. They ran it with no load until it seized up. The plant in Carcross was also over-sized because of the demands of the Arctic Mine which shut down almost immediately.

Note: There follows a discussion of the difficulty of supervising a far-flung system of generating plants with unreliable operators.

No. 10 AL FISK

December, 1992

Biographical Note

Mr. Fisk has lived in Dawson for many years and works for Parks Canada.

Mr. Fisk described a survey by Envirochem/Environmental Protection Service in 1985. Tom Finnbogasun of Envirochem examined transformers in the area and did a detailed site survey at the Bear Creek Compound. A patch of PCB contaminated soil was found in a boneyard at Bear Creek where transformer hulls were situated. PCB was also found in the floor of the electrical shop. The material was later removed and transferred to Whitehorse.

Mr. Fisk suggested it would be impossible to trace contaminated transformer sites because YCGC recycled all their equipment. The Bear Creek camp was essentially a "recycling centre" where all so called new dredges were fabricated from old parts. Transformer equipment was reused at many sites.

The Chandindu, "12 Mile" power station was used from 1914 to 1932, when the North Fork was underway. Mr. Fisk believed equipment from the old 12 Mile plant was used in the North Fork system.

Tom Finnbogasun had compiled a list of serial numbers pertaining to transformers over the years, ranging from unlikely use to certain use of PCBs. Mr. Fisk carried this list with him for years and personally checked many old transformer carcasses. He walked the old Coal Creek and Chandindu power lines, checking out transformer carcasses. None of these had serial numbers in the hazardous range. He concluded the equipment used in all the power projects related to dredging pre-dated the use of PCBs.

Mr. Fisk mentioned dredge No. 11 near Last Chance Creek being associated with PCB. [A memo dated August 14, 1985 from Doug Kittle of EPS, Yukon Branch confirms the removal of 3 transformers from dredge No. 11, which were shipped to Alberta for disposal.]

A letter/report from Tom Finnbogasun to Mr. Fisk of August 20, 1985 describes the inspection and sampling program concerning PCBs at Parks Canada facilities. This document is on file at EP, Whitehorse.

No. 11 ART FRY

December 9, 1992

Biographical Note

Mr. Fry has lived in Dawson City since 1929. He worked on the dredges for many years and then began mining his own ground.

There were dredges operating long before YCGC came on the scene, at least as early as 1912. They all must have had transformers which were cooled with something. But, if people are going to worry about contamination, there were so many outhouses and horse barns in Dawson in the early days that "People should all be dead in this town here long ago."

Mr. Fry is sure they never saved the contents of the transformers; they just spilled them on the ground and the flood waters came and washed them away. But even if you find the contamination, he wonders what you can do about it. He has heard about mercury contamination near the army barracks on the hill in Whitehorse and so much oil contamination in the industrial area that you can not drink the water. But again, he wonders, what can be done about it. "You can remove the [contaminated] soil, but where are you going to put it?"

Note: There follows a tangential conversation about global pollution questions.

There was a smaller transformer in Dawson itself that was replaced after Mr. Fry arrived in Dawson, whether because it burned or had other problems he does not know.

Dredge number 3 worked the lower Klondike Valley and number 4 worked its way up to Bear Creek and beyond. Number 2 shut down in about 1940 right in Bear Creek. Each dredge had a main switch on it, but that was not of any size. If there were PCBs on number 11, then presumably they would have been on all of them - but only a little. The Granville transformer would have served probably three dredges. It was well out of the valley, because they were mining the valley. He remembers seeing the transformers, but he does not recall exactly where they were. When the transformers were salvaged, naturally the salvager, Striker, would dump out the oil and take only what he wanted. He also took the rails from the old Klondike Railroad, the North Fork plant and powerlines, and cleaned up Clinton Creek townsite. One of the very early transformer sites was on the road to Queen Gulch.

The old-timers used mercury because they wanted to process a lot of gravel and they only had limited water. They were "crowding the box" and they wanted to recover as much gold as possible. But some of the gold coated with mercury went through the box and miners still find it sometimes.

Note: There follows a tangent on Mr. Fry's early life and politics.

YCGC did not use mercury on the dredges and Mr. Fry has not used it at all. He does not think any miners have used it, since he has been in Dawson.

He feels that under ordinary circumstances you do not need mercury; your gold is going to sink to the bottom by itself.

It came in an inch and a quarter pipe with a cap on each end. That would weigh about ten pounds. He found a flask of it once and he gave it away. He does not know where you could buy it, but he supposes you would have to order it from an assayer.

No. 12 ALLAN GOULD

December 9, 1992

Biographical Note

Mr. Allan Gould is a long time Klondike resident. He worked for YCGC for many years.

Mr. Gould did not recall any specific use of PCBs in transformer maintenance. He noted that large transformers were located at Wet Gulch, which was the camp associated with No. 11 dredge. He suggested late summer or fall would be a good time to pinpoint transformer locations - he could likely find many of the locations. However, most of them were salvaged by Ernie Striker and others, to the point where little evidence remains on the ground. There may be hulks at Sulphur and Granville. The main copper salvage was from the transmission lines, and the copper inside the transformers may have been a minor item of interest in salvage.

We examined a 1945 map of transformer locations with Mr. Gould. He thought the final arrangement in 1966 would have been a lot different.

Mr. Gould believed the only significant use of mercury would have been at the Bear Creek gold room.

He did not recall significant use of pesticides in the area.

No. 13 JOHN GOULD

December 10, 1992

Biographical Note

Mr. John Gould is a long time resident placer miner and historian who has resided at Dawson for many years.

Mr. Gould described his experience of the use of mercury on Hunker Creek. The main use was in the 1920 to 1940 period. The dredging operations would have only used it at the gold

room at Bear Creek. It was usually collected in a retort and used over and over again. A small quantity would have lasted a long time. The Northern Commercial Company may have been a supplier of mercury.

No. 14 TERRENCE KENNEDY

January 21, 1993

Biographical Note

Mr. Kennedy came up to the Yukon in 1946 to build fire towers along the highway. In 1953 he started with the Yukon Forest Service as a forestry officer. He worked in Teslin for 4 to 5 years, then in Haines Junction until 1968 when he moved to Whitehorse.

When the highway was built, the trees were pushed up along the side of the highway, dried out and became fire traps, so fire towers were constructed to look out for fires. Mr. Kennedy remembers one year when there were 35 fires between Whitehorse and Marsh Lake.

In 1953 he started work with Forestry. In those days they did just about everything; fight forest fires, look after fisheries issues, act as game wardens etc. Oddly enough though, the mining recorder was in charge of timber permits.

Forestry started the campgrounds and every campground had a dump. It was part of Mr. Kennedy's job to do a dump survey along the highway. The last one he did was in the mid 1960's. There were dumps at all the maintenance camps which were located approximately every 30 miles. Also every lodge would have its own dump. He was also to check all the gravel pits as they frequently were used as dumps. The dump at Cracker Creek was the worst he had ever seen. It serviced the lodge, CNT, and the maintenance camps. The garbage was scattered over an area of approximately 10 acres in a mature pine forest behind the sites. Another bad dump was the one at Million Dollar Falls where a large camp was situated. All garbage was dumped over the bank directly into the Takhanne River.

He remembers hearing about herbicide use on the highways for about 2 years but did not actually see it and does not know which areas were done. He believes herbicides were used on emergency air strips throughout the Territory as there would be no equipment nearby to mechanically control the brush. He does not know what was used but thinks originally it had a different purpose, perhaps in mining. Mr. Kennedy said they accidentally discovered an insecticide for bug control at their latrines at their fire fighting camps. Misto-Van was a disinfectant and when calcium chloride [$CaCl_2$] was added, then some water thrown on it, an explosion resulted, killing all the insects hovering around the latrines. $CaCl_2$ was used for fire control. Back fires were created by putting diesel on $CaCl_2$ which produced an explosion.

During his time in Haines Junction he remembers getting small pellets and Tossits for insect control. They were issued small batches which were used up that season.

They were placed in ponds around the residential areas to kill the mosquito larvae. Paddy's Pond, a slough behind Hillcrest is soft bottomed and quite a number of barrels and other "stuff" are buried there. Till was taken from Ice Lake and McLean Lake area to help fill it in. About 3 years ago, this area was sprayed for mosquito control which seemed to have killed all the frogs there.

In the early 1960's, there were lots of moose between Haines Junction and Haines, Alaska and consequently, lots of wolves. The wolf control method used for several years was poison, probably strychnine. On one occasion, a couple of wolf-killed-moose carcasses were poisoned and left out for the wolves. They did collect 9 wolf carcasses but also unfortunately, 7 wolverine. Usually poisoned meat was dropped from planes. Poisoning proved to be an unsuccessful method as more birds and small animals were killed rather than wolves.

When he came to Whitehorse in 1946, there were 2 dumps. The trenches in the Northland Trailer Court area was the original dump site but became plugged with tires. The Range Road dump was used and initially everything was dumped into the Yukon River side. Later dumping occurred into the McIntyre Creek side. Even a ramp was constructed for trucks to back up on and dump. Eventually a dozer was employed which pushed all the garbage over the sides.

Another dump was located in the slough where the bridge to Kishwoot Island is. It was a mess in there but a lot of it has been dredged out. The ground is soft and the heavy material sinks into the ground while the lighter material is washed downstream during high water.

There was an ammunition dump, used by CIL and occasionally by Whitehorse Copper [although they had their own], 1.5 miles down the Carcross Road on the left hand side as you go towards Carcross.

During the Canol Road days some cats were lost off Teslin Lake where they had been parked. Although the shore is rocky, it is muddy further out and the weight of the cats caused them to sink into Teslin Lake.

Mr. Kennedy carried out an inspection when the Venus Mine closed. There were several plastic bags full of sulphuric acid, some leaking. A couple of men were cleaning up the site at the time, and said they would be dumping the acid. Mr. Kennedy did not know where it was dumped.

He also inspected Arctic Gold and Silver and discovered that their tailings pond was dry. The culvert blocking the pond had been pulled and the pond drained into a small creek which flows into Bennett Lake. He suggests that testing should be conducted in Bennett Lake.

The transfer site for asbestos from trucks to boxcars was located in an open area at the south end of 4th Avenue where Yukon Housing is now. He feels soil testing should be conducted here.

No. 15 JIMMY LYNCH

December 9, 1992

Biographical Note

Mr. Lynch is a long time Klondike resident and has mainly mined in the Sixtymile placer camp. He worked for the Klondike Mining Co. on a dredge at Sixtymile.

Mr. Lynch recalled limited use of mercury in the Sixtymile dredge operations. He described the use of a half potato held over the hot retort button to condense and re-use mercury. He suggested the little cabins where gold recovery took place is where mercury would have been spilled or wasted, but these amounts would be negligible because of the cost of the stuff.

To his knowledge, elemental mercury was not extensively used in the Sixtymile camps.

He did not think PCB contaminated oil was used in the area. The dredge he was on had an on-board diesel generator and there were no sophisticated switches or capacitors that would have had PCB in them.

No pesticides were ever used in the area to his knowledge.

No. 16 MAGNUSON/COUCH/ KREUZPAINTER

November 30, 1993

Biographical Notes

Ray Magnuson was born and raised in Atlin, B.C. From 1960 until his retirement in the late 1980's, he worked for the Yukon Highways Branch.

Orville Couch came to the Yukon in 1944 and worked as a heavy equipment mechanic and shop foreman at various Alaska Highway sites until his retirement in the 1970's.

Joe Kreuzpainter came to Yukon in 1946. He drove truck for the various agencies responsible for the Alaska Highway over a period of some thirty years.

Note: The following notes are taken from a conversation with Messrs Magnuson and Couch. As noted below, Mr. Kreuzpainter joined the group toward the end of the session.

One of Mr. Couch's first jobs was to close down every second camp along the Highway - about 1945. So he shut down Lower Liard River [mile 496], Iron Creek, Lower Rancheria [mile 670], Teslin [mile 804], Marsh Lake [mile 883]. Whatever equipment or parts were not immediately needed in the adjacent camp was hauled to a dump.

In those camps they used fogging machines and hand-held sprayers containing five percent DDT in kerosene.

Mr. Magnuson never saw more than one or two barrels of DDT-laced oil in a camp. They could order it from headquarters in the same way they ordered any other lubricant or motor oil.

For many years from 1944, there was an acre or more of full barrels [perhaps 1500 barrels in all] near where the Northwestel compound stands today on the Alaska Highway in Whitehorse. They were finally bought by a man from Watson Lake and sold to Cassiar for a "small fortune".

At one point Mr. Couch was ordered to travel

from one end of the Highway to the other, checking for and removing stocks of a particular kind of cylinder oil that was proving harmful to the equipment. His instructions were that, if there were eight barrels or less of the defective oil, he should simply open the bungs and pour it out on the ground. If there were more than eight barrels, they should be identified and separated from the rest. He does not know what they did with those. As it happened, when he got to Whitehorse, he found 250 barrels of the bad oil "right under their noses".

There was a Highway maintenance yard at Mile 911 [near McCrae], then 956 [Stony Creek], 1016 [Haines Junction], 1056 [Kluane Lake], Destruction Bay, 1156 [a former Utah Construction camp] and 1206.

The road built by the Army [in 1942] was little more than a trail through the trees; often two vehicles could not pass and only a 6 X 6 could get through. Then a number of contractors were hired, including Utah Construction, to widen it, correct the grades, gravel it and so on.

Mr. Couch recalled an incident where some one poured a jug of water into each vehicle gas tank. It froze. He had to take every gas tank off, drain the gas on to the ground, pump hot air into it till the ice melted, then put the tank back on the vehicle -a long and cold process.

The camps were equipped with 30-50 kilowatt diesel power plants - cat mostly. In the early years the only camp that had a transformer was Watson Lake - it was there to help even out the load. Later when the Highway maintenance crews started sharing power with the community or other installations [such as at Teslin], transformers were installed by Yukon Electric. In Teslin they were near the airport because we shared power with Transport Canada.

Later there were camps at Stewart Crossing, Gravel Lake, Mayo and Dawson. On the Dempster there was Klondike [kilometre 66], Ogilvie [kilometre 206] and Eagle Plains. Last summer and fall the R.M.O. in Dawson cleaned up a lot of barrels left behind by the oil exploration camps, so Mr. Magnuson thinks the area has been cleaned up fairly well. He was at Eagle River in 1969 and there was still plenty of oil company activity in those days - and for about another two years after that - both drilling and seismic.

Highways Branch hauled gravel out of the bed of the Porcupine River for the Old Crow air strip. In succeeding years they hauled gravel for air strip maintenance, pads for buildings and streets. Five or ten thousand yards could be removed each year and by the following season the river would have replaced it.

Mr. Magnuson saw mercury used by the placer miners in Atlin in the 1950's. It was usually contained in a cylinder like a small fire extinguisher. Mining the creeks today, you will still find some mercury in the gravels. He assumes it would be brought in like other goods from the railway at Carcross, by boat in summer along Tagish and then overland to Atlin Lake or in winter by cat train. The road to Atlin was not completed until 1949.

Note: Mr. Kreuzpainter joined the group at this point.

There was a tanker equipped with a high-pressure pump used for spraying the sides of the Highway for brush control. This was not used after 1960. About three days after spraying the brush would look like it had been hit by a killing frost. It was probably not used more than a couple of years. The only problem from that would be if, say, fifty barrels of the weed-killer were left lying somewhere - no doubt the effects of the spraying are long gone.

No. 17 CECIL MCLENNAN

December 18, 1992

Biographical Note

Mr. McLennan came to the Yukon in 1954 to be chief engineer with Northwest Power Industries on the Yukon-Atlin-Taku Power Project. He later worked as a highway construction engineer for Public Works Canada, where he was involved with, among other things, the route selection and construction of the Robert Campbell Highway and the first 40 miles of the Dempster Highway. He now lives in Whitehorse.

The Yukon-Atlin-Taku Power Project was a scheme to divert the upper part of the Yukon River - with a dam near Whitehorse - to flow back through Atlin Lake and a series of smaller lakes, including thirteen miles of tunnels, to the Taku River for the purpose of power generation. About three years of work, including such field work as surveying, drilling and flow measurements, went into the project before it was scrapped.

There was a lot of debris at Nakonake Lake, including oil cans that had been punctured by bears. Mr. McLennan heard of the same thing at Simpson Lake - all the cans were punctured and rolled about by bears and apparently the bears would drink the oil.

One of the buildings at the old townsite of Discovery, near Atlin, used to be an assay office. Mercury was found between the cracks of the floor boards and on the ground.

Around the highway survey and construction camps, they used DDT in a liquid form and Buhac, a brown powder that was burned to produce an anti-insect smoke. Both these products were available in the hardware stores and were the responsibility of the individual. No insecticides were provided to the camps.

Previous to DPW taking over, the Canadian Army had used defoliants along the Highway. He has noticed foliage dying along the highway to Dawson in the last few years and he thinks it is because of the leaded gasoline emissions from cars.

Mr. McLennan and Bob Davies stocked a pot hole lake east of Ross River with trout, but they did not attempt to clean the lake out first. The fish thrived on the shrimp that were there naturally and after one season they were pan fry size.

No. 18 PHIL NOWASAD

November 5, 1993

Biographical Note

Mr. Nowasad came to Yukon in 1959. During his career with Public Works Canada and Yukon Highways Branch, he worked on the Dempster Highway survey and on bridge construction throughout the territory, including the Stewart River bridge on the North Klondike Highway.

Before the Dempster Highway there was a cat trail running north and east from Dawson to service the oil exploration outfits in the Eagle River area.

He worked on the Dempster survey in the Eagle River area in 1970 and they flew the area every day by helicopter. They saw remnants of the oil exploration camps - big fuel tanks; leach pits where oil and drilling fluids had been pooled; seismic line that had become run-off channels and had eroded 15 to 20 feet deep. He got stuck on the wrong side of one trench that had been dry in the morning but was running neck deep by evening, so he had to spend the night there.

In the early years [1959 - 60] they did not use any bug sprays, but by 1970 there was a fogger in camp - which did not do much good. There was some kind of chemical in it, but he did not know what it was.

In the 1960's Mr. Nowasad did not recall any herbicides being used along the highways, though they probably did use something later [in the 1970's]. In his time they mostly just ran the grader along the edge to keep the brush down.

The oil company camps were supplied from the Parkin air strip which was located in the Eagle River area but some distance from the present Highway. They used it occasionally when they were surveying the Highway. Then, in 1972 or so, a winter road was pushed through to Old Crow [they later decided they did not want to use it].

You can probably still see some of those seismic lines today if you fly the Dempster Highway, because the vegetation does not come back very quickly in that country. By contrast, the old ten percent hill near Stewart Crossing was abandoned while he was there and after a few years it was completely grown over. They thought recently they might use that road again, and they had to let a clearing contract, because it had grown back so much. Then, they decided to go around it after all.

Steel bridges such as the Stewart River bridge received three coats of paint: The first was "red lead" and was applied at the point of fabrication - usually Vancouver. Then a grey coat and a green coat were added once the bridge was built. Any surplus paint would be disposed of at a local dump. There were dump roads leading off the highways in most locations, although they were not controlled or managed. The main concern was bears. The dumps were often in old gravel pits, sometimes buried and sometimes not.
After the Stewart, he worked on the Money Creek, Campbell River, Lapie Canyon, Morley River and Sicany River bridges, more or less a season at each place; each camp had a generator, but they were very small - perhaps five or ten kilowatts. He does not recall any trucking accidents involving dangerous products.

No. 19 JOHN SCOTT

November 16, 1992

Biographical Note

Mr. Scott worked as a longshoreman in Whitehorse for 10 years prior to World War II. He left the Territory from 1935 to 1947 when he trained as a mining engineer and then worked at the Juneau Mine. He worked at Elsa for a short time and also on the dredge at Bear Creek. He chose and surveyed the site for the McIntyre Creek hydro plants and supervised construction and operation of the plants. After he retired, he built the MV Schwatka.

Lead concentrate from Elsa would be stockpiled in Mayo on the river bank and bought by riverboat down the Stewart River, transshipped to Yukon riverboats, and brought to Whitehorse. The concentrate was shipped in paper lined burlap sacks and would often rot as they were just left out in the elements. Bags would leak or burst, the lead would be swept up and put back in bags, but there was lead dust all over the place. The sacks were transferred from the boats to flat cars right at the depot site.

The riverboats were painted every year with lead based paint, white lead and red lead paints.

Mercury was used extensively in the gold room at the Juneau mine. It was ladled into the concentrate and then the amalgam was retorted to drive off mercury vapour which was then re-condensed and re-used. Mercury was used in a similar manner at the Bear Creek gold room. There is naturally occurring mercury in the 40 and 60 Mile areas and the old timers used to mine it.

PCB oil was shipped in barrels by White Pass to the building just south of the White Pass terminal in Whitehorse. This building [which also served as a fire hall] was the site of a small diesel generator from pre-war days. [A larger military generator was installed near the Yukon Inn during the war.] Mr. Scott ladled the PCB oil into the transformer; 5 to 10 gallons for the small ones, and up to 500 gallons for the big ones. When transformers blew, oil was largely burned, but whatever was left would be taken to the dump. PCB oil would also have been used in the; military generator on Fourth Avenue, airport stand-by generator, Mayo townsite generator, Elsa Mine generator, North Fork plant and various dredge camps, and perhaps at the small plant on Twelve Mile Creek.

Whitehorse was really bad for mosquitoes as there are so many swamps in the area. Used motor oil would be put on the ponds to smother them. The only thing really for personal use when one went in the bush was Citronella which did not work very well. After the War, the power demands of Whitehorse were greater than what the diesel plant could supply. In 1949 and 1950, John Scott and his partner John Phelps were responsible for bringing hydro electric power to the Southern Yukon. They surveyed potential sites, chose the McIntyre site, built roads, dammed the north end of Fish Lake, and supervised the construction and operation of two plants. The hydro plant is located near the old Pueblo Mine site. This 300 person mine had operated until a cave-in occurred in 1917 and was never re-opened. A railway spur from McCrae serviced the mine and the tracks were still there when the hydro plants were built.

A small pothole lake with high steep banks on the south side of the Alaska Highway near McCrae should be checked because it was a favourite dumping spot of the military.

The area around Johnsons Crossing was also a major dumping area for material from the construction of the Canol.

The asphalt used for chip seal, which is being done all over the Yukon now, should be checked for contaminants because it is the residue of the refining process.

Mr. Scott also felt that arsenic should have been one of the contaminants on our list.

No. 20 KEN STEELE

November 18, 1992

Ken Steele was initially interviewed as a representative of White Pass. Information that was elaborated on in Marvin Taylor's interview was not included in this write up.

Mr. Steele wanted to know why lead is the only heavy metal being investigated and not zinc, copper, or cadmium.

There were lead concentrate spills in the freight yards. This area would include the site where Motorways is now and also the Taga Ku site. The findings from soil testing here is well documented by Norecol. There has been no testing between these sites and the river. There were spills up at the Utah transfer site but the Government has done testing at this site. There used to be a railway spur in the

large lot east of the Klondike Inn where trucks from UKHM would unload the lead to the rail cars. White Pass had the soil in this area tested but Mr. Steele was not at liberty to release the results.

There used to be a main army dump across from Canamet Sales and behind and under Beaver Lumber. Mr. Steele figures that a lot of Whitehorse is built on top of old dumps. For example, when the excavation was being done for the Klondike Inn, cat tracks were dug up.

White Pass was the main carrier until the highway was built. He believes there are no records of weigh bills or manifests for the riverboats, the train or the trucking service.

No. 21 ROD TAIT

December 2, 1992

Biographical Note

Mr. Tait came to Haines Junction in 1964 to take over as foreman of the experimental farm. He worked there until the late 1960's. He has then worked in the petroleum distribution business, transportation and ranching. He was on the Local Improvement District [LID] in the 1970's.

Mr. Tait described the history of the experimental farm. It was established in 1945 and functioned until the early 1970's. Various crops were grown and information documented on the aspects of farming viability in the area.

A field chemical sprayer was fabricated at the farm in the late 1950's, but by 1964 it was not in use. No pesticides were used during Mr. Tait's time on the farm, but there was likely 2,4-D used in the 1950's. Any residual materials including lab chemicals, was evacuated to Beaverlodge in 1970. If any dumping of leftovers did take place, it would have been in small quantities and likely went to the local garbage dump. Mr. Tait believed 2,4,5-T was applied on a pasture at Mile 1017.5 in the late 1940's. He also thought herbicide was used on the Haines-Fairbanks pipeline. Mr. Tait was told that Bennett Airways operating out of Fairbanks, was contracted to apply growth retardant along the pipeline, likely 2,4,5-T. He believed the person who ran the job is still active.

A company called Shamrock Oil had a tank farm near Mackintosh Lodge, about Mile 1024. There were four big tanks there, the idea being to gravity feed refined products to Whitehorse. The pipe was laid and the system worked for a year before it was closed down. Shamrock Oil sold to B/A [now Gulf Petroleum], and Mr. Tait worked for Russell Distributing, selling fuel stored at the Shamrock Oil tank farm in the late 1960's. The whole place was closed, likely due to leakage.

The old refinery located past the Champagne Aishihik office on the pioneer road remains an eyesore and environmental hazard. The refinery was likely built around 1945, to refine crude oil and produce asphalt for anticipated paving of the highway. The project was plagued with problems and only produced a small quantity of product and the lucrative road surfacing contracts never materialized. The place was abandoned until 1967 when another failed attempt was made to start the plant. Mr. Tait thought the remaining tanks are partially full and contain "dogs and cats and God knows what", and that the site should be cleaned up.

There was a serious spill from the Haines-Fairbanks pipeline in the late 1960's. It was detected because of lost product, and entered Dezadeash Lake from an underground pipeline area. The cause of the spill was "anode zones" and the pipe looked like it was shot full of holes with a shotgun. Hercules planes airlifted tons of baled straw from the U.S. to soak up the spill. Locals were hired to help. Hundreds of lake trout washed up dead on the north shore. The pipeline shut down around 1971. The leaky pipe problem was never solved satisfactorily.

Mr. Tait described several abandoned waste sites in the area:

[1] Haines Junction Airstrip/Pine Creek area, near end of old strip, lots of localized dumps there, and downstream along Pine Creek, especially on the left bank near the road crossing [a major dump].

[2] Dumps along the pioneer road [the 1942 route from Champagne to Haines Junction]; a large metal dump close to town on south side of the road - huge piles of vehicle hulks; Marshall Creek area - scattered dump that borders on the Dezadeash River near Marshall Creek, was originated in 1942.

[3] Mile 1018 - 150 metres off road on the south side, was a huge military camp, pits on hill sides were said to be gun emplacements. There was "at least an acre of cans on the ground there". A dug-out lagoon there was

used as the experimental farm water supply.

[4] Million Dollar Falls - Takhanne River; there is a big dump in a draw near the falls behind the present day campground. When Mr. Tait first saw the dump in 1965, it was full to the brim with packing crates and all sorts of garbage. Now it has receded a lot. The "Million Dollar" name came about because the camp was unusually well supplied with all the latest gadgets during the war.

[5] Near Bear Creek Summit; dump at former pumping station. There were 6 apartments there, so plenty of household garbage dumped.

No. 22 MARVIN TAYLOR

December 1,1992

Biographical Note

Mr. Taylor came to the Yukon in 1942 with the U.S. Army with transportation. He later started working for White Pass and Yukon Route where he is now President of the organization.

Note: Mr. Taylor refers during the interview to notes prepared for him by Ken Steele during a preliminary conversation with the interviewers.

White Pass transported lead out of the Mayo area starting in the 1920's. It was a lead concentrate - not a finished product - and at that stage it is not a toxic item. White Pass have had quite a bit of experience cleaning up lead at the Skagway terminal where it is more like dust and even at that stage it is not toxic. Mr. Taylor does not know if they lost any lead into the Yukon River in the early days, but if they did, it would not be toxic. When this lead scare came up, he had the yards tested by Norecol of Vancouver. All the areas were safe, depending on what you want to use them for. For the Company's purposes there was no problem. He also had the whole railroad tested from Whitehorse to the border and it was okay too. The Utah yard did not go into operation until 1969. It was found to be safe for industrial purposes, but not for a residence. The area where trucks are washed was marginal, but again there was nothing toxic.

White Pass has no record of ever having transported mercury, though it may well have been handled as general freight.

White Pass has never been in the electrical business and so Mr. Taylor assumes that the Company would have had no use for PCB's. White Pass has transported transformers, but he knows of no accidents where they have been involved. In the rail operations White Pass had to generate its own electricity at the maintenance stations, but they used small generators where no transformers were needed. So he concludes that White Pass should be clear as far as PCB's are concerned.

Regarding herbicides, in B.C., the Company sprayed the railway about five years ago, complying with all the regulations and all the permits. This year [1992], for the first time, they sprayed from the B.C.-Yukon border to the south end of Cowley Lake. They stopped there to avoid the main residential areas. They used Roundup and followed the B.C. regulations with the approval of the Yukon. They did the same thing in Alaska and, in fact, the Company's system has been recommended as a model for the state of Alaska, so they are pretty comfortable with it. Before that, all right-of-way maintenance was done by hand.

This year White Pass removed three tank cars from Bennett Lake - the accident happened in 1953 - and that is the last item Mr. Taylor knows of in the Company's operations that could be a problem of any kind. The cars contained gasoline and bunker oil.

White Pass bought ties from local sawmills in the Carcross area and for many years they used them untreated. In perhaps the early 1950's, they put in a small plant at Carcross to treat them with heated diesel fuel to which "penta" - pentachlorophenol was added. After leaving the ties in the heated mixture for an hour, the ties were removed and bathed in cold diesel fuel for coating. The plant was located just north of where the Tutshi sat on a spur line. To the best of Mr. Taylor's knowledge, there was never a spill there. In later days Dave Harder treated the ties himself at his location before delivering them to White Pass. Since about 1982 the Company purchased pressure treated ties from Vancouver.

White Pass did not paint their bridges. The only steel component in B.C. and Yukon is the girders on the Carcross bridge which are not painted.

They never used any spray insecticides [only personal products that they gave their employees] and they have no way of knowing

about shipments of insecticide that they may have transported.

White Pass sold the airline in 1938 [approximately] and has not maintained its emergency airstrips since then. There was one near the White Pass itself and there may have been one somewhere between Whitehorse and Mayo or Dawson, but they were never maintained with herbicides.

White Pass has had derailments, but the only serious one was the one they cleaned up this summer. Mr. Taylor was not aware of any riverboat accidents during his time with the Company. Before that "You would have to check the history books." On the highway there have been tanker problems from time to time, but these were always cleaned up to the satisfaction of every one and White Pass has no record of them.

Mr. Taylor has read that the Company used carbon black to melt a channel through the ice in Lake Laberge. He can not verify that, but he does know that they used coal dust for that purpose, because there was some in inventory when he came to work for the Company in the 1940's. It had been shipped in from outside, because it was packed in sealed sacks. It was not used during his time.

Note: At this point Mr. Taylor stopped speaking from his prepared notes and simply answered questions and offered comments.

He does not recall there being a major dump in the Granger area or even a road in there. White Pass drilled a big well near where the Yukon Inn now stands, "But that was nothing but a rabbit patch in those days." To get to the airport, you went up the hill at the end of Main Street, though there was a wagon and sled road roughly where Two Mile Hill is now.

There were military camps dotted around every where, but he does not recall if they used transformers.

No. 23 PHIL TODD

January 22, 1993

Biographical Note

Mr. Todd came to Yukon in October, 1946. He worked on heavy equipment as an operator/mechanic before opening his own salvage business.

Mr. Todd identified the following dump locations:

- 3 - 4 miles east of White River between pump station and bridge on south side of Highway;
- Mile 73 or 74 on the Haines Road in the bed of a river coming out of a glacier but on the far side of the road from the glacier;
- Mile 86 Haines Road between two rivers on both sides of the road
- behind Gold Rush Auto on the Alaska Highway near McCrae; and
- on the road to the old fox farm just off Alaska Highway just east of railway [McCrae area].

The tar in the area of the old Whitehorse refinery was dumped when they moved the refinery out.

The Government should be doing something about the carbon tetrachloride that shows up from time to time. It is very dangerous, because it produces phosgene gas which is bad for the ozone, but they have no procedures for disposing of it.

Mr. Todd knew a salvager who bought transformers from War Assets Disposal just as Yukon Electric did. He burned a lot of the oil in his stove and the rest he dumped on the ground in the dump which is now Granger Subdivision. This same man bought material from Striker who brought the transformers from Dawson.

The U.S. Army started the Range Road dump. It continued to be used until it was blocking McIntyre Creek. Mr. Todd feels that must be a source of all kinds of contamination - they should do some intensive water sampling there.

He does not recall any weed-killers being used on the highways, but they certainly used DDT in aerial spraying around Whitehorse in the 1950's. Local people used to spray local ponds, but they found that lube oil worked just as well. Mr. Todd never heard of Tossits.

Lead paint was used widely on bridges, tanks and even on paved roads. Since it hardens when exposed to air, the residues would still be in the dumps.

Mr. Todd has seen mercury in placer shows,

usually in a metal flask. He thinks it could be bought in drugstores.

Mr. Todd feels a distinction should be made between full-time airports and strips for daylight use only. Aishihik and Snag were lighted runways 24-hour-a-day, seven days a week. He would guess there were 70 or 80 people at each.

No. 24 NEWT WEBSTER

January 11, 1993

Biographical Note

Mr. Webster has lived in Dawson since the 1930's. From 1936 to 1967 he was superintendent of the North Fork power plant which supplied power to the dredge camps operated by Yukon Consolidated Gold Corporation, as well as back-up power to Dawson City.

Note: This interview was conducted by telephone. No audio recording was made.

The equipment at the North Fork plant had been there since 1904 or 1905. They never had to replace the oil in the transformers or refill them - they never burned out. However, they did sometimes remove the oil and filter it to get the water out. The transformers also had a cooling jacket which would sometimes sweat and that is how water got into the oil. Mr. Webster never heard of PCBs until after he had retired, so as far as he is concerned, they never used PCB oil products. Besides, from the 1950's onward, they were gradually shutting down their operations, so they would not be putting money into new equipment then.

He thinks the capacitors on the dredges contained a different substance - a kind of gel. He does not really know what it was.

They had a special stock of oil marked "transformer oil". It was a light oil, similar to the kind you buy in the pharmacy for digestive troubles. However, if it got too cold, say, minus 40 or more, it would not pour. But as long as there was power to the transformer, it was fine.

He does not recall any use of insecticides in the camps, but they did use 2,4,5-T to keep the brush down along the North Fork ditch. They first got the stuff because they had a big problem with dandelion fluff in the turbines. But then they found it was very good for brush control. A man walked along the ditch, applying the 2,4,5-T with a hand-pump. He believes White Pass used to do that along their rail line - he suggests that it would be easier and safer to fire up one of their steam locomotives and spray steam along the line - that is very effective and no chemicals involved.

He does not believe there was much mercury used in his day, but if there was, of course it would go down into the cracks in the bedrock and stay there. It can not harm any thing as long as it stays down there. If it was used in the gold room at Bear Creek, they would retort it, because they would not want to lose it - it was too expensive for that. One could buy it at the hardware store, but a small quantity was quite expensive.

When they salvaged the copper out of the transformers, they sold the tanks, either as tanks or cut up for scrap metal for various purposes. He does not think they went to waste.

The dredge motors used 440 volt power. The main circuits to the camps were 440 volts as well with small transformers for appliances that needed 110 or 220. The main transmission line was carrying 33,000 volts, so there were two step-down transformers for each set-up - from 33,000 to 2,300 and then from 2,300 to 440 volts

No. 25 ED WHITEHOUSE

December 3, 1992

Biographical Note

Ed Whitehouse was born in Dawson in 1909; grew up and went to school there. He did the winter 1928-29 mail run by dog team between Dawson, Stewart and Scroggie. He worked on the dredges and as a shovel operator for YCGC from 1929 to 1937. He then worked for Yukon Territorial Government until he retired in 1973, as a fireman, ferry operator and foreman of building maintenance, ferries and road construction.

All the dredges and camps had transformers. In 1966, a company from Winnipeg came up, dumped out all the transformers and retrieved the copper out of them.

No herbicides were used on the road right-of-ways in the Klondike area.

The Canadian Army built all the bridges on the Dempster Highway and Public Works built the

highway, in 1958. Insecticides were used at Ogilvie camp. The insecticide was a yellow powder which smouldered on the stove. At other camps, smudges were used as well as head and bed nets.

Before the Dempster was built, there was a winter road which went as far as Chapman Lake/Windy Pass area for the oil exploration in that region. There used to be a main camp at the bottom of Flat Creek Hill where the cat trains would take off from. In the early days, roads followed ridges for drainage and they were all over the Klondike.

In 1964, Secony Oil had a big camp at Chapman Lake near the Blackstone River. Oil wells were capped in the area. There was an airstrip at the camp which is still used as an emergency strip. There used to be many buildings here although now there are none. There was an extensive network of roads for the oil exploration, over 250 miles, starting around 10 miles north of Chapman Lake.

Mercury came in tubes of pipe with two screw ends. He found one of these in a house he bought in Dawson, sold the mercury and this covered the cost of his house.

Appendix B

Native Interviews

This appendix contains the summaries of interviews with 10 First Nations. They are listed in alphabetical order according to band name. Six of these interviews were conducted by Project Team members, the remainder by the environmental representative of the respective band.

YFN-1 CHAMPAGNE/AISHIHIK FIRST NATION

January 14, 1993

Present: *Ed Chambers*
Alex Van Bibber
A neighbour

Mr. Chambers contributed the most to this interview as Mr. Van Bibber had to leave early.

Mr. Chambers knew a man in Whitehorse who was very pleased to get barrels of transformer oil from Dawson after the North Fork plant shut down. It was available for reuse as hydraulic fluid.

The City of Whitehorse was incorporated in about 1950 and that is when they started looking for a dump site. They eventually decided on the Range Road site.

If you are looking for sources of contamination, look no farther than the White Pass tank farm and barrel washing plant right on the bank of the Yukon River in Whitehorse. There are barrels from that place all over the Yukon, because they will only take them back if you have the receipt for the deposit - there is no salvage fee, so even if a trucker finds a cache of forty barrels, there is no incentive for him to throw them on his truck and bring them back.

Another good idea would be to look at the Aishihik airstrip: This would be a typical site and it is largely still visible. Most of the dump sites along the Highway have been buried, so they are hard to examine.

He thinks most of the oil exploration camps in the north Yukon have been pretty well cleaned up now, but in the early days they were careless, especially about fuel handling. He hauled fuel in drums and tankers, first to Chapman Lake and then out to the Western Minerals camps. It was nothing to lose half a load of fuel on one of those trips and they did not bother to stop the flow while they transferred the filling hose from one barrel to another, so fuel was flying. There was quite a network of roads off the Dempster and he went as far as the barren tundra north of Old Crow, where they had huge fuel tanks - maybe 100,000 gallons. He filled one of those tanks and the fuel was coming out as fast as he put it in. So they threw drilling mud into the tank to seal it.

Note: A visitor joined the conversation at this point and suggested the White Pass train shops - including buried fuel tanks - the hospital and the Range Road dump as likely sources of contamination. There followed a tangential conversation about mail service and the problems of the Yukon tourism business.

Mr. Chambers hauled barrels of insecticide which was to be sprayed around Whitehorse for mosquito control in about 1974 or 1975. Dick Bond had the contract and he gave Mr. Chambers half a dozen of the barrels, but they were good for nothing, because whatever was in them ate the bottom right out of them. At that time they were spraying those sloughs in the Marwell area. They used hand-held foggers in the camps with diesel fuel in them, but people were only vaguely aware of what was going on in the camps, because those military camps were closed to the general public.

He believes the Government sprayed the sides of the highway in the 1960's to kill the grass. But the calcium chloride has killed its share of vegetation too. He has seen them spraying it on the highway on a windy day. And he has seen trees killed by the calcium chloride. They used to haul it into Whitehorse by the trainload - it must be thousands of tons. All the unpaved streets of Whitehorse were treated with calcium chloride.

Mr. Chambers believes that we have always been able to adapt to or survive the plagues that have hit us over the centuries, but now we can not control our population, so we may be going to kill ourselves anyway - not to mention all the waves that we are subjecting our bodies and our food to.

He used to have the shop which is now the Whitehorse recycling centre. He remembers seeing gophers stuck in the tar that was oozing out of the ground, but then White Pass covered it up with three feet of fill. You can see the remains of the old refinery still there today. When they built it, they had to bring in a new big power plant - four or six huge Fairbanks Morris engines - because it took a lot of power. That powerhouse is a Department of Highways shop now.

The Army had a dump on the lot where Acklands is now [that was White Pass land originally]. He was working there with a loader six or seven years ago and he dug up cat parts just under the surface. This was handy to the "REME shop" which was about where the Bay [Canadian Tire] is now.

There were huge dumps at McCrae too:

There were warehouses in that area because there were rail sidings for off-loading material. Those warehouses were built of good fir timber and so were the highway bridges - massive fir timbers treated with a green substance.

They used to run barges on Aishihik Lake to service the airport.

Note: There follows a tangent on the salvaging of crashed airplanes, the difficulties of working for government as a private contractor, inequities between rich and poor, gun laws and old Yukon characters.

Mr. Chambers has a three-page list of all known aircraft crash sites in Yukon with map coordinates.

There was a proposed mine at Mile 90 on the Canol Road. He worked on a cat train that went in to Sheep Creek, but the mine never materialized.

YFN-2 DAWSON FIRST NATION

December 8, 1992

The Project Team made a presentation at Chief Isaac Centre. The YFN environmental representative, Ed Kormendy, several band members, one elder and some land claims staff were in attendance. The project was explained and a general discussion of contaminants took place.

One of the band members recalled that in 1968 a number of song birds died after the local spraying of insecticides.

Tim Gerberding mentioned that a pile of scrapped transformers was seen 2 years ago near Clinton Creek and suggested that these should be investigated.

An elder recalled finding a large brown growth in a chum salmon caught downstream of Dawson. The specimen was given to DFO for analysis.

At the close of the meeting, the people were asked to discuss the contaminants issue with elders and forward any information through the environmental representative.

YFN-3 KLUANE TRIBAL COUNCIL

February, 1993

Mr. Keith Johnson, researcher for the Kluane First Nation Resource Management Centre, met individually with 7 knowledgeable people of the area, including elders from the White River First Nation. Sketches accompanied the interviews locating the identified sites [on file at LES office] and each person indicated that he/she would be available to help pinpoint each site if there was difficulty in locating them. Each summary is presented below.

Jim Flumerfelt, Foreman of Highway Maintenance at Destruction Bay

Mr. Flumerfelt presumed that wherever camps and sawmills were located there would have been a garage, storage site and dump site. He identified the following: Silver City, Sheep Mountain, Congdon Creek [sawmill[, Destruction Bay, Duke River, Burwash Creek [sawmill and camp], and the south side near the old bridge at Donjek River.

Chief Joseph Johnson, Kluane First Nation

Chief Joseph Johnson claims that at Long's Creek [Mile post 1156], on the right hand side under a bluff, there was a large dump that the army used.

There was a large spill of diesel or fuel oil at Swede Johnson Creek. What happened was that the pipeline froze up and they pushed salt water through to clean the pipe, and it froze. While they were repairing the pipe, there was a spill above Swede Johnson Creek and they could not eat the Grayling there for about 3 or 4 years. You could taste the diesel right in the meat.

Mr. Dick Dickson

Mr. Dickson remembers them using carbon tetrachloride [solvent], but after, the army decided not to use the stuff any longer. He does not know what they did with it. They probably buried it wherever they had a dump. There is one place just past the White River, in an old gravel pit where there are some old barrels and metal sticking out of the ground. About a mile past the bridge.

Mr. Thomas Bradley

When asked about mercury usage in placer mining, Tom indicated that although he never

used mercury in his operations, Ray Davies and Bill Drury had used mercury on their Arch Creek claims. Henry Besner used mercury on his Burwash Creek placer mine.

When asked about contaminants, Tom indicated that the army had used Agent Orange [2,4,5-T] for defoliation of the pipeline right of way, and possibly on the Alaska Highway. He remembers watching crews spray a substance on trees and willows along the Highway, and over a period of time noticed that the trees and willows were dying.

There were two dump sites that Mr. Bradley remembers. Between White River Lodge and Koidern Lodge there was a garage that the army had constructed on the left side going north. The building is no longer standing, but the cement pads are still there. There was a pump station between Bear Flats Lodge and Dickson's place, the road is on the left going north. Just the cement pads are there now.

Tom Bradley related that Henry Inger told him about watching army personnel dig a large hole on the White River bar and dump barrels and other materials into hole. Vehicles were also buried. Tom has no knowledge of the location of this site.

Mrs. Bessie Johns, Beaver Creek

All around the Snag Airport, there are lots of barrels that the army left behind, many of them have rusted out and the contents have drained. The army left lots of batteries behind.

Another dump is at the old pumphouse; there was a large dump there and they buried lots of stuff. The old pumphouse is in Beaver Creek on the first road on the right past Canadian Customs.

There was a dump and camp behind the old Livesey's store in Beaver Creek. She and her husband were picking berries and found a bunch of old barrels sticking out of the ground, some of them were still full. There is lots of old trucks there too.

At Mile post 1220, beside her Dad's place, there was an old army camp. She does not know what might be buried there.

Mr. Williams Peters, Beaver Creek

At Dry Creek Hill, right on top of the hill on the 1202 side, this side of that sharp corner, there is a road on the right - you cannot miss it - the army buried a bunch of stuff there.

Mr. Bernie Johnson, Burwash Landing

Mr. Johnson indicated that in the course of doing research for the land claims department of the Kwanlin Dun First Nation, he came across some information that documented the use of Agent Orange [2,4,5-T] as a defoliant by the U.S. Army on the pipeline [Haines-Fairbanks] right of way. There was also some documentation that the U.S. Army had used other pesticides and defoliants on clearing the Alaska Highway right of way. This information is contained in the archives of the Department of the Interior in Anchorage, Alaska.

YFN-4 KWANLIN DUN FIRST NATION

February 5, 1993

Present: *Darren Clethero*
Jessie
Alan Taylor
Carol Elofson
Michael Roger

Because of the health warnings, people are wondering how to tell if a fish is good to eat or not. People have always set nets in Tagish and caught grayling in the creek flowing into Fox Lake. The question was raised whether those grayling are safe.

The question was asked why the Government allows planes to land in the water supply for Whitehorse?

One elder had seen sewage apparently flowing directly from the Whitehorse hospital into the Yukon River and another had seen sewage flowing from a pipe near the Marwell lift station into the river.

It was believed that when the White Pass tank cars fell into Bennett Lake in the early 1950's, newspaper reports had mentioned one of them splitting open.

There is old telegraph wire stretching all the way from Whitehorse to Dawson.

As recently as a couple of years ago, insecticides have been used on the slough near the ball diamond at the old village. According to the speaker, this has been occurring for many years.

Note: Because of the low attendance at this meeting, elders supplied names of other persons that could be contacted if more information was needed.

YFN-5 LIARD FIRST NATION

January 18 - 19, 1993

This summary was prepared by Roberta Jules, the environmental representative for the Liard First Nation, on the basis of interviews she conducted with the following elders:

Bob Watson
Russell Magun
Oscar Stewart
Mary Stewart
Matthew Jimmy
Robert Jules
Alfred Caesar
Minnie Caesar

Insecticides [DDT] were available in stores and used as a household cleaner. It was also handed out by the public health nurse to kill lice, their eggs and other household bugs. In the 1960's aerial spraying for mosquitoes and black flies was done over Upper Liard and Watson Lake area. The spraying was done every spring. After the spraying a lot of small animals were found dead.

Mosquitoes were also controlled by ground fogging, some people pumped chemicals, which resembles oil, around their house. These people lived near the old Alaska Highway [where the campground is today] in 1956. The pumps came from the Hudson Bay store. They were discarded anywhere.

Tossits [described by elders - look like red berries] were placed all over the ice at Francis Lake by trappers and the game warden in the late 1940's and early 1950's. They also used another poison in powder form mixed with meat. This poison and the Tossits were used to kill wolves. As a result a lot of other animals were also killed. The poisons were later burned.

A few lakes in this area have been restocked but it is not known if anything was used in those lakes. The lakes are Ratin and Wye Lakes on the Alaska Highway, and Francis Lake on the Robert Campbell Highway. In the 1960's a lot of dead fish were found in Moon Lake. No one knows what killed these fish. There are no fish in the lake today.

The army sent here to build the highway and the airport, made dumps all over. Before, they dumped a lot of barrels and other junk in Watson Lake. The fish in the lake are full of worms and pus [infection] and a lot of fish were found dead. Some barrels were also left on the lake shore. Barrels were also discarded in Target Lake on the Campbell Highway. The barrels were believed to contain gas. There are no fish in this lake today.

Transformers, more barrels, DDT, and other things were dumped and buried at Radio Range on the Alaska Highway past the airport. There are other dumps in Upper Liard, 2 Mile, 2.5 Mile, the airport and the old pipeline near 2 Mile. A lot of chemicals were discarded in the dump near the airport. No one knows if there are any chemicals dumped in the other dumps.

Herbicides were used around the airport and the town of Watson Lake in 1952. The chemicals which resembled black oil came in pump containers. The chemicals were pumped all over to stop the growth of grass, willows and weeds.

In the 1960's the Yukon/BC border was sprayed. The chemical is unknown. All growth in the area stopped. An elder of Upper Liard shot a moose in this area about 25 years ago. The moose was in a very bad condition. Its hair fell off the skin and the meat fell apart.

Lead based paints were used on a few boats in the Watson Lake area. Some paint containers were burned and others were thrown in the dumps. Lead was also used for plumbing to seal leaks in pipes. The elders do not know if the paints they used were lead based.

Mercury, also known as quick silver, was used by a few people to prospect gold. The mercury was used over and over. The mercury came from the Hudson Bay store where it was later returned. They do not know what was done with the mercury after it was returned.

A few elders, who still live traditionally, have found deformities on animals. A moose with white sacs in the meat was shot 10 miles up the Liard River in the Big Eddie Swamp and in another moose shot at Simpson Lake area.

Fish caught in the Liard River had tissue that was like a soft watery substance. Whitefish from Francis Lake had white stringy stuff in its tissue. A growth resembling the white stringy tissue was growing on the chest of an elder who lived in this area most of his life.

YFN-6 **TA'AN KWACH'AN COUNCIL**

January 13, 1993

Present: *John Adamson*
Irene Adamson
Irene Smith
Sophie Miller
Henry Broeren
Doreen Grady
Shirley Adamson

Note: Photographs were displayed in the room showing a number of barrels washed up on the shore of a lake. The site was described as the east shore of Lake Laberge south of Laurier Creek and north of the access to the Livingstone Trail. Some of the barrels were cast iron and contained an unknown substance.

The Ta'an Kwach'an First Nation has documented and reported these barrels and other similar problems many times already. They feel they are stuck at step one in the process. These barrels should be tested and appropriate steps taken to clean them up. It is a disservice to First Nations people to ask them for this information again, when nothing has been done about the problems that have already been identified.

Note: There was then a discussion as to whether or not weed killers were ever used along Yukon highways. It was agreed that a new weed resembling tumble-weed had recently appeared on the roadsides. It was noted that some seeding had also been done.

The experience with the discovery of toxaphene in the Lake has been very frustrating for the Band. They deal normally with several departments, but then they find that toxaphene is the responsibility of Agriculture Canada. They simply do not have the resources to play this "snakes and ladders" game. They need coordination among the departments of government.

One of the river boats sank just off the island at the end of Mile Eight Road near Andy's wood camp. Some of the cargo was lost into the River, but the boat was refloated. The nature of the cargo was not known.

They are aware of two spills from the ore trucks from Faro, one into Fox Lake and the other near Shallow Bay. The concentrate was blowing like smoke into Shallow Bay, and they don't think it was cleaned up properly.

The Department of Highways uses so much calcium chloride that it must be a major source of pollution as it flows into every stream and lake along the highway.

A plane crashed off the north end of Richthofen Island and was never found.

They used to use oil and lamp black [or some similar black substance] to open a channel for the river boats in Lake Laberge. We often saw lots of dead fish after that practice. The fish began tasting oily too, just like after the refinery was built at Whitehorse. In 1938 an oil slick was seen on the shore of Lake Laberge.

Note: Based on the descriptions by the elders, Ms. Shirley Adamson drew two sketches, one of the known dump sites in Whitehorse and the other of dump sites near McCrae.

There are dumps in many places, but they have not heard of the Army dumping material on the ice of Lake Laberge. The Northland Trailer Park is built over a dump. The area across the street from where the SAAN is now was a dump - there are cars and other things buried there. In fact, that was all a slough as far south as Fort Yukon. Every one threw their garbage into it or into the River - you could take your garbage to the river ice just as you take it to the curb for pick-up today. When spring came the garbage would go out with the ice. Later they moved the dump to the area where Beaver Lumber is now. They used garbage to try to fill in that slough, so that the City could expand in that direction. Discarded heavy equipment was put in there as fill too. The Hospital also used this dump. They also put train cars in the River as bank protection. There was a fox ranch in the area that is now downtown Whitehorse in the early days. Even before that there was a slaughterhouse on Second Avenue not far from where the Mall is now - some of the poles are still there. There are several army dumps in the McCrae area. Across the highway from McCrae and just south of the turn-off to Whitehorse Copper there is an old army dump. Still lots of old cans etc. there. Also on the left side in the dip before Wolf Creek is a dump site where equipment is visible. Mr. Adamson offered to point them out on site as he has salvaged them for parts over the years and is very familiar with their locations. He also knows of a 6 x 6 truck in Atlin Lake just off Labrador Point that went through the ice in the 1950's.

They sprayed for mosquitoes from aircraft around Whitehorse and even went as far as Laberge [Shallow Bay] in the 1950's. There would be warnings on the radio to bring in your laundry and cover up your vehicles. The stuff also smelled awful. The spray was so powerful it took the paint off a new pick-up truck.

There were two separate Army exercises that affected the Ta'an Kwach'an; they fired at Richthofen Island using big guns set up on the west shore of the Lake; and they bombed an emergency airstrip which was located on the road to Mud Lake off Mile 12 on the Mayo Road - that road is closed now by a gate put up by Pelly Mountain Outfitters. No warning of either exercise was given, but the bombing shook the windows in their houses, and one time one of the windows popped right out. Of course, the Army started the big fire of 1958 - chemicals of some kind were used in fighting that fire. The fire retardant used is of concern because it washes off into the river system.

The Government should take metal detectors to each site where there was a highway construction camp - they would find lots of buried garbage. The boys used to tell them about REME [Royal Electrical and Mechanical Engineers] burying a lot of new stuff near their shop, cases of it.

Mr. Broeren worked for twenty years in the Old Crow oil fields; there are lots of barrels left all over that area. In fact, anywhere that mining has taken place, one can expect to find all kinds of garbage.

This is a big country and First Nations can not monitor every inch of it. They have been wracking their brains for sources of pollution, but it is frustrating that the obvious ones have not been dealt with. Whitehorse Copper, for example: There is even a sign there warning about PCB's - why are they still there?

They have seen little round globules of oil that look like chicken pox on the livers of ling cod - especially the older ones but not on all of them. But the sheefish [inconnu] seem to be in good shape.

YFN-7 TAKU RIVER TLINGIT

January 12, 1993

Present: *Jack Williams*
Edward Jack
Alan Carlick
Melvin ?

The Band will be undertaking a program of sampling from Paddy Lake where fish have been found with unusual spots on their livers. It has been chosen because there is no vehicle access and very few people go there, so it should be a clean lake.

As recently as four or five years ago, insecticides were sprayed in the area of Camp Yukon.

Many years ago several drums were seen about 200 to 300 feet from Atlin Lake on a small farm that was being established at that time near the Yukon border. The owner said they were for the hay; whether it was fertilizer or weed killer was not clear.

There was also a fox farm in the Atlin area.

The Atlin Silver Mine closed down in about 1986. It was an old mine with a new mill, equipped with a cyanide circuit. It probably had an assay set-up as well. When they shut down, there were barrels on the property, but they have been scattered and rolled down the hill side by tourists - just for fun. Water from the mine property flows into MacDonald Lake.

Band members have seen mercury in some of the creeks. They know that it goes down into the cracks in the bedrock and can be re-distributed if the bedrock is disturbed. That is why they opposed the Surprise Lake project.

The present Atlin Dump is right across the road from Como Lake and near the reserve. There are no controls on what can be dumped there, so the water for the reserve is bound to be affected. The other town dump drains into a slough which, in turn, drains into Atlin Lake. There are no rats or suckers in that slough any more.

There was a mine at Border Lake above Telsaqua that closed down about ten years ago, leaving drums of fuel and drilling muds behind.

At Kennicott Lake on a little island in the mouth of the main creek that feeds the lake, there are rusty drums partly submerged in the muskeg. Some of them still contained liquid.

Someone flew in to Little Trapper ten or twelve years ago to build tent frames for an exploration company. The whole valley was littered with paper, styrofoam and bits of old shacks that had blown down, as well as blasting caps and dynamite - "You name it."

A fishing guide told Mr. Jack that his boat hit

something hard one stormy day on Little Atlin Lake. When he came back in calm weather, he found a big army gun just under the water. There was probably an army camp on Little Atlin Lake during the building of the Alaska Highway and there is probably lots of other junk in the Lake. They must have had insect sprays too and whatever they had was in large quantities.

All the lakes along the Alaska Highway should be investigated, especially the deeper parts. The Army knew which lakes were deep and which ones were shallow and they would not throw their junk into the shallow parts.

The Band would like to get some funding to monitor the quality of the water they pump from their wells, and the water they deliver to the homes at Five Mile. They already know that the iron levels are higher than they used to be and the water is sometimes fizzy, as if there were carbon dioxide in it.

On Spruce Creek [tributary of Pine Creek] there is a backhoe, a big machine with two motors and a five or six yard bucket. It must contain a thousand gallons of oil. It has been there for at least ten years and every year the creek washes a little closer to it. Soon that backhoe is going to fall into the creek with all its oil. First Nations people should be hired to do the clean-up work, because they know where the real problems are - this backhoe, for example.

Note: There follows a discussion of the legal right of a downstream water user to seek redress if his water is polluted by an upstream user. The case of the Laberge band against the City of Whitehorse was discussed as an example.

Frank Slim told Mr. Williams that the Army hauled so much garbage - and even brand new equipment - down to Lake Laberge, that the ice caved in under the weight. This was their disposal method.

Another place to look for contaminants would be Johnsons Crossing. There was a big camp there.

There was a man in town who had a barrel of mercury behind his house for years. Eventually he sold it to a miner on O'Donnell River.

There is something like 37 drums around Kuthai Lake, so there is probably oil contamination there. This is a concern because Kuthai is a salmon spawning area.

At Ruby Creek there remains only the foundations of the buildings that used to be part of a mine development.

Some lakes have been stocked with rainbow trout, but there were no fish in those lakes before, so they did not have to kill them off first.

There is also the Engineer Mine which may be going to reopen and the Taku Mine which used to dump all its waste into the Taku River.

Mr. Williams has noticed some unusual behaviour in the caribou: He followed their tracks up the road; they would go off the road into the deep snow toward a big tree, then, without reaching the tree, they would turn back on to the road. They did this several times. He supposes they found the snow was too deep, but they wanted to paw the ground at the base of the tree. There used to be lots of caribou, but now they do not see them any more. But he believes that you can not just blame the wolves: it also has a lot to do with their food. If there is too much ice on the ground, they can not get their food, so they starve.

Band members hear stories about the Army cats and trucks getting stuck during the building of the Alaska Highway. Rather than trying to get them out, they just buried them and moved on. The same is true for the barges: If a truck or a barrel fell off a barge, they did not bother to retrieve it. Ten years after the highway came through, every one in the area had a cat. Mr. Williams and his crew found one near Quiet Lake - a brand new one - that had been parked there so long there was a big tree growing up inside the track. There was an Army camp near the turn-off from the Atlin Road on to the Tagish Road and another one at Carcross.

There are a couple of cats on mining properties in Blue Canyon. At least one of them has been there for ten or fifteen years, so Mr. Williams thinks they must be abandoned.

Aerial spraying for mosquitoes was done in Atlin about ten years ago.

The Band has some sewage problems also: some people overload their septic tanks. Sometimes the holding tanks are not emptied carefully, so that sewage is spilled on the ground and finds its way into the Lake. It was only a few years ago that Band members found that their out-houses were contaminating the Lake, but they did not even have running water until they started complaining.

People used to use telegraph wire to string their fish nets under the ice. As a result there is a lot of telegraph wire at the bottom of the lakes, particularly Atlin Lake. Here again, the native people know where the nets were set, so if it turns out that the wire is a problem, the native people should be contracted to clean it up.

YFN-8 LITTLE SALMON/ CARMACKS FIRST NATION

January 26, 1993

Present: *9 Elders*
7 other Band members

The interview session began with an explanation of the Arctic Environmental Strategy and the background and purpose of the Archival research project. Each of the target contaminants was described in detail. One of the elders wanted to know what was being done about sampling water and fish along the waterway from Whitehorse to Carmacks because Whitehorse was likely the source of many of the contaminants.

The first concern that was raised was the apparent change in lake-side vegetation along the shore of Jackfish Lake, situated near Pelly Crossing along the Klondike Highway. Some of the elders talked of a white discolouration on the bottoms of the brush and trees that was not present before the road was built. The water quality, vegetation, and fish were suggested for sampling.

The next issue raised was the possibility of discarded transformers containing unknown quantities of oil being removed from the Nt. Nansen mine area. The fate of these transformers and contents was not known.

A discussion concerning mosquito control took place. The people recall extensive aerial spraying of Carmacks ending about 8 years ago. One person recalled paint peeling from a vehicle parked under the flight path. The substances used in the spray were unknown and no one knew of any specific disposal sites of unused insecticides.

A discussion of garbage disposal sites followed. The elders complained about the practise of burning the Carmacks municipal landfill, and wanted to know how this practise could be brought under control because of the obnoxious odour, smoke and possible distribution of substances. It was suggested that the Department of Community and Transportation Services should be contacted on this matter at an upcoming meeting.

A garbage dump associated with a road house on Little Braeburn Lake was mentioned. It was thought that this dump would have been used until the opening of the Klondike Highway in 1953.

Another dump along the old road was mentioned at "Little River", just north of the Takhini River crossing. There was a military construction camp there before the Alaska Highway was located at its present alignment. Similarly, a dump at Montague House was cited as a large local refuse site used for many years.

There was also mention of an ore truck which went into the Pelly River years ago. They did not have any other details about the incident.

One elder mentioned a number of barrels which appeared to be producing a rust coloured discharge on the shore of Round Lake, one of the lakes along the south side of the Nansen Road.

The garbage dump at McCabe Creek was mentioned as a long time refuse disposal site. [This site is on inventory.]

A small plane crash with unknown cargo was mentioned on Coal Mine Lake. The crash happened a "very long time ago".

One of the elders mentioned an ore truck crashed into the Pelly River at the old ferry crossing in the 1950's. The ore was from Keno.

Concerns were expressed about the fate of abandoned mines in the area, particularly Mt. Nansen and Tantalus Butte Coal Mine. When would these places be cleaned up and made safe? One person talked of people who worked in the Coal Mine developing cancer in later years, and wanted to know if there were carcinogens in the mine. The unsafe open shafts and old cave-ins were raised as a possible hazard that should be cleaned up.

The issue of fish stocking and poisoning was raised. The elders were aware of recent stocking programs in the area, but did not know of deliberate poisoning prior to introduction of fish stocks. One person thought that one of the Twin Lakes may have been poisoned.

Then followed a discussion of the need to educate people on how to recognize hazardous materials in the bush so that they can make

note of them when they go to fish camps or on traplines. The need for local water supply sampling was raised by one elder who wanted Morse Creek sampled [downstream of Carmacks], because it is their water supply at the camp and may be affected by mining activity upstream. One elder wanted to know if snow was being sampled for contaminants, since he understood these substances can be transported long distances through the air.

One of the elders then told a local legend about how to increase yield of fish in lakes where the catch was lean.

The interview session then broke into lengthy discussions of waste management, health impacts of contaminants in country food, and other related topics.

YFN-9 VUNTUT GWITCHIN

February 9, 1993

A public meeting of approximately 40 members, was held in Old Crow on February 9, 1993. At that time, Don Sax the environmental representative of the Vuntut Gwitchin First Nation, raised the issue of the contaminants of concern for this project. No one at the meeting had any recollections of any such materials being used or stored in the area.

They are aware of many caches of petroleum products in barrels but all these have been documented and in some cases, cleaned up. It is also known that there are a number of lakes and certain sections of the river where drums, etc. have been dumped, but again these apparently have all been documented.

Appendix C
Waste Site Inventory

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
BC	PUMP STATION MILE 1205.5 BEAVER CREEK	6223	14052	CANOL PUMP STATION H	1	SEE DIAND INVENTORY	D.I.A.N.D.	MILITARY, 1944-1945
BC	PUMP STN MILE 1166 ALK HWY KOIDERN	6159	14038	CANOL PUMP STATION G	1	SEE DIAND INVENTORY	D.I.A.N.D.	MILITARY 1944-1945
BC	BEAVER CREEK PUMP STN	6227	14038	PUMP STATION	1	SEE DIAND INVENTORY	D.I.A.N.D.	MILITARY 1954-1970
BC01	OLD TELEGRAPH LINE - ALASKA HWY TO SNAG	6214	14041		0	INSULATORS, POLES AND WIRE TO BE REMOVED WILDLIFE HAZARD	D.I.A.N.D.	MILITARY 1941- CIRCA 1964
BC02	SNAG AIRSTRIP	6222	14025	ABANDONED STRIP/ VILLAGE USED BY BAND	1	BUILDINGS, GENERATORS, 80-100 DRUMS IN DUMP ALL EMPTY, DRUM STORAGE AREA TO BE INVENTORIED	LAND CLAIMS R-8	MILITARY USE 1941-APPROX.1964
BC03	OLD MILL RD #1	6227	14041	ABANDONED SAWMILL	0	BURN COMBUSTIBLES, SLING METAL DEBRIS TO NEARBY SITE OR AIRPORT. OLD BLDG, HORSE STALLS, FUEL TANKS	D.I.A.N.D.	
BC04	OLD MILL RD #2	6226	14047	ABANDONED	0	SITE WITH METAL DEBRIS	LAND CLAIMS S-52 BLOCK	
BC05	DC 3 [MILITARY] CRASH SITE IN SMALL LAKE	6231	14042	ABANDONED AIRCRAFT	0	SLING TO AIRPORT, UNKNOWN CARGO	D.I.A.N.D.	LAND CLAIMS, AND FAIR-1 OWNED BY M. STAMMERS, SEE MAYO MINING RECORDER YB29162
BC06	KOIDERN RESIDENTS	6159	14039	ABANDONED RESIDENCE	0	2 - 4 CAR BODIES	D.I.A.N.D.	ORPHAN SITE, MAY HAVE BEEN RESIDENTIAL LEASE
BC07	BEAR FLATS AND WHITE R. LODGE	6158	14030	FOUR ACTIVE LANDFILL SITES	0	YTG MUST FIRST SET UP CONTROLLED LANDFILL SITE; GENERAL HOUSEHOLD GARBAGE	D.I.A.N.D.	LOCAL RESIDENTS, HOUSEHOLD GARBAGE
BC08	BURWASH FLATS	6126	13913	ABANDONED DUMP SITE	0	OLD ENGINE BLOCK, CULVERT, PIPE AND PARTS. METAL REFUSE	LAND CLAIMS R-1 BLOCK	SITE POSSIBLY ON RESIDENCE MILE 1103.9, OR FEDERAL LOTS 00020, 00014. WITHIN R-1 BLOCK.
BC09	DRY CREEK	6210	14041	ABANDONED DUMP SITE	0	HAUL TO BEAVER CREEK DUMP SCRAP METAL DUMP.	LAND CLAIM S-18 BLOCK	
BC10	TATAMOGOUCHE CREEK	6125	13925	ABANDONED CABIN	0	OLD COLLAPSED BUILDING	D.I.A.N.D.	
BC11	PINE VALLEY	6148	14004	ABANDONED SAWMILL	0	REMOVE SCRAP; BURN DEBRIS.	LAND CLAIM R-10 BLOCK	
BC12	BEAVER CREEK SAWMILL	6218	14057	ABANDONED SAWMILL	0	OLD SAWMILL PIECES	D.I.A.N.D.	NO MINERAL CLAIMS PAST OR PRESENT

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A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
BC13	CASINO AIRSTRIP [OLD DAWSON 129]	6241	13908	ABANDONED CAMPSITES ON AIRSTRIP	0		ARCHER CATHRO	ARCHER CATHRO AND ASSOCIATES [1981] LTD BOX 4127 WHITEHORSE, Y.T. Y1A 3S9
BC13	CASINO AIRSTRIP	6241	13908	ACTIVE/ABANDONED EXPLORATION CAMP	2	NO MINERAL TENURE	ARCHER CATHRO	SAME AS ABOVE
BC15	PROSPECTOR AIRWAYS MINE	6157	14032	EXPLORATION/MINING	0	MINE ADIT, CORE AND CREW SHACKS. UNKNOWN LEACHATE, ADIT DISCHARGE.	ALL NORTH RESOURCES LTD.	QUARTZ CLAIM GROUP 009126Q "MICRO",ALL NORTH RESOURCES LTD. TO OCT.10,1992. 1964: PETER VERSLUICE; 1967: DISCOVERY MINES LTD.; 1972: CANADIAN SUPERIOR EXPLORATION; 1974: PETER VERSLUICE; 1983: HARRY VERSLUICE et. al.; 1987 to date: ALL NORTH RESOURCES LTD.
BC23	WHITE RIVER COPPER MINE	6147	14048	MINING/EXPLORATION CAMP	0	RMO RECOMMENDS CONTRACT FOR REMOVAL. SITE CAN BE ACCESSED BY EXISTING WINTER TRAIL. SITE INVENTORY CONSISTS OF TRAILERS, MT DRUMS, MT FUEL TANKS, STEEL PIPE, CORE STORAGE, METAL PARTS AND DEBRIS.	DOUG REGHER, QUARTZ CLAIMS	QUARTZ CLAIM GROUP 009154Q "DOUG", DOUG REGHER; 1983 to DEC.5, 1992: DOUG REGHER. CONSISTS OF 2 CLAIMS SURROUNDED BY S-40 BLOCK, WHSE MINING RECORDER DISTRICT.
BC24	WHITE RIVER COPPER MINE	6146	14047	MINING/EXPLORATION/ STAGING	0	RMO RECOMMENDS CONTRACT FOR REMOVAL. CAN BE ACCESSED BY SAME WINTER TRAIL AS BC23. SITE INVENTORY CONSISTS OF TRAILERS, UNKNOWN TRAILERS, UNKNOWN QUANTITY OF FUEL IN TANKS, WOOD DEBRIS, DOCK, AND CAMPSITE DEBRIS.	D.I.A.N.D.	NO RECENT MINERAL TENURE. LOCATED IN S-40 BLOCK.
BC25	SNAG REPEATER SITE	6226	14021	MILITARY, WWII	0	SOIL SAMPLES TAKEN AT SITE NEGATIVE FOR PCB	D.I.A.N.D.	MILITARY USE
BC26	BURWASH PIPELINE TEST SITE	6126	13915		0	CONCRETE PLATFORM, BURIED INSULATED PIPE, UNDERGROUND TANKS.	LAND CLAIMS R-1	SITE LOCATED WITHIN R-1 BLOCK.
BC27	BURWASH PIPELINE TEST SITE	6126	13915	STAGING AREA, METAL SCRAP AND REFUSE	0		LAND CLAIMS R-1	SITE LOCATED WITHIN R-1 BLOCK.
BC29	INDEPENDENCE CREEK CAMP	6252	13944	EXPLORATION CAMP	0	RMO RECOMMENDS BURN WOODEN DEBRIS ON SITE, REMOVE DRUMS TO CASINO AIRSTRIP. SITE INVENTORY CONSISTS OF TENT FRAMES, MT DRUMS, 1 DRUM JP4.	D.I.A.N.D.	QUARTZ CLAIM GROUP "VINA", HELD BY ATLAS EXPLORATIONS LTD. 330-355 BURRARD ST. VANCOUVER, B.C. 1970 TO 1972. SEE WHSE DISTRICT MINING RECORDER INSTR. No.Q44757
BC31	DRILL SITE	6147	14048	OLD DRILL SITE WITH CORE STORAGE	0	RMO RECOMMENDS REMOVAL ALONG WITH BC23 AND BC24	LAND CLAIMS S-40	LOCATED IN S-40 BLOCK.

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
BC32		6144	14040	EXPLORATION CAMP/ STAGING AREA	0	SITE INVENTORY CONSISTS OF 6 MT DRUMS, METAL SCRAP, TENT FRAMES AND REFUSE. RMO RECOMMENDS REMOVE DRUMS TO WHITE RIVER LODGE, BURN WOODEN DEBRIS ON SITE.	D.I.A.N.D.	EXPIRED QUARTZ CLAIM GROUP "DOUG", INCLUDING CLAIMS Y21642 AND Y21644 ARE ABOUT 1km FROM SITE. WHSE MINING RECORDER DISTRICT.
BC33		6137	13940	STAGING AREA	0	WOODEN TOWER, PLATFORMS, SHED.	LAND CLAIMS S-48	SITE LOCATED WITHIN S-48 BLOCK.
BC39	CASINO MINE CAMP	6244	13850	EXPLORATION/MINING/ STAGING/AIRSTRIP	0	RMO CONSIDERS POLLUTION POTENTIAL HIGH UNTIL PROVEN OTHERWISE.	ARCHER CATHRO	LOCATED WITHIN QUARTZ CLAIM BLOCK HELD BY T. BECKER, ARCHER CATHRO AND ASSOCIATES [1981] LTD.
CA01	OLD ROADHOUSE AT BRAEBURN	6130	13549	ABANDONED ROADHOUSE	0	4 x 4 ACCESS IN DRY WEATHER ACROSS CREEK AT NORTH END OF B. LAKE; BUILDINGS COLLAPSED AND RANSACKED YEARS AGO. NO DRUMS.	D.I.A.N.D.	USED PRIOR TO 1953, OLD DAWSON TRAIL.
CA03	TWIN LAKES DUMP	614230	1355600	DUMP SITE - ABANDONED	0	SITE CLEANED UP ?	D.I.A.N.D.	
CA04	TATCHUN CREEK GARBAGE DUMP	6217	1361900	LANDFILL [ACTIVE?]	0	TRENCH PIT FILLED; BURIED WASTE ?	D.I.A.N.D.	NO MINERAL TENURE
CA05	KM 407 - OLD SAWMILL SITE	6225	13636	ABANDONED SAWMILL	0	SITE DEBRIS TO BE CLEANED UP; HOLES IN GROUND TO BE FILLED IN	D.I.A.N.D.	IRWIN ARMSTRONG?
CA06	OLD CABINS ASSOC. W SAWMILL SITE KM 407.7	6225	13636	ABANDONED	0	HAUL METAL TO CARMACKS METAL DUMP SITE. BURN WOODEN DEBRIS.	D.I.A.N.D.	
CA07	KM 432 McCABE CRK.	6232	13646	ABANDONED	0	WOODEN FRAME RACKS. 2 DRUMS.	DOUGLAS BAIRD, QUARTZ CLAIMS [OR S-5]	QUARTZ CLAIM GROUP #HA01401, INITIAL GRANT 09/1984, RENEWAL TO 19 SEPT. 1994, SEE INSTR. No. QA21572. WHSE MINING RECORDER DISTRICT [MAY BE WITHIN LAND CLAIM S-5]
CA08	KM 424 - McCABE CRK.	623230	1364600	LANDFILL ACTIVE	0	REMOVE SCRAP METAL. BURN WOOD. FILL IN HOLES AND LEVEL GROUND. - RELOCATE SITE TO APPROVED LANDFILL.	DOUGLAS BAIRD, QUARTZ CLAIMS [OR S-5].	LANDFILL ACTIVE, USED BY MIDWAY LODGE AND MINTO RESIDENTS. OWNERSHIP SAME AS CA07, SEE ABOVE REMARKS.
CA09	KM 432 - MINTO	623530	1365230	REFUSE\DEBRIS AT LARGE	0	REFUSE TO BE COLLECTED BY HAND TO LOAD IN TRUCK. BUILDING TO BE LEFT AS IS.	D.I.A.N.D.	REFUSE AND DEBRIS AT LARGE, VARIOUS USERS 1900-1950.
CA10	KM 432.4 - MINTO	623600	1265130	DUMP SITE REHABILITATED.	0	DUMP SITE REHABILITATED. NEW DUMP SITE TO BE DETERMINED FOR LOCAL RESIDENTS.	OPERATED BY MIDWAY LODGE, [IN S-11].	DUMP SITE REHABILITATED. LAND CLAIMS.

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
CA11	KM 454 - HOPPER IN GRAVEL PIT	624500	1364000	ABANDONED EQUIPMENT	0		D.I.A.N.D.	
CA12	KM 464 - 2 VEHICLES AND 2 DRUMS REMAIN	624900	1363500	LANDFILL CLOSED 1988.	0	NO POLLUTION POTENTIAL.	D.I.A.N.D.	LANDFILL CLOSED 1988
CA13	KM 473.1	625200	1362530	ABANDONED OLD SAWMILL SITE	1	LARGE AMOUNT OF DEBRIS SPREAD OUT OVER LARGE AREA. 25 DRUMS ON SCATTERED ON SITE STATUS??	D.I.A.N.D.	POSSIBLY MAX KWAKINS OR KLIPPERTS.
CA14	24 KM ACORN ROAD	625300	1361100	ABANDONED DWELLING, REFUSE AND DEBRIS.	0		D.I.A.N.D.	POSSIBLY KLIPPERTS. LINCH CURRY TRAPPER USE NOW.
CA16	PELLY RANCH ROAD	625230	1370630	ABANDONED WOOD CUTTING OPERATION	0	REFUSE LEFT BEHIND FROM WOODCUTTING OPERATION.	D.I.A.N.D.	ABANDONED, WOODCUTTING, 1978
CA17	KM 30 PELLY RANCH ROAD	6252	1370000	PERSONAL BELONGINGS	0	CONSIDERED TO BE A 'MESS' BY LOCAL AREA RESIDENTS.	D.I.A.N.D.	ABANDONED PERSONAL BELONGINGS
CA18	**KM 415.7 KD. HWY**	622830	13640	ABANDONED SMALL SAWMILL SITE	0	LOW PRIORITY\NO HAZARD	D.I.A.N.D.	NO CURRENT MINERAL CLAIMS, [MAY HAVE BEEN OWNED BY DAN LANG].
CA21	REVENUE AIRSTRIP	6221	1371630	MINING CAMP\AIRSTRIP	1	1. 3 CREEK RESOURCES; 500 GAL FUEL TANK MT, DRUMS, PAILS, BATTERIES. 2. G. WILSON; 78 MT DRUMS, METAL AND WOOD DEBRIS. 3. GARAGE; WASTE OIL, DEBRIS. 4. REVENUE A/S; CULVERT COLLARS, DRILL ROD.	ARCHER CATHRO	GROUP #009274Q, ARCHER CATHRO VALID TO 04/1997
CA23	MURRAY CREEK			ABANDONED CABIN	0	ADD IN SITE		NO MINERAL TENURE
CA24	NANSEN AIRSTRIP	620430	13704	AT STRIP MISC DEBRIS AND OLD PACKER	0	NO HAZARDS; PHOTOS; PR ON SITE 92	D.I.A.N.D.	LAPSED CLAIM , SEE YA93733 WHSE MINING RECORDER, GORDON DICKSON, GROUP NO. HA01415.
CA25	KM 55 NANSEN ROAD	6202	13703	GRAVEL SCREEN LEFT BY HWY's, YTG ABANDONED	0	NO HAZARD; PHOTOS	D.I.A.N.D.	
CA26	VICTORIA LABS OLD CABIN, DEBRIS				0	NO NOTES	D.I.A.N.D.	
CA27	NORDENSKIOLD SAWMILL	613830	1360130	ABANDONED	0	1 DRUM	D.I.A.N.D.	GENERAL ENTERPRISES, 1950'S
CA28	LITTLE BUFFALO LAKE	615230	1362500	MINING CAMP PLACER EXPLORATION	0	1 MT DRUM, SOME KEGS, I DRUM 100/130.	R.WONGA CLAIM, OR P.SLONSKI	LIKELY ON PLACER CLAIM P32616, ROBERT J. WONGA. ALSO SEE PETER SLONSKI, POSSIBLE LAND USE PERMIT

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
CA29	AMAX CAMP 1979	620040	1375353	EXPLORATION	0	POSSIBLY ARCHER CATHERO AT 622500,1373930 [LAT\LON]	D.I.A.N.D.	AMAX CANADA LATE 1970's
CA30	CAMPSITE S.W. of PROSPECTOR MOUNTAIN				0		D.I.A.N.D.	UNKNOWN
CA31	PROSPECT MOUNTAIN AIRSTRIP				0		D.I.A.N.D.	UNKNOWN, w CAMPSITE AT S. of SOUTH END
CA32	HAYES CREEK NORANDA CAMP	623400	1375530	EXPLORATION CMP\ AIRSTRIP. ABANDONED	2	140 DRUMS STAMPED 'INT. MINE SERVICE'. 8 DRUMS AT NORANDA CAMP. 12 MORE DRUMS COUNTED IN THE AREA.	D.I.A.N.D.	NO CURRENT MINERAL TENURE, POSSIBLY OLD NORANDA HOLDING.
CA35	KLINES GULCH 1 Km N.of K.G. AIRSTRIP	623930	1380130	MINING CAMP/ACTIVE	1	CURRENTLY IN USE. 48 DRUMS MT. 8 100# PROPANE. REMOVAL BY SKID IN WINTER ALONG TO CASINO TRAIL.	HAYES RESOURCES	NORANDA, 1989 VALID TO 1995, SEE WATSON LAKE MINING RECORDER YB15618. NORANDA EXPLORATION COMPANY LTD. 201-107 MAIN ST. WHITEHORSE, Y.T. YIA 2A7
CA38	STU CLAIMS	622430	1365000	ABANDONED MINING EXPLORATION CAMP	0		U.K.H.M. LTD.	"STU" GROUP, QUARTZ CLAIMS, SEE YA08698 WHSE MINING RECORDER, VALID TO FEB 1994, U.K.H.M. LTD.
CA39	UKHM - MINTO	6237	1371400	ABANDONED MINING EXPLORATION CAMP	0	20 DRUMS & DEBRIS. SEE CA40.	WESTERN COPPER/ TECK CORPORATION	SEE CLAIM NO. Y 61629 WHSE MINING RECORDER, SEVERAL HOLDERS FROM 1971, 21 YEAR LEASE WENT FROM ARASCO TO SILVER STANDARD, TO WESTERN COPPER HOLDINGS, TO TECK CORPORATION. SEE ALSO INSTRUMENT OF RECORD NO's. 2273, 15451, 015761Q, RH00387.
CA40	ASARCO CAMP	6237	13714	ABANDONED EXPLORATION CAMP	2	87 DRUMS MT. 3 MUD TANKS. FUEL TANKS: 23 FULL DRUMS [JP4&DIESEL]; 64 EMPTIES. AIRSTRIP 1.5 KM [USEABLE?]. UP HIGH ON RIDGE. SOIL CONTAMINATION. WENT THROUGH FIRE, 1980. NO SURFACE WATERS. POWER CABLES. NEEDS FURTHER ASSESSMENT.	WESTERN COPPER/ TECK CORPORATION	SAME AS CA 39 ABOVE
CA41	CANADIAN SUPERIOR EXPLORATION 1974	6243	13740	EXPLORATION CAMP ABANDONED.	0	NO SITE INFO	D.I.A.N.D.	FORMERLY CANADIAN SUPERIOR EXPLORATION
CA42	STODDART CREEK HEADWATERS			EXPLORATION/MININ G?	0	NO SITE INFO	D.I.A.N.D.	FORMERLY MILL CITY GOLD
CA43	TELEGRAPH CO.	6155	13437	ABANDONED TELEGRAPH LINE	0	LOW HAZARD	D.I.A.N.D.	
CA44	CLEAR LAKE	6247	13508	ACTIVE CLAIMS EXPLORATION	1	NOT CERTAIN ABOUT POLLUTION POTENTIAL OR DRUMS IN LAKE? SEE CA46.	TOTAL ERICKSON RESOURCES	GETTY MINES [1982-3], TOTAL ENERGOLD CORPORATION TRANSFERRED TO TOTAL ERICKSON.

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
CA45	SW LONE MOUNTAIN	625030	1350230	ABANDONED EXPLORATION CAMP	1	3 DRUMS ONE DRUM IN LAKE; STATUS? DOCK AND TENT FRAME NOTED 10/92.	R-8 BLOCK, LAND CLAIMS	CONWEST, [1979], LAND CLAIMS
CA46	CONWEST AIRSTRIP	6247	13510	EXPLORATION CAMP USED '92	0	DRUMS NEW AT 1989 VISIT. DOZER ON SITE '92.	TOTAL ERICKSON/ ENERGOLD MINERAL INC.	CONWEST, LATE 1970'S - EARLY 1980'S. SEE CLAIM NO. Y81265. RECENT TRANSFER PENDING APPROVAL, FROM TOTAL ERICKSON TO ENERGOLD MINERAL INC., RENEWAL TO DEC 2002. SEE ALSO INSTRUMENT OF RECORD NO. RH00673.
CA47	LITTLE KALZAS LAKE	625630	1353530	EXPLORATION\TRAPLINE #156	0	REMOVE FROM INVENTORY, TRAPPER USE.	D.I.A.N.D.	
CA48	KLIPPERTS WILLOW CK SAWMILL 1977	6253	13633	SAWMILL STATUS??	0	NO SITE INFO		
CA50	CAMP OR DRILL SITE W of PELLY RANCH	625230	1375038	ABANDONED EXPLORATION CAMP?	0		D.I.A.N.D.	NO MINERAL TENURE
CA51	DETOUR LAKE	6240	1344300	ABANDONED EXPLORATION CAMP	0	6 DRUMS 4 MT 2 FULL KEROSENE. VEHICLE HULK, GENERAL REFUSE.	D.I.A.N.D.	G.E. BUILT THE ROAD AND STRIP. NO MINERAL TENURE LATELY.
DA003	USEFUL LAKE	6710	14023	ABANDONED STAGING	0	BARRELS ON SHORE ARE EMPTY.	D.I.A.N.D.	
DA006	SHINGLE POINT	6856	13714	DEW LINE STATION	5	10 drums. IN PROCESS OF CLEAN UP.	IVVAVIK NATIONAL PARK	MILITARY, RADAR
DA007	SUMMIT LAKE	67.543	136.529	ABANDONED. 53 DRUMS, 12 FULL	2	12 DRUMS - 10 DR JET B; 2 DR AV GAS. FUEL LEAK ON GRD; 2-3 LEAKING DRUMS.	CWS	UNKNOWN
DA008	DEMPSTER HWY MI 169			ABANDONED. FOUR 40,000 GAL TANKS	0	RECOMMEND DISPOSAL OF TANKS. TANKS NOT OF ANY VALUE. BOLTED CONSTRUCTION.	D.I.A.N.D.	FORMERLY CHEVRON TERR. VENTURES
DA019	NORTH KLONDIKE RIVER	6403	13830	ABANDONED MINING CAMP\HERITAGE SITE TRAILER CAMP w FUEL STORAGE TANKS.	0	HISTORIC PIPELINE SUPPORT STRUCTURE FOR MINING ACTIVITY.	D.I.A.N.D.	
DA020	UP RIVER OF CARIBOU STOCKPILE				0	CABINS LOCATED ON MAP (RMO); CAMP w 10,000 GAL STORAGE TANKS. CONFIRMATION OF FUEL STORAGE?	D.I.A.N.D.	
DA021	EAGLE PLAINS DUMP	6619	13644	LANDFILL	2	UNKNOWN CONTENTS IN DUMP.	YTG RESERVE, BOX 2703/ Y1A 2C6	

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
DA027	UNNAMED LAKE	6652	14039	ABANDONED OIL & GAS EXPLORATION CAMP	2	63 DRUMS TOTAL, 5 FULL JET B. NOTED WAS CONCERN FOR LAKE SURFACE WATERS AND LEAKING DRUMS. ONE 1981 DRUM.	D.I.A.N.D.	TEXACO 1972, OIL AND GAS, NO LAND USE PERMIT.
DA038	OLD CROW FLATS	6821	14009	ABANDONED - 7 DRUMS ON OLD CROW FLATS	0	7 DRUMS x 45 GALLONS. 4 DRUMS FULL OF JP4. STABLE SITE & DRUMS ARE NOT LEAKING.	LAND CLAIM?	UNKNOWN, NO RECENT MINERAL TENURE
DA044	MOLLARS AIRSTRIP WHITESTONE MTN	6706	13841	AIRSTRIP ABANDONED DUMP\CAMP	2	57 EMPTIES; 5 FULL of JP4:1974. TNTA FUEL AND ODD STUFF. DC3 ACCESSIBLE. 9 X 100 PROPANE TANKS PARTIAL. OXYGEN CLY FULL.	D.I.A.N.D.	BRASCON 1974
DA045	PINE CREEK WELL STRIP	6656	13818	ABANDONED OIL & GAS WELL SITE.	2	ALSO 10 to 15 BOXES of BLASTING WIRE/EXPLOSIVES. 2 SQ 20 GAL; 1 45 EMPTY.	D.I.A.N.D.	ABANDONED OIL AND GAS EXPL.
DA046	OLD CROW RD. TANK	6645	13733	ABANDONED STORAGE TANK 10-20,000 GAL.	0	TANK WELL ON WAY TO BEING RUSTED OUT [RIVETED SEAM CONST]. 3' WATER IN TANK.	D.I.A.N.D.	
DA049	EAGLE CREEK	6036	13637	ABANDONED DRUMS ON TUNDRA	0	14 DRUMS ALL MT.	D.I.A.N.D.	NO MINERAL TENURE
DA052	JOHNSON CREEK	6804	1380000	ABANDONED. 8 DRUMS EMPTY. JOHNSONS CR	0	8 EMPTIES SUNK AND RUSTED INTO TUNDRA, RETURNING TO PREVIOUS STATE.	D.I.A.N.D.	
DA053	RAPID CREEK	6839	13636	ABANDONED. 3 DRUMS FULL ON RIDGE CREST.	1	3 DRUMS JP4; OLD FUEL. LOW CONCERN DUE TO LOCATION.	D.I.A.N.D.	RAPID CREEK/FISH RIVER-[1975] WELCOME NORTH MINES LTD. 675 WEST HASTINGS ST., VANCOUVER,B.C., V6B 1N2 OTHERS WERE: CANADIAN JOHNS/MANVILLE[1964], SPHERE DEV. CORP. [1967], SELWYN EXPL. ET AL [1979, 1980, 1981], NORANDA INC. [1981].
DA059	BLACKSTONE TRAIL	6507	13757	TRAIL, ABANDONED EMPTY ARMY FUEL TANK.	0	25,000 GAL TANK EMPTY. TANKER IN GOOD COND, ARTICULATING FRONT END; AI CONSTRUCTION.	D.I.A.N.D.	
DA060	CHAR CREEK	6442	13733	ABANDONED TRAILER & CMPSTE 70 DR EMPTY OIL & GAS EXPLORATION	0	70 MT DRUMS. MAY BE CLEANED UP ?	D.I.A.N.D.	
DA062	CARIBOU STOCK PILE			ABANDONED	1	3 TRAPPERS CABINS ALONG BANK OF PEEL RIVER. VERIFY SITE INFO.	D.I.A.N.D.	OLD SHELL OIL STAGING AREA

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
DA063	SHIP GRAVEYARD	6404	13626	ABANDONED STAGING AREA. HERITAGE	0	SEE WATSON LAKE MINING RECORDER Y 73595, ORIGINATED 1973, WAS HELD BY CANEX PLACER, CYGNUS MINES LTD., MOST RECENT WAS PLACER DEVELOPMENT LTD., PLACER DOME INC. VALID TO JAN 1993.	D.I.A.N.D.	RIVER SHIPPING INDUSTRY
DA075	AIRSTRIP	6608	13827	A/S, STAGING	0	5 DRUMS ON SITE	D.I.A.N.D.	
DA116	BONNET LAKE	6810	13747	ABANDONED CMPSTE, DUMP, DRUMS IN LAKE.	2	37 FULL JET B. 10 EMPTY JET FUEL. 10 MT DRUMS. 9 DRUMS [CONTENTS UKN] NEAR AND IN WATER ON SOUTH SHORE. 187 = TOTAL # of DRUMS.	CANTERRA ENERGY LTD.	AQUATAINE OF CANADA, NOW CANTERRA ENERGY LTD. RELIEF FROM ASSESSMENT WORK OIC 1991-870. ALSO HOLD CLAIMS IN BLOW RIVER, BOULDER CREEK, JOHNSON CREEK, DRIFTWOOD RIVER AND MT. FULTON AREAS.
DA119	HUNGRY LAKE FIRST NATION'S CAMP	6540	13605	CAMPSITE IN USE. 18 DRUMS FUEL	0	NATIVE CAMP\LAND CLAIM? EMPTIES: TEN 45 GALLON DRUMS; EIGHT 10 GAL. KEGS	LAND CLAIM?	
DA121	SAM LAKE	6824	13837	ABANDONED OIL & GAS EXPLORATION...DRUMS.	2	7 JET B FULL, 18 EMPTIES. 1 STOVE OIL; LEAKER, 45 GAL DRUM. 2 DR IN WATER CONTENTS??	D.I.A.N.D.	
DA122	TENT ISLAND	6854	13838	ABANDONED BARGE	0	BARGE IS MADE OF PLATE STEEL; RECOMMEND REMOVAL REFERRED TO PRIVATE SOURCE. BARGE IS ON MAINLAND WEST ACROSS CHANNEL.	D.I.A.N.D.	
DA124	SOCONY MOBIL AIRSTRIP	6612	13833	AIRSTRIP ABANDONED 88 DRUMS.	1	OLD DRUMS ARE QUITE RUSTED, 12 DRUMS FULL AND SEALED. OLD: 55 drums; 12 FULL w JETB. NEW: 14 FISHERIES EMTV's drums JP4, '87.	D.I.A.N.D.	UNDER OIL AND GAS REGS, SOCONY OIL
DA146	CHANCE CREEK	6813	13842	MINING ABANDONED	0	3 EMPTIES; 4 PARTLY FULL 10 KEGS. REMOVE TO OLD CROW.	D.I.A.N.D.	UNKNOWN
DA147	BLOW RIVER DELTA			ABANDONED ROTTING WOODEN BARGE	0		D.I.A.N.D.	
DA148	RAMPART HOUSE HISTORIC SITE	6725	14058	ABANDONED HBC TRADING POST.	0	PRESENTLY w 51 EMPTY DRUMS.	D.I.A.N.D.	
DA151	THISTLE CREEK/YUKON RIVER CONFL.	6304	13930	PLACER STAGING BARGE ACCESS ACTIVE.	1	FUEL TANKS [2 5000 GAL] ARE STILL IN USE. NO BERMS ON TANK. CONTACT YTG PUBLIC SAFETY RE YTG GAS & HANDLING ACT/REGS.	D.I.A.N.D.	NO CURRENT MINERAL TENURE [UNSURE OF PRECISE LOCATION].

APPENDIX C

A.E.S. WASTE SITE INVENTORY

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
DA153	FORTY MILE HISTORIC BARGES	6422	14043	HERITAGE. ABANDONED 2 RIVER BARGE.	0		D.I.A.N.D.	
DA155	NO NAME	6833	13632	?	0		?	
DA156	MT. DAVIS GILBERT	683230	13640	?	0	8 BARRELS	?	
DA157	NO NAME	6831	13713	?	0		?	
DA159	BOUCHER CREEK	6357	14033	FUEL STORAGE AREA	0	30 BARRELS, REMOVE TO TOP/WORLD HWY.	?	
DA160	RUSTY SPRINGS	6429	14016	EXPLORATION CAMP ABANDONED/TRAIL	2	1992 50 FULL DIESEL, 11 FULL 100/130, 4 JP4, 110 EMPTIES SCATTERED.	D.I.A.N.D.	NO RECENT MINERAL TENURE
DA162	EAGLE TRAIL [HISTORIC]	6447	14041	ABANDONED AIRCRAFT CRASH SITE	0	UNKNOWN CARGO	D.I.A.N.D.	
DA169	PORCUPINE AIRSTRIP [WINTER]	6619	14007	AIRSTRIP ABANDONED 24 DRUMS.	1	3-4 DRUMS FULL MINOR LEAKAGE NOTED 1992.	D.I.A.N.D.	
DA171	POWER HOUSE - PENSTOCKS HISTORIC	6401	13845	ABANDONED - N FORK POWER STATION	1	PENSTOCKS TO UNDER GROUND SPILLWAYS AND BUILDINGS ARE SEEN AS HAZARD.	D.I.A.N.D.	PART OF NORTH FORK POWER GENERATING STATION, TURN OF CENTURY TO 1960's.
DA172	NORTH FORK GATEHOUSE	6401	13825	ABANDONED HISTORICAL	0		D.I.A.N.D.	SEE DA171
DA173	STEAM SHOVEL AT N FORK GATEHOUSE	6401	13825	ABANDONED HISTORICAL	0		D.I.A.N.D.	SEE DA171
DA174	NORTH FORK DITCH [HISTORIC]	6400	13811	ABANDONED. 2 STEAM SHOVELS & BUILDING.	0		D.I.A.N.D.	SEE DA171
DA175	YUKON DITCH LITTLE 12 MILE STATION	6422	13852	ABANDONED STAGING/ HISTORIC	0		D.I.A.N.D.	HISTORIC GOLDFIELDS WATER SUPPLY
DA176	POWER STATION: CONFL of L12MI	6423	13858	ABANDONED HISTORICAL	0		D.I.A.N.D.	HISTORIC, POWER GENERATION
DA177	YUKON DITCH	6415	13908	ABANDONED DITCH. HISTORIC	0	STATION	D.I.A.N.D.	SEE DA174
DA178	STEAM SHOVEL	6405	13830	ABANDONED SITE USE. OLD STEAM SHOVEL.	0	NORTH FORK	D.I.A.N.D.	PART OF NORTH FORK POWER PROJECT

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A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
DA179	STEAM SHOVEL	6408	13913	ABANDONED STEAM SHOVEL. HISTORIC	0	AT LEPINE CREEK	D.I.A.N.D.	
DA181	STEAM\BOILER	6409	13814	ABANDONED STEAM SHOVEL	0	AT LEPINE CREEK	D.I.A.N.D.	
DA187	MALLARD AIRSTRIP	6550	14015	AIRSTRIP. ABANDONED. 2 DRUMS??	0	ACCESS via OGILVIE RIVER TRAIL.	D.I.A.N.D.	
DA188	MINER RIVER AIRSTRIP	6529	13943	OUTFITTERS CAMP. ACTIVE	0	16 EMPTIES TO DELIVER.	STAN REYNOLDS. OUTFITTER	
DA189	BLACKSTONE RIVER	6401	13744	EXPLORATION CAMP. ABANDONED	0	v OLD DRUMS AND SCRAP METAL. ALL EMPTY.	D.I.A.N.D.	
DA190	OLD CROW RIVER	6750	13954	FISH CAMP	0	FISH CAMP BELONGS TO OLD CROW FIRST NATIONS. DELETE FROM INVENTORY?	LAND CLAIMS?	
DA191	SCHAEFFER CREEK	6751	13953	CAMP ABANDONED	0	OLD CABINS AT MOUTH OF SCHAEFFER CREEK, CLEAN UP BY BOAT FROM OLD CROW RIVER.	D.I.A.N.D.	
DA195	EAGLE PLAINS	6625	13643	BARREL CACHE	0	310 DRUMS, 191 SLUNG TO EAGLE PLAINS DUMP. COMPLETE REMOVAL SCHEDULED FOR 1993.	?	
DA196	DEMPSTER HWY KM 300	6557	13722	BARREL CACHE/BLDG SUPPLIES	0	60 DRUMS AND BUILDING SUPPLIES AT SITE.	?	
DA197	SAMUELSON HILL A/S	6623	13702	AIRSTRIP	0	24 DRUMS, 23 FULL, ONE EMPTY JP-4, REFUSE ALONG STRIP.	?	
HJ01	H.Jct. ASPHALT REFINERY	6045	13730	ABANDONED REFINERY	2	NO MINERAL TENURE	D.I.A.N.D.	LAND HAS REVERTED TO FEDERAL CROWN.
HJ02	RAFT CREEK	6127	13811	EXPLORATION CAMP/ ABANDONED	0	78 DRUMS TOTAL DRUMS IN CREEK FULL OF WATER; TAKEN OUT WHERE POSSIBLE. 68 EMPTIES, 2 FULL AV GAS 100/130. 5 OIL SPACE HEATERS. BATTERY, DEBRIS. NO ADIT OR DIAMOND DRILL. 100 m of OUT FILTER LAKE CAMP.	D.I.A.N.D.	

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A.E.S. WASTE SITE INVENTORY

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
HJ03	AISHIHIK AIRPORT	6138	13730	AIRPORT AND STAGING	2	ELECTRICAL EQUIPMENT CIRCA 1940; GIVEN TO B. HUBERT, H.Jct. SERIAL #'S TAKEN. TWO DUMP SITES w 'you name it'. GENERATOR AND TERMINAL BLDG. REWIRED. 60 DR IN OLD DUMP. STATUS?? SOME DUMP SITES OFF OF YTG LAND. DUMP HAS NOT HAD PHYSICAL INSPECTION.	Y.T.G.	WWII AIRPORT, U.S. MILITARY TO R.C.A.F., BLDGS, A/S TRANSFERRED TO Y.T.G.
HJ04	STEVENS LAKE	6142	13728	ABANDONED	1	BURN AND BURY; REMOVE SCRAP METAL. CHOPPER ACCESS. ELECTRICAL EQUIPMENT A POSSIBILITY. M.O.T. - SITE FOR AISHIHIK AIRPORT.	M.O.T.?	BEACON SITE BLDGS
HJ05	McKINLEY CREEK DC3 CRASH SITE	6104	13727	ABANDONED 1940-50. FUSELAGE, wo ENGINES.	0	AIR LIFT OR WINTER CAT TRAIN REMOVAL. LOW PRIORITY. HISTORIC SITE.	D.I.A.N.D.	
HJ06	TALBOT CREEK CRASH SITE	6140	13818	CRASH SITE OF 4 SEAT PASSENGER PLANE.	0	AIR LIFT TO BURWASH AIRSTRIP.	D.I.A.N.D.	
HJ07	OLD HJ SCRAP METAL DUMP	6046	13727	ABANDONED METAL DUMP	0	REMOVE TO LANDFILL SITE. DRUMS EMPTY AND MAINLY CRUSHED. PUBLIC SAFETY. MINOR OIL\FUEL ASSOCIATED w OLD MOTORS\CARS\DRUMS.	D.I.A.N.D.	ABANDONED METAL DUMP
HJ08	MACINTOSH LODGE KM 1646 AK. HWY	6047	13739	ABANDONED HOUSEHOLD REFUSE DUMP	0	BURY ON SITE. LOW PRIORITY.	D.I.A.N.D.	ABANDONED HOUSEHOLD GARBAGE
HJ09	THATCHELL CREEK	6134	13738	ABANDONED EXPLORATION CAMP	0	DISMANTLE AND BURN; SLING WASTE METAL AND BURY AT AISHIHIK REFUSE SITE. NO PHYSICAL INSPECTION. INVENTORY NEEDED. LAND CLAIMS. NO CORES OR ADIT. CAMP FRAMES.	LAND CLAIMS	UNKNOWN
HJ10	MILLION DOLLAR FALLS ADJ CAMPGRND	6006	13656	OLD HAINES HWY CONST. CAMP DUMP.	0	RMO RECOMMENDS TEST FOR CONTAMINANTS; CRATES,DRUMS, ETC. IN CREEK FLOWING INTO TAKHANNE RIVER. SEE HJ INTERVIEWS, ARCHIVAL CONTRACT.	D.I.A.N.D. OR YTG?	MILITARY CONSTRUCTION SITE, NOW LIKELY D.I.A.N.D. OR PART OF Y.T.G. CAMPGROUND RESERVE.
HJ11	OLD MARSHALL CREEK ROAD	60	13725	MILITARY, LOCAL RESIDENTS ?	0	MILITARY USE DURING 40'S, SEE HJ INTERVIEWS, ARCHIVAL CONTRACT SITE IS 8m FROM DEZADEASH RIVER.	D.I.A.N.D.?	MILITARY CONSTRUCTION AND MAINTENANCE SITE, MORE RECENT USES UNKNOWN.

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
MA	KM 465, HWY 11 [WHITEHORSE KENO RD.]	0635420	1351900	LANDFILL. ACTIVE.	0	LANDFILL 200M FROM LIGHTNING CREEK.	YTG/KENO CITY	ACTIVE LANDFILL, CLAIMS OWNED BY U.K.H.M.: 56402, 59316, 55600. RENEWAL OF LEASES, 21 YEARS FROM JAN, 1982. SEE MAYO MINING RECORDER INST. NO. 2918, 2920, 2940. UNITED KENO HILL MINES LTD. 196 ADELAIDE ST.WEST, TORONTO ONT. M5H 1W7.
MA01	ELLIOTT LAKE	6429	13541	OUTFITTER or TRAPPER	1	DRUMS RIGHT ON SHORE. 11 DR, STATUS.	D.I.A.N.D.	OUTFITTER OR TRAPPER, NO MINERAL TENURE.
MA02	HART LAKE	6436	13510	OUTFITTER CAMP. ACTIVE	0	AIRSTRIP UP ABOVE LAKE. SOME EMPTY DR.	D.I.A.N.D.	NO MINERAL TENURE, RICK FURNESS POSSIBLE USER.
MA03	CARPENTER LAKE\UPPER CARPENTER CRK	643030	1350500	OUTFITTER CAMP. ACTIVE	1	NO HAZARD IDENTIFIED. NO PHOTOS. 10 DRUMS, 2 IN LAKE.	D.I.A.N.D.	ACTIVE OUTFITTER CAMP, NO MINERAL TENURE.
MA04	WIND RIVER	6455	13442	ABANDONED. 1 SMALL CABIN & DOCK.	0	OLD DAWSON SITE. NOT MUCH THERE. NO PHOTOS .	D.I.A.N.D.	NO MINERAL TENURE.
MA05	WIND RIVER STRIP	644515	1343730	AIRSTRIP. ABANDONED. STAGING/MINING	1	AIRSTRIP UNUSABLE. STRIP ON FLOOD PLAIN. NO INVENTORY ON GROUND.	D.I.A.N.D.	NO MINERAL TENURE.
MA06	NORTH OF WIND RIVER AIRSTRIP	644630	1343800	EXPLORATION. ABANDONED DRILL ON BENCH.	0	6 DRUMS	D.I.A.N.D.	NO MINERAL TENURE.
MA07	WIND RIVER	6445	1343900	OUTFITTER. ACTIVE	0	ACTIVE USE. 6 DRUMS	D.I.A.N.D.	NO MINERAL TENURE.
MA08	ANGLE LAKE	6445	1343830	OUTFITTER CAMP. ACTIVE	0		D.I.A.N.D.	NO MINERAL TENURE.
MA09	BEAR RIVER AIRSTRIP	644830	13416	AIRSTRIP\OUTFITTER. ACTIVE\STAGING	1	RMO INSPECTED SITE; 29 FULL DRUMS BURIED IN MOSS; 9 DR EMPTY. USEABLE STRIP = 1200 to 1500 FEET IN LENGTH.	D.I.A.N.D.	ACTIVE OUTFITTER A/S, NO MINERAL TENURE.
MA10	BEAR RIVER AIRSTRIP	6449	13416	SAME SITE AS MA9. NO HAZARD.	0		D.I.A.N.D.	NO MINERAL TENURE.
MA12	QUARTET LAKES	00?	000?	ABANDONED. CAMPSITE	0		D.I.A.N.D.	NO MINERAL TENURE.

APPENDIX C

A.E.S. WASTE SITE INVENTORY

02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
MA13	KIWI LAKES	6513	1343630	ABANDONED. EXPLORATION CAMPS [3].	1	WET LANDS. FUEL DRUMS SETTLING INTO BOG. POTENTIAL FOR CONTENTS? TO REACH LAKE. DRUMS APPROX 100' FROM LAKE. COAL DEPOSIT. PART OF PROPOSED CLEAN UP. PROPANE; ABOUT 50 x 5 GAL PAILS, CONTENTS?, DRILLING MUD. - 224 DR, STATUS?	D.I.A.N.D.	DRUMS MARKED "PAMICON 80-82" WAS OWNED BY ABERMIN CORPORATION, WENT BANKRUPT, ALL CLAIMS LAPSED. SEE MAYO MINING RECORDER CLAIM NO. YA30757. PAMICON DEVELOPMENTS LTD. 711-675 WEST HASTINGS ST. VANCOUVER, B.C. V6B 1N4. ABERMIN CORP. 1500-1075 WEST GEORGIA ST. VANCOUVER, B.C. V6E 3C9.
MA14	CHAPPIE LAKE	6547	13457	STAGING\TRAPPER. ABANDONED ?	1	REALLY OLD SITE. 114 DRUMS; SOME DRUMS REPORTED TO BE IN LAKE. DRUMS DETERIORATING IN LAKE. DRUMS NEAR LAKE.	C.S.A. MANAGEMENT	COAL EXPL. LICENSE NO. Y414. CSA MANAGEMENT AND GOLDCORP INC. C/O DAVID A. BARR 1334 CAMRIDGE PLACE, WEST VANCOUVER, B.C., V1G 2M9.
MA16		6557	13421	ABANDONED. REFUSE	0		D.I.A.N.D.	NO MINERAL TENURE.
MA17	BONNET PLUME RIVER	6555	13428	ABANDONED - 2 DRUMS	0	NO PHOTOS, MAY BE WRONG LOCATION.	D.I.A.N.D.	
MA18	MOBILE OIL SNAKE RIVER	6559	13320	OIL & GAS. ABANDONED. NO AIRSTRIP OR WELL.	0	SITE SHOULD BE INSPECTED TO VERIFY.	D.I.A.N.D.	NO MINERAL TENURE.
MA19	NORTHCAP AIRSTRIP	6555	1330400	AIRSTRIP/OIL & GAS. ABANDONED	0	DRILLING MUD ON SITE	D.I.A.N.D.	NO MINERAL TENURE.
MA20	CRANSWICK	6540	13303	AIRSTRIP\STAGING. OIL & GAS EXPLORATION	0	HISTORIC SPILL ON SITE STOVE OIL 5,000 GAL TO 100,000 GAL. SITE RECLAMATION APPEARS GOOD. NO PHOTOS	D.I.A.N.D.	NO MINERAL TENURE.
MA21	POPCORN FISH LAKE	6528	13349	ABANDONED. AIRCRAFT CRASH SITE	0	UNKNOWN CARGO	D.I.A.N.D.	NO MINERAL TENURE.
MA22	MARGARET LAKE	6519	13430	STAGING	1	PROPOSED FOR CLEANUP. 2 DRUMS JP4 FULL. 22 EMPTIES.	R. MOSES USER	NO MINERAL TENURE.
MA23	CREST AIRSTRIP MT. CORP	6522?	13322	AIRSTRIP. ABANDONED	1	LARGE EXPLORATION AREA. RIVER 0.5 MILE AWAY. 102 DR, STATUS? 10,000 GAL TANK, CONTENTS?/BULGED. 12 KEGS, CONTENTS?; 100 LB PROPANE.	CREST EXPLORATION LTD.	525 IRON AND MICA CLAIMS OWNED BY CREST EXPLORATION LTD. C/O CHEVRON CANADA RESOURCES, 500 FIFTH AVENUE, S.W. CALGARY ALBERTA, T2P OL7..21 YEAR LEASE FROM FEB. 1972, SEE MAYO MINING RECORDER CLAIM NO. 81242.
MA24	MT PHELPS RAPITAN CREEK	6504	13349	OUTFITTER CAMP. ACTIVE	0		D.I.A.N.D.	NO MINERAL TENURE
MA26	FAIRCHILD LAKE - NARROWS	6459	13346	OUTFITTER CAMP - ACTIVE	0		S-127B LAND CLAIMS	LAND CLAIMS

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A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
MA27	FAIRCHILD LAKE	645730	1334530	ABANDONED - STAGING	2	50 DRUMS WITHIN 50' OF LAKE PROPOSED FOR CLEANUP TOTAL DR 185	S-140B LAND CLAIMS, M. STAMMERS	LAND CLAIMS, AND FAIR-1 OWNED BY M. STAMMERS, SEE MAYO MINING RECORDER YB29162
MA28	DELORES CREEK	645130	1334100	OUTFITTER CAMP	0		D.I.A.N.D.	NO MINERAL TENURE
MA29	PINGUICULA LAKE	6442	1332500	CAMPSITE?/LOG CABIN	1	4 FULL DRUMS of DIESEL. 5 w JP4. 12 EMPTIES	S-124B LAND CLAIMS	LAND CLAIMS
MA30	ARDEN LAKE	6432	1331330	ABANDONED STAGING AREA	1	2 DRUMS IN LAKE AND ONE ON THE BEACH	D.I.A.N.D.	NO MINERAL TENURE
MA31	BONNET PLUME RIVER	642430	1325400	ABANDONED MINING CAMP	1	24 DRUMS	D.I.A.N.D.	CYPRUS RESOURCES 1974, TRANSFERRED TO BRITISH NEWFOUNDLAND EXPLORATION LTD., CLAIMS LAPSED, SEE CLAIM Y70181.
MA32	BONNET PLUME RIVER	6424	13255	ABANDONED EXPLORATION CAMP	0		D.I.A.N.D.	CYPRUS RESOURCES, SAME AS ABOVE MA32
MA33	GOZ CREEK MINE			EXPLORATION/ ABANDONED	1	NO SITE INFORMATION SEE MA 34,MA35	D.I.A.N.D.	DOME PETROLEUM AND GEORGE SIVERTZ, LAPSED 1982 SEE CLAIM YA62486.
MA33?	EAST RACKLA RIVER STRIP	641330	1330900	ABANDONED. XPLO,STAG,MIN ,OUTF CMP\AREA	1	90 DRUMS. MOST DRUMS ON OPPOSITE SIDE OF RIVER	D.I.A.N.D.	PRISM INTERNATIONAL 8/88: 3RD FLOOR PEMBERTON BLDG. 744 WEST HASTINGS ST., VANCOUVER, B.C. V6C 1A5, STRIP 1-3, LAPSED.
MA34	PORTER PUDDLE	642130	1324630	ABANDONED OUTFITTER\STAGING	2	DRUM INVENTORY FOR WHOLE LAKE AREA 13 DR IN WATER. 45 DR ON LAND DRUM STATUS?? SEE MA 33,MA35 NO PHYSICAL SITE INSPECTION	D.I.A.N.D.	NO MINERAL TENURE
MA35	GOZ CREEK AIRSTRIP	6425	1323130	AIRSTRIP/EXPLORATION CAMP ABANDONED	2	PHOTOS. DIFFICULT TO SAY HOW CLOSE DRUMS ARE TO CREEK. 50 DR FULL STOVE OIL, ONE LEAKER; 14 OTHER DR; 4x100GAL TANKS. MORE PHOTOS TO FOLLOW FROM DON.. SEE MA 34, MA33 NO PHYSICAL SITE INSPECTION	D.I.A.N.D.	NO MINERAL TENURE
MA36	BONNET PLUME LAKE	641930	1315615	OUTFITTER CAMP, ACTIVE w 9 DRUMS	0	SAME SITE AS MA37	D.I.A.N.D	CANADIAN SUPERIOR EXPLORATION LTD. OWNED THE TARA CLAIMS 6 MILES NORTH EAST, NOW LAPSED. PRISM RESOURCES LTD. OWNS VAL CLAIMS 10 MILES NORTH EAST OF SITE. SEE MAYO MINING RECORDER CLAIM NOS. YA30884, Y97784.
MA38	GOZ LAKE	6432	1322000	OUTFITTER, ACTIVE	1	ONE DRUM IN LAKE, TOTAL DR 10	S-148B LAND CLAIMS	ACTIVE, OUTFITTER, LAND CLAIMS.

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
MA42	KATHLEEN LAKES, MAIN LAKE	641430	13414	STAGING/OUTFITTER, ACTIVE	1	28 DR;20 DR NEAR OR IN LAKE, STILL IN USE BY OUTFITTER; NICE SETUP!	R-26B LAND CLAIMS	STILL ACTIVE, OUTFITTER, LAND CLAIMS.
MA43	KATHLEEN LAKES, RIDGE ABOVE MAIN L.	6417	13412	EXPLORATION CAMP, ABANDONED.	0	DRUMS UP HIGH, LOOKS OK	R-10B LAND CLAIMS, GORDON DICKSON	2 CLAIMS OWNED BY GORDON DICKSON SURROUNDED BY LAND CLAIMS. SEE CLAIM NO. 80351.
MA45	KATHLEEN LAKES, WEST LAKE	641630	1342230	ABANDONED, AIRCRAFT CRASH SITE	0	OF A MOUNTAIN NORTH OF THE CHAIN LAKE	R-26B LAND CLAIMS	LAND CLAIMS
MA46	KATHLEEN LAKES TRAIL	6416	13426	STAGIN, ABANDONED. 31 DRUMS	0	FAIRLY DRY SITE	D.I.A.N.D.	NO MINERAL TENURE
MA47	SCOUGALE LAKES	640900	1344630	TRAPPERS CABIN, 2 LEVELS	0		D.I.A.N.D.	NO MINERAL TENURE
MA48	CLARK LAKES [106D map]	640730	1345600	ABANDONED, SHACK, HERITAGE???	0	SETTLING SLOWLY INTO THE MUSKEG, w A PAIR OF RUSTING DRUMS PERCHED ON A COUPLE OF LOGS NEAR BY. D.WHITE, 1990.	D.I.A.N.D.	HERITAGE VALUE? NO MINERAL TENURE
MA53	RUSTY GRAVEL CREEK PIT	6327	13626	GRAVEL PIT S. of Ag TRAIL	0	GRAVEL PIT w TANK [SIZE?]	D.I.A.N.D.	NO MINERAL TENURE
MA54	RUSTY CABIN CREEK	6327	1362630	ABANDONED, ROTTING CABIN	0	LET ROT.	D.I.A.N.D.	
MA55	RUSTY CREEK, WEST TRAIL	6327	13627	ABANDONED, CAMP	0	TIN AND GLASS, CLEANED UP.	D.I.A.N.D.	NO MINERAL TENURE
MA56	RUSTY CREEK, CONE COLLECTION AREA	6328	13628	ABANDONED, 1960's WOOD HARVESTING...	0	AND CONE COLLECTION AREA?, SITE LEFT w DRUMS, METAL, BATTERIES, ETC	D.I.A.N.D.	TOM[E] COVE, ABANDONED 1960'S, NO TENURE
MA58	20 MI S. of SNAKE RIVER	6547	13330	ABANDONED CAMP, 10 DRUMS	0	OLD DAWSON SITE, NO PHOTOS	D.I.A.N.D.	NO MINERAL TENURE
MA59	SWAN LAKE	6333	13248	?	0		S-110B LAND CLAIMS	LAND CLAIMS
MA60	PLEASENT LAKE	6332	13257	?	0		S-109B LAND CLAIMS	LAND CLAIMS
MA61	AURORA LAKE	64	135	ABANDONED, DRUMS IN MOUTH OF CREEK	1	STILL UNCONFIRMED SITE, SITE NEEDS FOLLOW UP	R-13B LAND CLAIMS	LAND CLAIMS
MA62	BONNET PLUME RIVER	6519	13431	ABANDONED, 8 DRUMS ..NO PHOTOS	0		D.I.A.N.D.	NO MINERAL TENURE

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SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
MA63	FAIRWEATHER LAKE	6315	13217	EXPLORATION, ABANDONED.	1	12 DR; ONE DR IN LAKE, NOW IN USE BY OUTFITTER	D.I.A.N.D.	NO MINERAL TENURE
MA63B	FAIRWEATHER LAKE	6314	1322213	OUTFITTER, ACTIVE	0		D.I.A.N.D.	ACTIVE USE, OUTFITTER, NO MINERAL TENURE
MA64	KALZAS TWINS [SAME AS MA57]	631730	13443	ABANDONED?, MINING CAMP\AIRSTRIP	0	45 DRUMS	J.D. RANDOLPH	DAVID, PAT, BLACKIE : WOLF 1-10 ALL OWNED BY J.D. RANDOLPH, GENERAL DELIVERY, MAYO, Y.T.,YOB 1MO, SEE MAYO MINING RECORDER CLAIM NO. YA38160.
MA65	BIG KALZAS LAKE	6314	1344030	TOURISM, 2 CABINS AND INCOMPLETE LODGE	0	ON LEASE, SITE IN USE FOR TOURISM	LEASE	NO MINERAL TENURE
MA66	BIG KALZAS LAKE	6314	13441	CAMP AND FORESTRY FUEL...	1	FIELD OPS FUEL CACHE ON POINT OF LAND ACROSS LAKE TO THE SOUTH OF CAMP.	FIELD OPS	
MA67	BIG KALZAS LAKE	6314	13443	ABANDONED?, CAMP AND FUEL CACHE...	1	ACROSS LAKE TO THE WEST OF CAMP, ON THE NORTH SHORE. 8-10 DRUMS SCATTERED.	D.I.A.N.D.	NO MINERAL TENURE
MA69	EDWARDS LAKE	6342	13414	CABIN MIDWAY ON LAKE, ALONG NORTH SHORE.	0		D.I.A.N.D.	NO MINERAL TENURE
MA71	RUSTENBURG JACOB	6334	13720	TRIAL/TWO GRAVEL PITS w EQUIPMENT	0		J. RUSTENBURG	J. RUSTENBERG, BOX 237, MAYO Y.T. YOB1MO, OWNS PLACER CLAIMS IN THE AREA. SEE MAYO MINING RECORDER CLAIM NO. P015745.
MA72	SUNSHINE CREEK	6347	13632	SKID CABIN ON CLEARED BENCH	0		D.I.A.N.D.	NO MINERAL TENURE
MA73	RUSSELL CREEK	6302	13320	PLACER CLAIM, AIR STRIP ON GRAVEL BENCH	1		D.I.A.N.D.	PLACER CLAIMS LAPSED, LAST OWNER WAS ALFRED POPPE, 27-1725 ALASKA AVE., DAWSON CREEK, B.C. V1G 1P5, SEE MAYO MINING RECORDER CLAIM NO. P015553.
MA74	McCLUSKY LAKE	6434	1342430	OUTFITTER?\TRAPPER?	0		S-152B LAND CLAIMS	LAND CLAIMS
MA75	McQUESTEN VALLEY AIRSTRIP	634530	1363630	AIRSTRIP, ABANDONED	0	COLLECTION OF WOOD WASTE AND FUEL DRUMS AT NORTH END OF OVER GROWN STRIP	D.I.A.N.D.	NO MINERAL TENURE
RR	KM 373, CAMPBELL HWY #4	0615800	1322500		1		D.I.A.N.D.	NO MINERAL TENURE

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
RR01	HARRIS LAKE	614800	1312700	ABANDONED, EXPLORATION CAMP	0		D.I.A.N.D.	NO MINERAL TENURE
RR02	LAMPMAN LAKE 2 KM AWAY	6124	13106	ABANDONED, EXPLORATION CAMP	1	DRUMS SITTING HIGH AND DRY [PENCILLED NOTE], 25 DR, ASSESSMENT??	D.I.A.N.D.	NO MINERAL TENURE
RR03	LAMPMAN LAKE	6128	13104	ABANDONED, EXPLORATION CAMP	1	23 DRUMS; POTENTIAL GRD CONTAMINATION; DRUM STATUS??	D.I.A.N.D.	NO MINERAL TENURE
RR04	FORTIN LAKE	6158	13134	ABANDONED, EXPLORATION CAMP	2	50 DRUMS; 10-15 V. OLD DRUMS SUBMERGED IN CREEK DRUMS, ADJACENT TO LAKE, MOST DEBRIS 1/2 MI TO THE NORTH OF CABIN ON LAKE SEE SITES RR5,6,7	D.I.A.N.D.	NO MINERAL TENURE
RR05	PIKE LAKE	6210	13042	ABANDONED, EXPLORATION CAMP	1	55 DRUMS ALONG SHORELINE, SOME SUBMERGED DRUMS IN STREAM AND SWAMP, NEED SITE INVENTORY SEE SITE RR4,6,7 GROUP	NORANDA EXPLORATION COMPANY	NORANDA, 1989 VALID TO 1995, SEE WATSON LAKE MINING RECORDER YB15618. NORANDA EXPLORATION COMPANY LTD. 201-107 MAIN ST. WHITEHORSE, Y.T. YIA 2A7
RR06	PELLY LAKES	6204	13091	ABANDONED, EXPLORATION CAMP	2	SEE RR4,5,7 RE GROUP 17 DRUMS IN BOG ADJACENT TO LAKE NEED SITE INVENTORY	D.I.A.N.D.	NO MINERAL TENURE
RR07	SUMMIT LAKE	6122	12920	OUTFITTER/OLD EXPLORATION CAMP	2	50 DRUMS ON SITE; 3 DR IN CREEK DRAINING TO SUMMIT LK, NO INVENTORY SEE RR 4, 5, 6 RE GROUP	OUTFITTER	NO MINERAL TENURE
RR08	HOWARDS PASS	6233	12933	ABANDONED, EXPLORATION CAMP	2	ADITS PRESENT, 100 DRUMS; INVENTORY REQUIRED, CAMP/MINE SEPARATE LOCATIONS	D.I.A.N.D.	SEE WATSON LAKE MINING RECORDER Y 73595, ORIGINATED 1973, WAS HELD BY CANEX PLACER, CYGNUS MINES LTD., MOST RECENT WAS PLACER DEVELOPMENT LTD., PLACER DOME INC. VALID TO JAN 1993
RR09	PLACER DOME CAMP	6248	12951	ABANDONED, EXPLORATION CAMP	1	50 DRUMS; STATUS	PLACER DOME INC.	SEE WATSON LAKE MINING RECORDER YA 21807, ORIGINATED 1977, WAS HELD BY CANEX PLACER, PLACER DEVELOPMENT LTD., CURRENTLY PLACER DOME VALID TO FEB 1995
RR10	FULLER LAKE	6258	13016	ABANDONED STAGING AREA	0		D.I.A.N.D.	NO MINERAL TENURE
RR11	JAKE LAKE	6320	13115	ABANDONED, EXPLORATION CAMP	0	6 DRUMS	D.I.A.N.D.	SEE MAYO MINING RECORDER SCOT CLAIMS, Y68375, 1972 TO 1979, WAS OWNED BY ATLAS EXPLORATIONS LTD.,CHANGED NAME TO CIMA RESOURCES LTD.
RR12	EINARSON LAKE	6356	13134	OUTFITTER CAMP	0		D.I.A.N.D.	NO MINERAL TENURE

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
RR13	MT SELOUS	6257	13214	?	1	40 DRUMS; STATUS????	D.I.A.N.D.	SEE MAYO MINING RECORDER Y 31461, 1968, AARO E. AHO [DECEASED]
RR14	ATLAS AIRSTRIP AND LAKE	6254	13205	AIRSTRIP, STAGING FOR CLEANUP	0	STAGING AREA FOR CLEANUP, SEE SITES RR13	D.I.A.N.D.	SEE MAYO MINING RECORDER Y14147, 1967 TO 1982, MANY OWNERS MAINLY ATLAS EXPLORATION/CIMA RESOURCES [NOW KNOWN AS HANKIN ATLAS INDUSTRIES LTD. 100- 4120 - 23rd AVE NE CALGARY, ALTA. T2E 6W9]
RR15	TROUT LAKE	6254	13337	ABANDONED, EXPLORATION CAMP	0	18 DRUMS, NO DR IN WATER	D.I.A.N.D.	
RR16	SQUARE LAKE	6241	13159	ABANDONED, EXPLORATION CAMP	2	30 DRUMS, STATUS MOSTLY EMPTY, VERIFY, DR ON EDGE OF LAKE, NOTHING IN WATER	D.I.A.N.D.	
RR17	JIM COOK LAKE	6226	13117	ABANDONED, EXPLORATION CAMP	2	9 DRUMS. DRUMS IN WATER [SWAMP]	D.I.A.N.D.	NO MINERAL TENURE
RR18	SWIM LAKES	6213	13245	ABANDONED, EXPLORATION CAMP	1	7 DRUMS; NO DRUMS IN WATER, RECREATIONAL CONFLICT, CORE SHACKS, OLD DOCK, OLD NODWELL IN PARTS.. RMO RECOMMENDS BURN WOODEN MATERIAL ON SITE, FERRY METAL WASTE BY R/W TO ROBERT CAMPBELL HIGHWAY, COMBINE WITH RR18 & RR19.	CURRAGH RESOURCES INC.	QUARTZ CLAIMS Y61762, Y66760, COVERING THIS SITE ORIGINATE 1971. HOLDERS HAVE INCLUDED DYNASTY EXPLORATION LTD., CYPRUS ANVIL MINING CORP. [CAMC], Cima RESOURCES LTD. AND CURRAGH RESOURCES INC. CURRAGH TENURE VALID TO 03/1993. [SEE WHSE MINING RECORDER ALL RR SITES]
RR19	2 MI FROM SWIM LAKE	6213	13249	EXPLORATION CAMP ACTIVE	1	5 DRUMS, RECREATIONAL CONFLICT QUARTZ CLAIMS COVERING THE SITE ORIGINATE 1971. HOLDERS HAVE INCLUDED DYNASTY EXPLORATION, CAMC, Cima, AND CURRAGH RESOURCES INC.. CURRAGH TENURE VALID TO 03/1993.	CURRAGH RESOURCES INC.	QUARTZ CLAIM Y61773 ORIGINATED 1971. HOLDERS SAME AS RR18. CURRAGH RESOURCES INC VALID TENURE TO 03/1993.
RR20	NEAR SWIM LAKES	6213	13253	ABANDONED, EXPLORATION CAMP	1	3 DRUMS. RECREATIONAL CONFLICTS RMO RECOMMENDS BURN TENT FLOORS ON SITE, HAUL DRUMS OUT BY R/W TO ROBERT CAMPBELL HIGHWAY ALONG WITH RR21.	CURRAGH RESOURCES INC.	SEE Y61836, CURRAGH VALID TO 03/93
RR22	SWIM LAKES	6211	13257	ABANDONED, EXPLORATION CAMP	1	3 DRUMS. RECREATIONAL CONFLICT RMO RECOMMENDS BURN OLD TRAILERS ON SITE, HAUL DRUMS TO ROBERT CAMPBELL HIGHWAY.	CURRAGH RESOURCES INC.	QUARTZ CLAIMS 86278, 86277, 92722 LIKELY COVER SITE, ORIGINATED 1965. SIMILAR HOLDERS AS RR20 AND RR21. CURRAGH RESOURCES INC. VALID TENURE TO 03/1993.

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
RR23	SWIM LAKES	6213	1330000	ABANDONED, EXPLORATION CAMP	1	45 DRUMS SPREAD AROUND AREA, RECREATIONAL CONFLICT	CURRAGH RESOURCES INC.	SEE WHSE MINING RECORDER SWIM 92259, ORIGINATED 1965, OWNERS HAVE INCLUDED KERR ADDISON MINES, AEX MINERALS CORP., CANADIAN NATURAL RESOURCES, CYPRUS ANVIL MINING CORP, CURRAGH MINING PROPERTIES, CURRENTLY CURRAGH RESOURCES INC. VALID TO 03/2002
RR24	MT MYE, NE SIDE	6221	13259	ABANDONED, EXPLORATION CAMP	0	7 DRUMS	D.I.A.N.D.	SEE WHSE MINING RECORDER SCT YB21140, EXPIRED 1990, SCOTT D. WALLIS, SEE ALSO RECORD No.RH15627
RR25	TWO PETE MOUNTAIN	6239	13324	ABANDONED, EXPLORATION CAMP	0	12 DRUMS	D.I.A.N.D.	NO MINERAL TENURE
RR26	1.5 MI N of KEGLIVIK LAKE	6234	13321	ABANDONED, EXPLORATION CAMP	1	20 DRUMS; STATUS NO DR IN WATER	ARCHER CATHRO [NEARBY]	SEE WHSE MINING RECORDER KEG YB27572, VERY CLOSE TO SITE, ARCHER CATHRO VALID TO 03/93
RR27	KEGLIVIK LAKE	6233	13323	ABANDONED, EXPLORATION CAMP	2	20 DRUMS SPREAD AROUND AREA, DR IMMEDIATELY NEXT TO LAKE; STATUS	ARCHER CATHRO [NEARBY]	SAME AS RR26 ABOVE
RR28	ANVIL\ROSE CRK CAMP	6225	13345	ABANDONED, EXPLORATION CAMP	0	10 DRUMS	LAND CLAIMS R-12	SEE WATSON LAKE MINING RECORDER YA 56437, WAS OWNED BY ARCHER CATHRO 1980-1984.
RR29	ANVIL\PELLY CAMP	6224	13358	ABANDONED, STAGING AREA	0	6 DRUMS, SITE 23 MI NW of FARO AIRPORT	D.I.A.N.D.	SEE WHSE MINING RECORDER YB 20265, WAS HELD BY GOLDEN RUM RESOURCES LTD./ COMOPLEX MINERALS CORP, SEE ALSO RECORD No.RHOO317
RR30	KEELE LAKE	6330	13027	NEW SITE	0	DON HUTTON rmo MAYO	D.I.A.N.D.	NO MINERAL TENURE
TE	MACKINAW CAMP MI 814 [KM 1310] ALASKA HW	0601450	1325510	OLD TESLIN LK CAMPGRD	0	CLOSE TO TEN MILE CR WASTE OIL PRESENT	YTG, TITLED LAND	SEE YA 55552, WAS OWNED BY ARCHER CATHRO TO JAN, 1983
TE02	CABIN LAKE	6012	13141	EXPLORATION CAMP	1	PROPANE BOTTLES, FUEL DRUMS W JP4 OR DIESEL, APPROX 40DR DR NEED TO BE ASSESSED	D.I.A.N.D.	SEE WATSON LAKE MINING RECORDER SWIFT CLAIMS YA33271, YA33248, YA33269, YA332 46; HAD VARIOUS OWNERS INCLUDING DUPONT CANADA 102-1550 ALBERNI ST. VANCOUVER, B.C. V6G 1A5; CSA MINERALS[PAMOREX MINERALS INC. 95 WELLINGTON ST. BOX 13 TORONTO, ONT. M5J 2N7]; LAST OWNED BY WELCOME NORTH RESOURCES INC. 1500-675 W.HASTINGS ST. VANCOUVER,B.C. V6B 1N2 01/1993.

APPENDIX C

A.E.S. WASTE SITE INVENTORY

02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
TE03	RED MOUNTAIN AIRSTRIP	6102	13347	MINING STRIP, QUARTZ MINING CLAIM	0	CONFLUENCE OF BOSWELL AND RED MOUNTAIN CREEK, 12 DRUMS; ALL EMPTY. LOW RISK SEE TE4,5,6 PHASE III	D.I.A.N.D.	CHECK WATSON LAKE MINING RECORDER, RECORD #297
TE05	SLATE MTN ACCESS #2	6058	13340	MINING/EXPLORATION	1	RED MOUNTAIN CREEK AREA, 50 DRUMS. STATUS? SITE ON ROUTE TO UPPER MINE SITE, LOW RISK ACCESS SITE; 'snowfall'. SEE TE3, TE4, TE6 SAME PROJECT	D.I.A.N.D.	"GUB" CLAIMS, WHSE DISTRICT, TO 12/92 SEE CLAIMS YA48040,YA48038. PREVIOUSLY WESTFORK PETROLEUM OR AMOCO CANADA PETROLEUM [INSTR. #Q102498]
TE06	SLATE MOUNTAIN EXPLORATION	6059	13346	MINING/EXPLORATION	1	PRIMARY CONCERN IN THE REGION, FOUR 5000 GAL ABOVE-GROUND FUEL TANKS WITH NO BERMS [8'X16' TANKS] ALL FULL, DIESEL?, 100 DRUMS. NEED TO ASSESS, POSSIBLE SURFACE CONTAMINATION, 2 TO 3 KM TO CREEK SEE TE 3, 4, 5 RE GROUP	D.I.A.N.D.	SEE WATSON LAKE MINING RECORDER, EXPIRED CLAIMS YA7953, YA7954, YA7955, YA22252
TE07	SEAGULL, UTM O9V US 771 793	6009	13112	MINING EXPLORATION CAMP	0	EMPTY DRUMS FULL OF HOLES. RD ACCESS. SOLID WASTE, LOW RISK	HARDY HIBBING	1989 TO 08/1993, HARDY HIBBING/PATRICK KOSTIUK BOX 547, WATSON LAKE Y.T.
TE08	LOGJAM	6001	13135	EXPLORATION/STAGING	0		LOGTUNG RESOURCES	SEE WATSON LAKE MINING RECORDER YA36638, WAS OWNED BY BARYTEX RESOURCES AND LAST BY PULSE RESOURCES LTD. ALSO NEARBY ARE LOG CLAIMS YA 11214 [OWNED IN 1970's BY AMAX, CANAMAX, AND CURRENTLY LOGTUNG RESOURCES ADDRESS UNKNOWN] SEE ALSO YA 11213, YA11210.
TE09	PURE SILVER	6002	13135	EXPLORATION/STAGING	0		7188 YUKON LTD.	SEE WATSON LAKE MINING RECORDER YA 21406, WAS OWNED BY PURE SILVER MINES, AMAX, AND OTHERS, CURRENTLY HELD BY 7188 YUKON LTD. 200-204 LAMBERT ST. WHSE, Y.T.
WL01	WATSON LAKE TOWN DUMP SITE	6004	12844	MUNICIPAL LANDFILL	0	DOCUMENT FOR RECORD.	YTG RESERVE 042 w MUNICIPAL MAINTENANCE	MAINTAINED BY TOWN OF WATSON LAKE.
WL02	PUBLIC WORKS CAMP, WATSON LAKE BLT	600300	12844	ABANDONED CAMP	0		D.I.A.N.D.	
WL03	OLD ARMY DUMP	600500	1284400	ABANDONED DUMP	0		D.I.A.N.D.	
WL04	POSSIBLY ON LAND CLAIM BLOCK R-9	6005	12920	ABANDONED SCRAP METAL DUMP	0		LAND CLAIM R-9	NO MINERAL TENURE
WL05	BIG CREEK CAMPGROUND, SITE #S-135	6008	12937	OLD YTG CAMP GRD WITH CAMP WASTE	0		YTG	

APPENDIX C A.E.S. WASTE SITE INVENTORY								02/11/93
SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
WL06	DUMP SITE NEAR SIMPSON LAKE CAMPGROUND	6038	12912	ABANDONED, CAMPER'S REFUSE	0		D.I.A.N.D.	ABANDONED CAMPERS GARBAGE
WL07	TUCHITIWA CAMP, DUMP SITE	605425	1291240	OLD AND PRESENT GARBAGE DUMP	0	YTG MAINTENANCE AND CONTRACTORS, AND MINERS JUNCTION LOT 1000 PLAN 67776, USE THE SITE. CAMP REFUSE; WASTE OIL, BATTERIES, SOME WASTE OIL PREVIOUSLY NOTED WAS GONE FALL 1992.	D.I.A.N.D.	SITE HAS BEEN USED BY Y.T.G AND OTHERS. NO TENURE.
WL08	OLD LODGE PROPERTY	6012	13013	OLD LODGE SITE	0	SITE NOT USED FOR PAST 10 YRS, 25 VEHICLE WRECKS	ON LOT 10 GR. 756 PLAN 42954 TITLED	
WL09	EXPLORATION CAMP	6012	13008	ABANDONED EXPLORATION CAMP	0		D.I.A.N.D.	NO MINERAL TENURE
WL10	RANCHERIA LODGE & YTG CAMPGROUND	600510	1303640	DUMP\SCRAP METAL	0	HOUSEHOLD WASTE; TIRES, METAL WASTE, OLD TRAILER FRAME, SCATTERED LITTER AT LARGE.	D.I.A.N.D.	MAY HAVE HAD MILITARY ORIGIN, RECENTLY USED BY RANCHERIA HOTEL, YTG PARKS, YTG HIGHWAYS AND CONTRACTORS. NO TENURE.
WL11	GOV'T DUMP, B.C.	6001	12755	DUMP	0	YUKON DUMP CLEANED UP, BC ACTIVE DUMP	BC GOV'T	
WL13	UPPER LIARD VILLAGE DUMP	6004	12858	ACTIVE LANDFILL	0	DOCUMENT FOR RECORD.	VILLAGE	MILITARY ORIGIN
WL14	WL# 14 to 27 IN WATSON LAKE				0		REFERRED TO RMO ROSS R., J.JENNINGS	
WL14	OSCAR LAKE NW-1			MINING EXPLORATION	0	SHEET 105A/15, SOME FULL DRUMS AND LUMBER	D.I.A.N.D.	
WL15	OSCAR LAKE NW-2			MINING CAMP	0	REMAINS OF OLD MINING CAMP	D.I.A.N.D.	
WL16	CONGLOMERATE CREEK 1			EXPLORATION CAMP?	0	ONE ABANDONED TRAILER	D.I.A.N.D.	
WL17	CONGLOMERATE CREEK 2			STAGING AREA	0	ABANDONED FUEL KEGS	D.I.A.N.D.	
WL18	LA BICHE RIVER			AIRCRAFT CRASH SITE	0	AIRCRAFT WRECK AND CAMPSITE	D.I.A.N.D.	

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
WL19	SWIFT RIVER DUMP [KM 1180, M 733]	0600030	1311200	MILITARY AND RECENT ACTIVE DUMP	0	ACTIVE LANDFILL SITE, INSPECTED BY EP 06/92. SITE LOCATED ON STEEP HILL SIDE; TOE OF DUMP NEAR RIVER, POSSIBLE FLOODING AT TOE. HISTORIC USE BY USAF 1940'S. FALL 1992 INSPECT; KEGS, BARRELS, HOUSEHOLD WASTE, WINDBLOWN LITTER.	YTG??	
WL25	HYLAND RIVER FIRE 5				0	2 ABANDONED BLDGS., WASTE METAL.	D.I.A.N.D.	
WL26	McMILLAN LAKE A SOUTH			ABANDONED CAMPSITE	0	ABANDONED CAMPSITE BLDGS.	D.I.A.N.D.	
WL27	McMILLAN LAKE B SOUTH			EXPLORATION CAMP	0	ABANDONED CORE SHACKS	D.I.A.N.D.	
WL30	LIARD R. MINING CAMP, QUARTZ LAKE	6032	12755	EXPLORATION CAMP	1	EXPLORATION, 10 DR NEAR WATER	D.I.A.N.D.	SEE WATSON LAKE MINING RECORDER Y 93401, NORANDA EXPLORATION COMPANY HELD CLAIM FROM 1975 TO 1992
WL31	GETTY EXPLORATION CAMP	6128	12733	EXPLORATION CAMP, CLAIMS LAPSED	0	6-45 GAL FUEL DRUMS, CAESAR LAKE IS 19 KM TO THE E.	D.I.A.N.D.	SEE WATSON LAKE MINING RECORDER YA 44872, WAS HELD BY RAMROD MINING, LAST BY VANCLIFF RESOURCES CORP. ADDRESS UNKNOWN [1986]
WL32	UPPER COAL RIVER #2	6122	12717	ABANDONED\EXP LORATION CAMP	2	100 DR ON SITE; NO INVENTORY. DRUMS ON EDGE OF LAKE/CREEK; NOT TOTALLY SUBMERGED, POTENTIAL RELEASE SEE SITES WL33,34 RE GROUP PHASE III	D.I.A.N.D.	SEE WATSON LAKE MINING RECORDER YA 56437, WAS OWNED BY ARCHER CATHRO 1980-1984.
WL33	UPPER COAL RIVER #3	6102	12709	ABANDONED EXPLORATION CAMP	1	10 DRUMS FUEL; ASSESSMENT, SITE IN HIGH ALPINE SADDLE, NO FLOW/MELT WATER, MINIMAL SITE DISTURBANCE SEE WL 32,34 RE GROUP PHASE III	D.I.A.N.D.	ARCHER CATHRO 1979 TO 1986, SEE YA45640
WL34	UPPER COAL RIVER #4	6113	12702	ABANDONED, EXPLORATION CAMP	1	POTENTIAL FUEL LEAKS; DR CLOSE TO LAKE. 9 DRUMS NEED TO BE ASSESSED, SEE WL 35 3 DRUMS	D.I.A.N.D.	SEE YA 55552,YA55564 OWNED BY ARCHER CATHRO TO JAN, 1983
WL35	ISO EXPLORATION CAMP	6113	12703	ABANDONED, EXPLORATION CAMP	0	3x45 GAL DRUMS	D.I.A.N.D.	NO MINERAL TENURE
WL36	47 MILE ROAD	6117	12843	ABANDONED, EXPLORATION CAMP	0	POSSIBLE QUARTZ CLAIMS IN GOOD STANDING	D.I.A.N.D.	SEE Y 64856, WAS OWNED BY J. TURNER, VANCLIFF RESOURCES, LAST OWNED BY SCORE RESOURCES CORP. 711-745 HOWE ST VANCOUVER, B.C. V6C 2B3[1989]
WL37	? LAND CLAIM BLOCK R-4	6116	1283200	ABANDONED, EXPLORATION CAMP	0		LAND CLAIM	POSSIBLE: CLIFF TURNER

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
WL38	LAND CLAIM BLOCK R-3	6123	12823	ABANDONED, EXPLORATION CAMP	0		D.I.A.N.D.	FORMERLY NORQUEST OR NEW JERSEY ZINC NO RECENT MINERAL TENURE
WL39	LAND CLAIM BLOCK R-3	6124	12817	ABANDONED, EXPLORATION CAMP	0		D.I.A.N.D.	NO MINERAL TENURE
WL40	ANDERSON LAKE	6140	12854	ABANDONED, EXPLORATION CAMP	1	40 DR EMPTY; 3 DR PARTIALLY FULL FUEL, DR 10M FROM LAKE, FUEL CACHE SITE, SEE WL41 & WL42 SAME LOCATION	D.I.A.N.D.	NO MINERAL TENURE
WL41	ANDERSON LAKES' LEASE	6141	12849	ABANDONED, LEASE LAPSED	0	DOMESTIC DEBRIS, WOODEN STRUCTURES, SCRAP METAL TO BE FLOWN OUT. SEE WL40 SAME AREA	MRS. RON HAWLEY	
WL42	ANDERSON LAKE, OLD CABIN	6140	12850	SQUATTER	0	GENERAL HOUSE HOLD REFUSE AT LARGE. BURN CABIN WHEN WEATHER PERMITS.	D.I.A.N.D.	FORMERLY [BCF]: BILL PEARLY
WL43	FRANCES LAKE, BASE OF MT.HUNT, E.ARM	6128	12923	EXPLORATION CAMP	1	4 to 5 TENT FRAMES, 40 -50 DRUMS ON SITE; NEED ASSESSMENT. NEED RMO INVENTORY OF SITE	D.I.A.N.D.	NO MINERAL TENURE
WL44	24 KM SW of FIRE LAKE, EXPLOR CAMP	610100	1304700	EXPLORATION CAMP, ABANDONED	0	SLING JEEP, BURN CABIN? 9 45 GAL DR	D.I.A.N.D.	NO MINERAL TENURE
WL45	19 KM SW of FIRE LAKE	6102	13042	ABANDONED, EXPLORATION CAMP	0	10 DRUMS?	D.I.A.N.D.	YB11644 WAS OWNED BY WELCOME NORTH MINES 1987 TO 1989, NO MINERAL TENURE BEFORE THEN
WL46	FIRE LAKE	6112	13030	ABANDONED, EXPLOR\OUTFIT CAMP	0	CONSULT WITH MR SMARCH. 25x45 GAL DRUMS??	WELCOME NORTH RESOURCES	YB33888 WAS OWNED BY PLACER DOME INC. [BOX 49330 BENTALL POSTAL STATION, VANCOUVER, B.C. V7X 1P1]; CURRENTLY OWNED BY WELCOME NORTH RESOURCES, VALID TO DEC. 1996
WL47	FIRE LAKE	6113	13034	ABANDONED, EXPLORATION CAMP	0	6 DR LEFT ON SITE	WELCOME NORTH RESOURCES INC.	YB34086 OWNED BY WELCOME NORTH, VALID TO JUL. 1997, WAS OWNED BY PLACER DOME INC ORIGINALLY
WL48	GRASS LAKE	6122	13047	ABANDONED, EXPLORATION CAMP	0	6 DRUMS ON SITE, SCHEDULED FOR CLEAN UP?	D.I.A.N.D.	NO MINERAL TENURE
WL49	3 KM FROM FIRE LAKE, QUARTZ CLAIMS	6114	13031	EXPLORATION CAMP	1	10 DR REMAINING; ASSESSMENT?	WELCOME NORTH RESOURCES	SEE YA 56602, WELCOME NORTH VALID TO SEPT. 1993

APPENDIX C

A.E.S. WASTE SITE INVENTORY

02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
WL50	BEAVER CROW RIDGE	6003	12457	ABANDONED, OIL & GAS EXPLORATION	3	SITE NEEDS TO BE CHARACTERIZED, 200? DR SOME WITH FUEL; DRILL MUD; CEMENT BAGS; LIME PAILS, 2 DRILL SUMP PONDS, DRAINAGE THROUGH SITE, SAUCY CR TRIB TO BEAVER. WELL HEAD INFO: SOBC-SHELL BEAVER CROW YT K2 #1 ,1963 LAT 6002N, LONG 12512W TROG	D.I.A.N.D.	SHELL OIL WELLSITE [1963]
WL51	OLD WELL SITE	6007	12409	ABANDONED, OIL & GAS EXPLORATION	0	COULD NOT FIND SITE SEPT/91 RMO INSPECTION	D.I.A.N.D.	
WL52	DENDALE LAKE	604730	1245000	ABANDONED,	1	3-4 10KEG, 3-4x45 GAL DR ASSESSMENT NEEDED, DRUMS CLOSE TO SHORE, DR MARKED ARCHER CATHRO 4/82 JP4, EXPLORATION?	D.I.A.N.D.	SEE WHSE MINING RECORDER KEG YB27572, VERY CLOSE TO SITE, ARCHER CATHRO VALID TO 03/93
WL53	BEAVER RIVER STRIP	6012	12505	ABANDONED, EXPLORATION CAMP	0	3-4 WOODEN ATCO TRAILER	D.I.A.N.D.	NO MINERAL TENURE
WL54	WATSON LAKE BARREL CACHE	6007	12848	ABANDONED, DRUMS SUBMERGED IN LAKE	3	APPROX 300 DR, AT APPROX. 30 FEET DEPTH. LAKE SURVEY CONDUCTED BY BURRAND DIVING SUMMER 91, CONTENTS STILL NOT CONFIRMED	D.I.A.N.D.	M.O.T./MILITARY DUMP SITE
WL55	MESSAGE POST LODGE	60050	1304300	ABANDONED, MI 715, X AK.HWY LODGE	0		PRESENTLY NOT OPERATING	
WL56	BARYTEX RESOURCES	6018	12725	EXPLORATION CAMP	0		BARYTEX RESOURCES CORP.	SEE Y 83309, VARIOUS OWNERS FROM 1974 INCLUDING GRANBY MINING, NOVAMIN, AND BREAKWATER RESOURCES LTD [350-6245 EAST BROADWAY TUSON, ARIZONA, U.S.A.,85711] TRANSFERRED TO CURRENT OWNER BARYTEX RESOURCES [520-470 GRANVILLE ST VANCOUVER, B.C. V6C 1V5] VALID TO 04/2003
WL57	KM 22 CAMPBELL HWY.	6010	12855	ABANDONED, ONE VEHICLE HULK	0		D.I.A.N.D.	
WL58	KM 1126.5 AK HWY	6006	1302200	ABANDONED, ONE VEHICLE HULK	0	TOW AWAY	D.I.A.N.D.	
WL60	M.O.T. DUMP SITE	600700	1284900	AIRPORT DUMP SITE	1	10 DRUMS. NEED TO FURTHER ASSESS SITE NEEDS RMO ASSESSMENT	M.O.T.	
WL61	CRANE HULK: S-279 KM 60.3 CAMPBELL HWY	6028	12907	ABANDONED	0		D.I.A.N.D.	CRANE HULK, REMNANT OF HWY CONST.

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
WL62	GOLDEX RESOURCES	6008	13025	MINING EXPLORATION	1	10 DRUMS. POSSIBLE ADIT, NARROW GAUGE TRACK, UNCERTAIN OF WHEN LAST VISITED	D.I.A.N.D.	SEE YA12632, WAS OWNED BY SEREM LTD., DELPHI RESOURCES LTD.; LAST BY GOLDEX RESOURCES INC. [402-1755 WEST BROADWAY, VANCOUVER B.C. V6J 4S5] LAPSED 1991
WL63	LUCKY LAKE	6130	12719	ABANDONED, FUEL CACHE	1	13 DRUMS NEAR LAKE, SOME DRUMS IN LAKE, USED AS FUEL CACHE BY WLFS, FIELD OPS? INSPECTED SEPT 91; SEE MIKE	FIELD OPS	
WL64	CONFLUENCE of GREEN AND HYLAND RIVERS	6037	12810	OLD CAMP	0		SITE SPECIFIC S-148	
WL65	UPPER HYLAND L., 18 Km E. of HWY #10	6002	12851	ABANDONED, 20 DRUMS	1	WILL HAVE TO INVENTORY SUMMER 1990, POLLUTION POTENTIAL?	D.I.A.N.D.	
WN01	BAKER L. MINING CAMP, 16'SQ. LOG CABIN	6001	13405	SEASONAL	0	CAMP FACILITIES; NO DRUMS	D.I.A.N.D.?	
WN03	236 KM KD. HWY., UNAUTHER'D GARB. DUMP	6108	13521	LANDFILL, ACTIVE	0	SOURCE CURTAILED BEFORE CLEAN UP COMMENCES	D.I.A.N.D.	UNAUTHORIZED DUMPING
WN04	OLD GARBAGE DUMP, S. END FOX L. KM 238	6111	13522	LANDFILL, ABANDONED	0	SOURCE CURTAILED BEFORE CLEAN UP	D.I.A.N.D.	
WN05	LE CAR IN QUARRY, E. of KM 255 KD. HWY.	6118	13532		0	REMOVE RENAULT CAR!	D.I.A.N.D.	
WN06	ONE OLD BURNED VEHICLE KM267.5 & PWR LN.	6119	13536		0	REMOVAL OF OLD VEHICLE	D.I.A.N.D.	
WN07	15 OLD ABAN VEHICLES BEHIND BRAEBURN LODGE	6129	13546		0	PRIORITY FOR CLEAN UP	D.I.A.N.D.?	PRIORITY FOR CLEAN UP
WN08	17 OLD VHCLS. W. OLD LOG SHED KM 1519.5	6051	13542		0	BURN SHED. TRANSPORT VEHICLES TO SUITABLE DISPOSAL SITE	D.I.A.N.D.	.5 Km SOUTH OF HWY.
WN09	GARBAGE DUMP, KM 1521, S. of Hwy.	6051	13543	DUMP	0	NEED FOR IDENTIFICATION OF MORE PERMANENT DISPOSAL SITE; ADVISE RESIDENTS.	D.I.A.N.D ?	
WN10	STONY CRK., OLD HWY CAMP	6048	13500	ABANDONED CAMP	0	RECOMMENDED TO BURN OLD BUILDINGS AND REMOVE SCRAP METAL BY TRUCK.	D.I.A.N.D.	U.S. ARMY 1943-1945
WN11	OLD METAL TRAIL, KM1557 MENDENHALL R.	6047	13618		0	TO BE REMOVED ALONG WITH DEBRIS	D.I.A.N.D.	
WN12	OLD CAR	6044	13529		0	TO BE REMOVED	D.I.A.N.D.	

APPENDIX C

A.E.S. WASTE SITE INVENTORY 02/11/93

SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
WN13	TAKHINI FUEL WOOD AREA, OLD 4DOOR SED.	6053	13523		0	OWNER 0F VEHICLE = LUCY SMITH	D.I.A.N.D.	VEHICLE OWNER LUC[K]Y SMITH
WN14	OLD CAMP OF KARL COOPER	6023	13553	ABANDONED CAMP	0	CLEAN UP PROJECT FOR FIRE CREW; REMOVE TO DUMP.	D.I.A.N.D.	FORMERLY KARL COOPER
WN15	OLD WOOD CUTTERS CAMP, MI 2.5 MEADOW RD	6054	13527		0		D.I.A.N.D.	
WN16	KM6.5 FLAT CRK RD E.SIDE-OLD SHACK &TRK.	6036	13527	ABANDONED SHACK	0		D.I.A.N.D.	
WN17	REMAINS OF OLD CAR ON N.FACING HILL TOP	6056	13527		0	FLATBED TRUCK REQUIRED	D.I.A.N.D.	
WN18	1/4 MI E of SCT LK RD TENT CAMP	6044	13529	OLD CAMP	0	FIRE CREW CLEAN UP PROJECT	D.I.A.N.D.	FORMERLY FRANK FAIRCLOUGH
WN19	MI 932.5 DUMP	0000	00000	OLD DUMP, CLEANED UP?	0	DUMP NOT FOUND	?	
WN20	UPPER LABERGE	6057	13506	FISHING AND HUNTING	0	CONSULT WITH BANDS	NATIVES CAMP	
WN21	LOWER LABERGE	6124	13513	HISTORIC, YTG HERITAGE	0	HISTORIC SITE	D.I.A.N.D.	HERITAGE VALUE, PADDLE WHEEL FUEL WOOD SUPPLY CAMP
WN22	BOSWELL MINES EXPLORATION CAMP	6112	13421	EXPLORATION CAMP	0	NO EXPLORATION CAMP WAS FOUND AT OR NEAR THESE COORDINATES; SEARCH VIA HELICOPTER. CHECK BOSWELL MINE RECORD p6 z6 F	BOSWELL MINES ??	NOT LOCATED ON GROUND
WN23	HOOTALINQUA	6135	13554	HERITAGE	0	HISTORICAL SITE	YTG HISTORICAL SITE	
WN24	KLONDIKE HWY MI 0.2, DUMP			LANDFILL	0		YTG LANDS	
WN25	KD HWY MI 12.5, DUMP			LANDFILL NOT FOUND	0	NO EVIDENCE OF DUMP FOUND	?	NO EVIDENCE OF DUMP FOUND
WN26	KD HWY MI 20, CAMP			CAMP SITE, NOT FOUND	0	NO CAMP FOUND AT MI 20 KD HWY	?	NO CAMP FOUND AT THESE COORDINATES
WN27	MI 35 KD HWY, FOX LAKE CAMPGROUND			CAMPGROUND	0	YTG CAMPGROUND	YTG PARKS	

APPENDIX C A.E.S. WASTE SITE INVENTORY								02/11/93
SITE CODE	SITE NAME	LAT	LONG	SITE USE	E.P. RANK	COMMENTS	CURRENT OWNERSHIP	OWNERSHIP PAST AND PRESENT
WS01	N. HNATIUK SAWMILL	622600	1341400	SAWMILL	0	RMO RECOMMENDS REMOVE VEHICLE HULKS BY TRUCK, BURN AND CONTOUR SAWDUST OR HAUL AWAY.	ABANDONED	EXPIRED LAND USE PERMIT

Appendix D

Historical Research on Contaminants in Yukon

Questionnaire

Questionnaire

(Before asking the questions, describe the nature of the research and the reasons for it, why this interviewee was selected, and how the information may be used.)

Do you mind if we use a tape recorder to record your answers?

Please describe briefly your work history in the Yukon. Were you involved in any of the following: highway construction or maintenance; power or phone systems; construction of buildings; oil refinery; pipelines; military installations; transportation; placer mining; mining exploration?

When were you involved in this?

Were you aware of the use of any of the following during these activities: insecticides such as DDT, or toxaphene products such as Hercules, Camphene or Alltox; herbicides or weed killers; PCB oils in transformers or other equipment; lead-based products such as paints; mercury?

How was the product transported? In what kind of containers? Where did it come from? How was it used? What happened to left-over products?

Can you describe precisely where the product was used and in what year(s)?

Who was in charge of the project? Who actually used the product?

Can you think of anyone else who may be able to help us track down instances of the use or disposal of these products?

Did you ever hear of accidents involving the transport of these products?

From your general knowledge of Yukon life, are you aware of any instances of the use, spillage or disposal of these products that we should be aware of?

We will summarize your comments in our report. Do you mind if we state your name during our summary?

Appendix E

List of Site Deleted from the A.E.S. Waste Site Inventory

APPENDIX E LIST OF SITES DELETED FROM A.E.S. WASTE SITE INVENTORY			
SITE CODE	SITE NAME	ON DPW MINES LIST	CLEANED UP SITE [YEAR]
CA	Tinta Hill [Silver TVSK Mine]	Yes	
CA	Tantatus Butte Coal Mine	Yes	
CA	Mt. Nansen Mines	Yes	
CA 15	Km 46 Acorn Rd.	No	Yes [1991]
CA 20	La Forma Mine [Mt. Freegold]	Yes	
CA 22	Tally Ho Freegold	Yes	
CA 33	Hayes Creek	Yes	
CA 34	Klines Gulch Airstrip	Yes	
CA 36	Merrice Lake Mining Camp	Yes	
CA 37	Williams Creek Site	Yes	
DA	Lone Star Mines	Yes	
DA 005	Stokes Point	No	Yes [in progress]
DA 010	Tuttle Airstrip	No	Yes [1991]
DA 011	North Hope A/S	No	Yes
DA 022	Km 398 Dempster Highway	No	Yes [1992]
DA 024	Cody Creek	No	Yes [1991]
DA 026	Tatonduk River	No	Yes [1992]
DA 031		No	Ivvavik National Park
DA 032		No	Ivvavik National Park
DA 033		No	Ivvavik National Park
DA 034		No	Ivvavik National Park
DA 035		No	Ivvavik National Park
DA 036		No	Ivvavik National Park
DA 037		No	Ivvavik National Park
DA 039		No	Ivvavik National Park
DA 042		No	Ivvavik National Park
DA 061	Km 460 Dempster Highway	No	Yes [1992]
DA 065	Winter Road	No	Yes [1991]
DA 072	Birch River	No	Ivvavik National Park
DA 111	Chapman Lake	No	Yes [1992]

APPENDIX E LIST OF SITES DELETED FROM A.E.S. WASTE SITE INVENTORY			
SITE CODE	SITE NAME	ON DPW MINES LIST	CLEANED UP SITE [YEAR]
DA 120		No	Ivvavik National Park
DA 123	Whitefish Lake Island	No	Yes
DA 128	Bear Cave Mountain	No	Yes [1991]
DA 142	Blackstone Trail	No	Yes
DA 143	Blackstone Trail	No	Yes [1991]
DA 149	Old Highway Lodge Km 15 Dempster Highway	No	Yes [1992]
DA 144	Old Crow Winter Road	No	Yes [1991]
DA 150	Eagle River Trail	No	Yes
DA 163	Eagle Trail	No	Yes [1992]
DA 164	Eagle Trail	No	Yes [1992]
DA 165	Eagle Trail	No	Yes [1992]
DA 166	Eagle Trail	No	Yes [1992]
DA 167	Eagle Trail	No	Yes [1992]
DA 168	Eagle Trail	No	Yes [1992]
DA 170	Chapman Lake	No	Yes [1992]
DA 182	Km 10 Dempster Highway Pit	No	Yes [1992]
DA 183	Tombstone	No	Yes [1992]
DA 184	Narn Claims	No	Yes [1992]
DA 186	Eagle Trail	No	Yes [1992]
DA 161	Coal River Mine	Yes	
DA 152	Matson Creek	No	Yes
DA 154	Clinton Creek Mines	Yes	
DA 158	Matson Trail	No	Yes [1992]
DA 245	Hart River Mine	Yes	
DA 48	Greaves Creek	No	Yes
DA 50		No	Ivvavik National Park
DA 60	Char Creek	No	Yes [1992]
MA	United Keno Hill Mines	Yes	
MA 11	Igor Mine Site	Yes	
MA 15	Bonnet Plume Mine	Yes	

APPENDIX E
LIST OF SITES DELETED FROM A.E.S. WASTE SITE INVENTORY

SITE CODE	SITE NAME	ON DPW MINES LIST	CLEANED UP SITE [YEAR]
MA 25	Crest Mine	Yes	
MA 39	Val Mine	Yes	
MA 40	Rusty Mountain Mine	Yes	
MA 41	Kathleen Lakes - Eastern Lake	Yes	
MA 44	Kathleen Lakes - North of Largest Lake	Yes	
MA 49	Clark Mine	Yes	
MA 50	South of Chandler Lake	Yes	
MA 51	Past Wernecke	Yes	
MA 52	Wernecke	Yes	
MA 57	Kalzas Twins	Yes	
MA 68	Peso Silver, Plata Inca	Yes	
MA 70	East of Boulder Creek	Yes	
RR	Iona Silver [Key, Ketza Key]	Yes	
RR	Faro [Cyprus Anvil] Mine	Yes	
TE 01	Fish Lake Military Beacon	No	Yes [1992]
TE 04	Slate Mtn. Access #1	Yes	
WL 12	Cleaned Up Site	No	Yes
WL 28	Silverhart Mines	Yes	
WL 29	Mining Camp	No	
WL 62	Goldex Resources	Yes	
WN	Venus Mine	Yes	
WS	Arctic Caribou Mine	Yes	