Release Date: November 28, 2005

Manitoba

THE PROVINCIAL COURT OF MANITOBA

IN THE MATTER OF: ***THE FATALITY INQUIRIES ACT***

AND IN THE MATTER OF: **CALVIN SEAN WOOD**

APPEARANCES:

Douglas N. Abra, Q.C, Inquest Counsel

Richard J. Wolson, Q.C., and Katherine L. Bueti for the Manitoba Department of Transportation and Government Services

William S. Gange for the Manitoba Workplace Safety and Health Division

William F. Armstrong and Ronald L. Olesky for Nor-Win Construction Ltd.

George J. Orle, Q.C., for the Wasagamack First Nation

Manitoba

THE FATALITY INQUIRIES ACT
REPORT BY PROVINCIAL JUDGE ON INQUEST

RESPECTING THE DEATH OF: CALVIN SEAN WOOD

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Paragraphs

[1] On a cold day in January 2002, Calvin Sean Wood was operating a five-ton truck on the ice of Island Lake. He was working on the initial stages of the construction of a portion of the winter ice road system on the lake near his home community of Wasagamack. His job was to clear snow in the area of the proposed road with a plow attached to the front of the truck. That truck went through the ice and Calvin Wood drowned.

[2] As a result of the death of Calvin Wood, a special prosecutor was appointed and charges were laid by the Crown against the Manitoba provincial government Department of Transportation and Government Services who the road was being built for; Nor-Win Construction Ltd. who was the general contractor; and the Wasagamack First Nation and its Chief and Council who were the subcontractors of the portion of the road where the accident occurred. The charges were allegations of breaches of the provisions of *The Workplace Safety and Health Act* R.S.M. 1987, c.W210.

[3] Before the matter came to trial, the special prosecutor withdrew all charges. Upon being notified of the withdrawal of the charges, the Chief Medical Examiner, pursuant to sections 19(1) and 19(2) of *The Fatality Inquiries Act*, S.M. c.30-CAP F52, directed that an inquest be conducted into the death of Calvin Wood to determine "1) the circumstances under which Mr. Wood's death occurred; and, 2) to determine what can be done to prevent future, similar deaths in light of recommendations made following the inquest into the death of Bruce Andrews in 1990 and, more recently, of technological advancements in the construction of ice roads" (Exhibit 1, Tab 1, page 1).

[4] Hearings were held on 19 days during the period of January 17th, 2005 and June 3rd, 2005. A number of witnesses were called and examined by parties that were granted standing.

[5] On January 12th, applications for standing to examine witnesses and make representations were granted to:

(a) the Department of Transportation and Government Services;

(b) Nor-Win Construction Ltd.;

(c) the Wasagamack First Nation; and

(d) the Workplace Safety and Health Division.

[6] Each of these parties was represented by counsel who attended on all of the hearing dates, participated in the examination of witnesses and made recommendations at the conclusion of the hearing.

[7] To understand how Mr. Wood came to his death on January 23rd, 2002, a review must be made as to how he came to be on the ice of Island Lake. The Government of Manitoba, through their Transportation and Government Services Department (the "Department") issued a construction order, No. X01334, for a series of winter truck roads on the east side of Lake Winnipeg from Provincial Road 304 to the remote First Nation communities on Island Lake. These winter roads total approximately 772 kilometers and serve a number of remote First Nation communities. The construction order for the building and maintenance of these roads was awarded to Nor-Win Construction Ltd. ("Nor-Win") which, in turn, subcontracted out various portions of the road work to the communities along the path of the road. None of the construction work was directly performed by Nor-Win. The subcontract for the portion of the road between Wasagamack and St. Theresa Point on Island Lake was given to the Wasagamack First Nation (Exhibit 1, Tab 7). This Section 17 was a distance of approximately 13 kilometers and represented less than 2% of the total contract (Exhibit 1, Tab 5, page 2 of 28).

[8] Nor-Win is a joint venture entity owned and operated by the ten First Nation communities that form the Southeast Tribal Council (Red Sucker Lake, Garden Hill, St. Theresa Point, Wasagamack, Poplar River, Pauingassi, Little Grand Rapids, Bloodvein, Berens River and Hollow Water). Nor-Win has no construction equipment and only a limited number of employees who work on the winter roads project. There are two superintendents (full-time), one for the northern region of the roads and one for the southern region of the roads. Working in a general supervisory capacity and spending only part of their time on this project were the two managers of Nor-Win to whom the superintendents reported.

[9] The subcontractors provided all the employees who did the actual work of building and maintaining the winter roads. The subcontractors were also responsible for providing all of the equipment used to build and maintain the roads.

[10] Calvin Wood was an employee of the Wasagamack First Nation. He was hired by them to work on the winter road project and his direct supervisor was foreman Kelvin Harper, also an employee of the Wasagamack First Nation.

Kelvin Harper reported to Stephen Harper, the Wasagamack Councillor in charge of winter roads. The employees of Nor-Win had no supervisory authority over the workers from Wasagamack who took their direction from the Chief and Council through Stephen Harper.

[11] Winter roads to the communities on the east side of Lake Winnipeg had been built for over the last 20 years. Since approximately 1981, Nor-Win had been the general contractor. The government, through the Department, had made a decision to deal solely with Nor-Win because as an entity comprising all of the communities which the road served, they would be able to provide employment and economic benefits as a result of the construction. This was not the manner in which other government construction arrangements were made throughout the province. The work on the winter road, as it turned out, was actually being performed by at least ten separate entities with a very limited form of supervision from Nor-Win.

[12] Inspectors employed by the Department were on site in the Island Lake area on a continual basis during the construction of the ice roads and during the period the roads were open. These inspectors, according to their testimony, were not involved in the direct supervision or decision-making processes of the contractors while the roads were being built. In fact, even when specific requirements of the construction order were not being performed, such as the timely provision of ice thickness information, they and the Department took no action other than to remind Nor-Win that this information was required by the Department. There were no surveys done by the inspectors to see if the equipment listed in the construction order as being available for use on Section 17 was, in fact, being used. The situation was, at the time of the accident, that none of the equipment listed was available and the piece of equipment used by Calvin Wood was not even on the list. There was no evidence of any concerted efforts made to monitor unsafe conditions by the departmental inspectors. Matters of safety were left to the contractor.

[13] The responsibility for performance of the work to be done pursuant to the construction order and the methods and the equipment used seem to be matters left to the discretion of the contractors. There were provisions in the construction order whereby work could be suspended by the Department for a variety of reasons set out under section 110.8.3 of the construction order. The government, at that time, did not suspend work when ice readings were not being provided in accordance with the construction order. Nor-Win, the general contractor, seemed, according to their superintendent Murdo McDougall, to have downloaded all of the

responsibility for the performance of the work to the subcontractor, the Wasagamack First Nation, under the contract between them (Exhibit 1, Tab 7).

Ice Measurements

[14] The decision of when to go out on the ice to commence the road construction is of obvious critical importance. In the present case, after an assessment that seems to have been solely based on experience and intuition, light vehicles (snowmobiles) were sent out to do a series of ice measurements. Observations as to the quality and thickness of the ice were done and a determination was then made to send out larger vehicles.

[15] Ice thickness measurements are the primary factors in determining ice-bearing capacity. Much evidence was heard regarding the appropriate thickness before travel can be undertaken with a minimum degree of risk. The ice measurements and their communication to those who made the decisions to put vehicles to work on the ice are of paramount importance. Prior to the accident, readings were done in an unstructured and disorganized manner and were not being communicated to the government inspectors in the manner required under the construction order. Some efforts were made to have the ice thickness readings delivered in a detailed and timely manner; however, they were not successful and no sanctions were imposed as a result of the failure to comply with this provision of the construction order.

[16] According to Don Kuryk (the Manager of Technical Services for the Department of Transportation and Government Services for the Province of Manitoba), there had been problems getting ice verification information in the manner required by the construction order for several years (Transcript, Volume 1 pages 87 to 89). There was a requirement under the construction order that:

> Prior to moving equipment onto any proposed ice road, the contractor shall test the ice for thickness, record the data on ice thickness verification sheets supplied by the engineer, and provide copies of the information to the engineer so as to mutually confirm that the bearing capacity of the ice is sufficient to carry the weight of the contractor's construction equipment.

(Exhibit 1, Tab 5, page 16).

[17] Further, the winter road safety guidelines at page 7 (Exhibit 1, Tab 6) emphasize the importance to "document all ice readings". Despite these

requirements to provide documented records of ice readings, they were not done prior to the accident. Don Kuryk was of the opinion that the departmental inspectors on the job at Island Lake were getting information in some manner that related to the measurement of ice (Transcript, Volume 1, page 89, lines 3 to 25). However, the inspector Don Wood in his testimony indicated that he did not receive any documented evidence of ice measurements and that he just kept asking the superintendent for Nor-Win, Murdo McDougall, to provide them. Mr. Wood further indicated that his supervisor in the Department, Robert McLeary, was aware that this information was not being received.

[18] The testimony of government inspector Don Wood was that he did not take an active part in decisions being made by the contractors such as when to put the snow-clearing equipment out onto the lake despite the fact that the Wasagamack foreman, Kelvin Harper, and a worker, George Junior Harper, stated that he did (Transcript, Volume 8, pages 11 and 12 and 103 and 104). Don Wood, on the other hand, maintained that he never advised contractors when to send vehicles out on the ice as he considers it the contractor's responsibility to make that assessment. He further indicated that even if asked he would not offer advice on that point; however, he would say something if he saw a vehicle on the ice when he knew it was unsafe to be there (Transcript, Volume 11, page 41).

[19] Without the provision of the ice thickness verification sheets as required under the construction order, the purpose of the provision of these sheets "to mutually confirm that the bearing capacity of the ice is sufficient to carry the weight of the contractor's construction equipment" (page 16 of the construction order) could not be accomplished. That, combined with the unknown weight of the vehicle being used, made it impossible for the Department to participate in mutually confirming with the contractor the bearing capacity of the ice. Further, the inspectors in their testimony were apparently unaware of any mutual responsibility to assess the bearing capacity of the ice as set out in the construction order and left it as the contractor's responsibility to make that assessment. In the end, it was left to those with the least experience and knowledge to make the critical assessment as to when snow-clearing on the ice should begin.

The Circumstances Prior to the Accident

[20] Calvin Wood was hired shortly before the accident to work on the winter road for the 2001-2002 season. The conditions for building the ice road on the Island Lake portion of the winter road were not good that year. There had been a

significant amount of snow and the temperatures in the earlier part of the winter had been, on occasion, unseasonably warm and fluctuated greatly. This made conditions for the formation of ice less than ideal. There were concerns expressed by government supervisors and inspectors that it was getting late in the season to start the road. The later the start of the construction process, the greater the danger the winter road may not be completed.

[21] Central Manitoba is an area that can be problematic in building ice roads because of unfavourable weather conditions in certain years. Evidence was heard that in the winter of 1997, because of unfavourable conditions, the winter road could not be built, resulting in significant hardship and economic loss because the communities served by the roads had to have goods sent in by aircraft. Some materials could not get in at all and other items were airlifted, resulting in substantial costs to senior governments and local communities.

[22] When the weather became much colder, around January 16th, 2002, the ice began to thicken and eventually a decision was made to use the truck plow owned by Wasagamack First Nation on the ice. Despite hearing from the job foreman, Kelvin Harper, the Nor-Win superintendent, Murdo McDougall, and the government inspector, Don Wood, it was not clear as to whose decision it was to send the plow out on January 18th. In any event, the plow began its work.

[23] There were issues with both the plow and Calvin Wood's experience. Firstly, the plow was a vehicle that had recently been purchased by the Wasagamack First Nation to do work the previous summer on a project in the community. Because of a lack of other operable equipment to perform the snow removal task, the truck was pressed into service and a plow attached to the front end. There was no evidence the truck was ever weighed or that the plow apparatus attached to the truck was weighed. The workers on the ice road who testified, George Harper and Andy McDougall, and their foreman, Kelvin Harper, relied on a plate in the vehicle's door to estimate the weight. They then thought, and could never explain clearly why, that ten inches of ice was needed to support a 10,000 pound truck. Kelvin Harper, the foreman, was especially unclear as to where he received this information. He also had no knowledge of the weight of the large steel plow that had been attached to the front of the truck. There was a later estimation by Sergeant Stephen Walker of the R.C.M.P. that the plow itself may have weighed anywhere from 3,000 pounds to 3,000 kilograms.

[24] The truck and plow had significant mechanical problems in the days prior to their use on the winter ice road. At the time, Arnason Construction Co. Ltd., a contractor which had equipment in Wasagamack and was doing work on another portion of the winter road, assisted in getting the truck and plow into an operable condition prior to January 18th, 2002. The truck had been purchased used from a contractor in British Columbia and had been used the previous summer on a construction project in the community of Wasagamack. One of the side windows on the vehicle had been broken out and replaced with plastic.

[25] The construction of winter roads for the 2001-2002 season had been delayed somewhat by warm weather and snow conditions in the Island Lake area. A cold period suitable for working on winter roads began on January 16th, 2002 and continued through to the date of the accident. There were concerns by this time that work had to be commenced soon to get the winter road completed to supply the various communities.

[26] After some observations and ice readings taken on an indeterminate basis, the decision was made to commence work on the ten-kilometer over ice portion of the road known as Section 17 in the contract. Section 17 ran from Wasagamack across Island Lake ten kilometers southeast to an intersection point with the ice road between St. Theresa Point and Garden Hill. It was the responsibility of the Wasagamack First Nation as the subcontractor to perform the construction and maintenance on this section of the winter road.

[27] Crews began working to clear that section of the road on January 18th and worked around the clock. A series of operators were used, one of them being Calvin Wood. On January 23rd at 3:30 a.m. Martin Harper took over operation of the truck plow and Kelvin Harper, the foreman, was in the pilot vehicle (his own half-ton truck) that remained in close proximity to the plow. Kelvin Harper went to pick up Calvin Wood to relieve Martin Harper on the plow. This was done and Kelvin Harper went home to sleep, leaving Calvin Wood out on the ice operating the plow by himself with no pilot vehicle.

[28] At 1:30 p.m. that day, Kelvin Harper called Calvin Wood on a C.B. radio and Calvin Wood advised he was almost out of gas. Kelvin Harper said he would go to the band office to make arrangements for fuel and bring it out. What was unusual was that the foreman, Kelvin Harper, did not have the authority to directly obtain gas for the project himself. For that he required an authorization from the Chief or other designated person. No one was available to provide this

authorization and he had to wait for a couple of hours for this to take place. The authorization was never received prior to Kelvin Harper being notified that Calvin Wood and the truck were missing.

[29] Nothing further had been heard from Calvin Wood and between 2:15 and 3:00 p.m. George Harper, who had travelled along Section 17, met Kelvin Harper back in Wasagamack and told him he did not see Calvin Wood or the truck. Kelvin Harper drove out to the area where the truck had been working, approximately three kilometers from Wasagamack, and found the hole in the ice beside the snow bank.

[30] The truck plow had gone through the ice into 12 meters of water. The R.C.M.P. were called and they attended the scene and began to conduct an investigation and recovery operation.

[31] The body of Calvin Wood was recovered from the truck two days later by an R.C.M.P. diver. The truck was found upright on the bottom of the lake with the body inside the cab of the vehicle.

Procedures in Place as of January 23rd, 2002

[32] Winter roads are used in Manitoba to link remote communities in the province to the existing highway system. Where the accident occurred, the road was part of a system designed to provide access to First Nation communities on the east side of Lake Winnipeg. This road was arranged for and contracted by the Province of Manitoba which provided limited technical support to build the roads. Funding for the road came from the Province with a financial contribution from the federal government.

[33] Over the past several years, this road has been constructed by the First Nation communities that it serves. The umbrella organization that is the general contractor, Nor-Win, has entered into the construction order with the provincial government. The construction order sets out the obligations and responsibilities of the contractor and any subcontractors that may be involved in the project.

[34] Nor-Win is a corporation that essentially just enters into the arrangement with the provincial government as the general contractor and then the actual work on each of the various portions of the road is farmed out to the various communities. Nor-Win provides no equipment and, despite having a

superintendent in the Island Lake area, offered little in the way of expertise or supervision for the carrying out of the obligations under the construction order.

[35] The provincial government, through the Department of Transportation and Government Services, has its own inspectors who carry out on-site monitoring of the work performed by the various bands. These inspectors conduct routine observations of the work-in-progress and eventually make the decision as to when the roads can be declared completed to the specifications set out in the construction order and opened to the public. These roads are used to supply the First Nation communities with thousands of tons of materials that are required over the entire year. The completed winter roads are designed to be able to support trucks with weights up to 80,000 pounds.

[36] In 1990, after a similar fatality occurring during the construction of a winter road, an inquest was conducted into the death of Bruce Andrews by the Honourable Judge Jack Drapack (Exhibit 1, Tab 3). This inquest suggested that "The appropriate government authority should investigate the feasibility of implementing the following recommendations." (see page 2 of the report). There was then a list of various suggestions designed to increase the level of safety when work was being done on winter roads. As a result of the recommendations contained in the inquest report, a committee was established consisting of 12 members: nine employees of the Manitoba Highways and Transportation Department (the predecessor to the present Transportation and Government Services Department), one additional member from the Department of Labour, one from Manitoba Hydro and one from a corporate entity (Abitibi-Price Inc.). In December of 1992, this winter road safety committee produced a document entitled "Winter Road Safety Guidelines" (Exhibit 14). This document set out information on the construction and maintenance of winter ice roads. There were no revisions to these guidelines prior to the January, 2002 accident. These guidelines were problematic in that the suggestions and recommendations contained therein were not mandatory and in many areas were not specific enough to provide contractors and others involved in the construction of winter roads with the necessary information to reduce the risks inherent in winter road construction to a minimal level. In particular, the reference to working alone in the guidelines seems to condone this type of practice and makes reference to the Manitoba regulations passed pursuant to *The Workplace Safety and Health Act* regarding a "working alone plan to be cooperatively developed by employers and workers" (see Exhibit 14, page 17). There is nothing specific in the guidelines about the

details of such a working alone plan and how it would be employed and what would be done to ensure compliance with such a plan.

[37] The winter road guidelines were just that, mere guidelines, and contained within them non-binding suggestions that are often vague in their nature. Comments regarding the speed of vehicles are imprecise such as the suggestion that the speed of vehicles during construction should be reduced. This is also apparent in the recommendations regarding load reductions for cracked ice and the use of safety equipment such as escape hatches and flotation equipment. There was no method in place to ensure the full distribution of the winter road guidelines to all workers involved in the construction and maintenance of winter roads.

[38] It is clear, with the information provided to this Inquest by expert witnesses who were called, the guidelines must be rewritten to provide up-to-date information on the issues of ice testing including revised distances between test holes to have distances more in line with current practices outside this jurisdiction. The witness Donald Hayley in his testimony (Transcript, Volume 14, pages 26, 27, 60 and 61) indicated a distance of 300 meters rather than one kilometer as being more in line with current construction practices in other jurisdictions.

[39] According to Donald Hayley, and commented on by other witnesses, ground-penetrating radar devices are used in other jurisdictions to give a continuous reading of ice thickness levels along the course of ice roads. This type of technology is now apparently undergoing testing in Manitoba and would obviously be superior to the practice of spot testing at various distances along the ice road. Further evaluation will have to be made to see if this type of technology can be incorporated into the construction of ice roads in Manitoba.

[40] This Inquest had the benefit of hearing testimony from two engineers with extensive experience in the construction and operation of winter roads. Donald Hayley testified about his experience as a consultant on the construction and operation of winter roads including the complete evaluation and updating of procedures on the Tibbit to Contwoyto winter road in the Northwest Territories that is built largely over ice and has traffic and weights far in excess of that seen on the winter roads in Manitoba. Dr. Daniel Masterson, PhD, also testified and provided an engineering report (Exhibit 3). Both expert witnesses were able to give in their testimony and reports general information about the construction and operation of winter ice roads and also to give specific reviews about the situation surrounding the fatal accident in question.

[41] While there were some differences of opinion, both engineering experts were consistent in their testimony about many aspects regarding the construction of winter roads. Both experts agreed that safety planning and training were critical and that all participants in the project from the government to the general contractor and the subcontractor should be involved in making the project as safe as possible. Donald Hayley suggested in his testimony and in his report (Exhibit 2) that a safety plan be one of the requirements imposed on contractors and subcontractors. This seems to be a most important matter that would be more likely to ensure that information regarding proper safety practices and procedures reached all of those involved in the construction and maintenance of winter roads.

[42] These witnesses offered several suggestions on how the guidelines could be improved. One of the central issues discussed by both engineers who testified was ice-bearing capacity. Donald Hayley and Dr. Daniel Masterson were both in agreement that careful consideration has to be given to the load-bearing capacity of various thicknesses of ice. This is a subject that has been carefully considered by engineers over the past 50 years and a formula has been developed called the Gold Formula (after Dr. Lorne Gold who initially proposed it). Differing jurisdictions use different applications of this formula. In Manitoba, the factor applied is seven, whereas in the Northwest Territories the factor applied is four. The decreasing number of the factor means an increase in the load-bearing capacity so that ice with a load-bearing capacity of four would, in theory, be able to support a greater load than ice with a capacity of seven.

[43] Both engineers agree that a careful assessment of ice has to be made as there are a variety of factors in addition to thickness that can contribute to a loss of load-bearing capacity, including cracks, poorly-formed ice, flooding conditions and snow loads at the edge of the cleared areas. There was extensive testimony on the appropriateness of the factor of seven currently in use in Manitoba and whether this high a factor contributes to an unacceptable risk during the construction phase of ice roads. Both Hayley and Masterson spoke to this issue (D. Hayley at Volume 14 of the Transcript, page 41, line 26 to page 42, line 29, and also see the testimony of D. Masterson, Volume 15 of the Transcript, page 77, lines 25 to 34). This issue will be commented on in the Recommendations portion of this Report.

Training of Ice Road Workers

[44] The issue of training of those involved in the construction of the winter roads was reviewed extensively at the hearing. It seemed from the evidence before

the Inquest that the training of Calvin Wood was minimal at best and perhaps even non-existent. It was apparently Mr. Wood's first year as an operator of equipment on the construction of an ice road. He did receive some verbal instructions from his foreman, Kelvin Harper, and perhaps his co-workers. At the time of the accident there were no formal training procedures in effect. The training of workers prior to the accident was very limited.

[45] Kelvin Harper, the foreman on the job, testified he did not receive any formal training in the construction of winter roads and the knowledge that he did receive regarding safety and the construction of winter roads was from previous foremen that he had worked for (Transcript, Volume 7, page 82, lines 4 to 23). Kelvin Harper received some supervision from one of the Council members (Stephen Harper) but received no formal training or written materials on the issue of safety. The Winter Road Safety Guidelines prepared in December of 1992 by the Department (Exhibit 14) never found its way down to the level of Kelvin Harper, the job foreman, and his crew until after the accident (Transcript, Volume 7, page 113).

[46] Other workers on the same crew as Calvin Wood, namely Percy Harper, George Junior Harper and Andy McDougall, all indicated that they did not receive any formal training, nor were they aware of the Winter Road Safety Guidelines (Exhibit 1, Tab 6). All of these witnesses testified that their knowledge of safety precautions came by word of mouth from their foreman. Kelvin Harper specifically indicated that he gave instructions on safety issues to Calvin Wood as it was his first year as a member of the winter ice road crew (Transcript, Volume 7, page 118, lines 30 and 31) and the safety information that Calvin Wood received from Kelvin Harper was merely Mr. Harper talking from experience and not from any notes or written material (Transcript, Volume 7, page 119, lines 3 to 32). All of this indicates a complete lack of formalized training being given to the crew of which Calvin Wood was part.

[47] Similar information was given to this Inquest by members of that crew regarding the issue of pilot vehicles. Kelvin Harper, the foreman, testified that in the year of the accident and in previous years it was common to work without a pilot vehicle. Prior to the accident during his contact with Murdo McDougall, the superintendent of Nor-Win, and Don Wood, the government inspector, the issue of pilot vehicles was never raised. It was only after the accident that this situation was rectified. The information of Kelvin Harper was confirmed by the testimony of other members of the crew about pilot vehicles.

[48] This same practice existed regarding personal flotation devices where this was not an issue or an option prior to the accident. There were no such devices available, nor was it ever suggested that they be worn.

[49] There was a problem concerning the use of oversized ice augers. Testimony at the hearing by both engineers and those experienced in the construction of ice roads indicated that holes drilled to check the ice depth should be done with four-inch augers. It appears that eight-inch augers were being used prior to the accident. The hearing was told that the use of augers of the larger size creates inherent problems with potential flooding and creation of slush on the ice. After the accident, there were efforts made to provide crews with the smaller type of augers with somewhat mixed success.

[50] The issue of training has been rectified to some extent subsequent to the accident by the setting up of current training programs for workers on the winter roads. However, at the time of the incident the training was minimal at best. The witness Don Kuryk testified that subsequent to the accident training has been revised dramatically and that different methods are being experimented with to deliver adequate training to all those involved in the construction and maintenance of winter roads. This includes the training programs funded by the Province and a review of literature being distributed to ice road workers on the subject of safety.

Equipment

[51] There was an indication from both engineers who testified at the Inquest that over the last several years there have been significant technological advancements in the area of ice road construction in other jurisdictions. Donald Hayley testified that the use of ground-penetrating radar and light tracked vehicles on the initial stages of construction can significantly reduce the risks associated with the construction phase of the roads. However, in Manitoba, at the time of the accident in 2002, a review of the equipment listed under the contract as being available in the various communities reveals a very modest amount of equipment (see construction order at Tab 5 of the Book of Documents (Exhibit 1), pages 6 to 10). In fact, the vehicle that was being operated by Calvin Wood was an older 1980 International truck that had been purchased during the prior year and used in the community of Wasagamack for a completely different purpose. There was a plow attached to the front of the vehicle to do the clearing work on the winter road; however this plow was of unknown age and weight. This truck did not have an escape hatch and it is not possible to determine if it would have been of assistance

prior to the vehicle going below the surface or later in allowing an easier exit out of the cab.

[52] Testimony from the engineer Donald Hayley indicated that in the initial stages of construction on roads in the Northwest Territories light tracked vehicles with snowplows are utilized. In fact, some of these vehicles are amphibious and are equipped with escape hatches.

[53] In the Northwest Territories, ice readings are frequently taken with ground-penetrating radar towed behind relatively light vehicles to give accurate and continuous readings of the thickness of the ice. On the winter road project that is the subject of this report there was evidence of ice testing being done by drilling holes in the ice at different distances. Apparently now closer distances are being utilized, especially in areas where problems with less than ideal ice conditions are encountered.

[54] The provision of the ice readings to the departmental representatives as required by the construction order was inconsistent at best. There were frequently times when no readings were provided and no sanctions imposed as a result of this. This problem, like many of the others, has been rectified to some extent by the provision of adequate drilling equipment and clearer guidelines as to when and where readings are to take place. The Department has indicated that now where there is a failure to provide ice thickness readings as required in the present construction order and the guidelines now in place, a suspension of construction operation occurs. This has apparently had a salutary effect on the providing of detailed ice readings in a written form.

Personal Safety Issues

[55] Calvin Wood was not wearing any flotation device at the time of the accident. This was the apparent practice at that time with a justification being advanced by some witnesses that this type of device might restrict the movement of someone who was inside a vehicle and make it more difficult for them to get out. The Inquest had the benefit of hearing from Dr. Gordon Giesbrecht, a Professor from the University of Manitoba and an expert in cold water survival techniques, to testify about the usage of various flotation devices (Exhibit 45, Curriculum Vitae of Dr. Gordon Giesbrecht).

[56] Dr. Giesbrecht testified that like so many other things, flotation devices have evolved over the last few years so that many different types are now available. In preparation for his testimony before this Inquest, he conducted a number of experiments wearing various types of flotation devices while getting out of a submerged enclosed space similar in size to that of the truck that Calvin Wood was in. The results of these experiments that were videotaped and shown to this Inquest demonstrated that almost all flotation devices tested enabled the wearer to exit the enclosed space with little or no more difficulty than without the devices. The flotation devices used included full floater suits, floater jackets, life preservers and inflatable life vests. It was only with the inflatable life vests that there was some increased difficulty in exiting the enclosed space.

[57] Dr. Giesbrecht also testified to a variety of techniques available to someone who finds himself in the water after breaking through the ice. These techniques and the information given by Dr. Giesbrecht would be of significant assistance to those who were working on ice roads and were at risk of finding themselves in cold water. There was no evidence to suggest at the hearing that Calvin Wood would have been assisted by wearing any flotation device. His body was found in the cab and he was obviously unable to exit the vehicle as it went to the bottom.

[58] The issue of whether an escape hatch would have afforded him some chance of survival is unclear. It certainly would not have hindered his chances and may have given him an opportunity to exit the vehicle prior to the roof going under the surface of the water. There were several comments by witnesses who testified that escape hatches may be of limited value; however most objections seemed based on costs and the fact that most of the vehicles currently utilized for the building of ice roads do not have escape hatches. There could be problems in putting escape hatches in vehicles that were not originally designed for them. An escape hatch may be of assistance in certain situations where the vehicle does not immediately sink.

The Accident

[59] After hearing evidence from the engineers, the R.C.M.P., Calvin Wood's co-workers, and the government inspectors, the most likely scenario leading up to the accident was that the vehicle that Calvin Wood was operating either ran out of gas or was very low on fuel and parked at the site of where the hole was near the snow bank. From the size of the hole and the condition of the surrounding area, the engineer Donald Hayley was of the opinion that the truck was stationary

(Transcript, Volume 14, page 69, lines 21 to 28) and Barry Arnason, a contractor with extensive winter road experience who personally viewed the site shortly after the accident, was also of the opinion the vehicle was stopped when it went through the ice at the side of the road (Transcript, Volume 13, page 31, line 23 to page 32, line 15). These opinions were not definitive but nevertheless this seems to be the most likely scenario. The combination of the vehicle being parked by the snow bank and stopped would have created a situation where there was greater stress on the ice at that location. This combination, then, may have contributed to the vehicle going through where it did. There was also the factor that the weight of the truck was never determined to any degree of exactitude and the ice in the area where the truck broke through was significantly thinner than that on other areas of the roadway.

[60] The issue of the damage to the window in the truck may have been a factor as well. Whether the window was broken on the passenger side, as one witness testified, or on the driver's side, as other witnesses testified, it would not have been, as Dr. Giesbrecht described, a scenario of a vehicle being submerged in the water and the cab relatively slowly filling up. At the time of the accident, with one of the window areas covered with plastic, it is likely the water would have come in a lot quicker and perhaps made it more difficult for CalvinWood to exit the vehicle in any sort of measured fashion. Any individual finding themselves under icy water in a vehicle is in a very perilous situation. However, as Dr. Giesbrecht's testimony demonstrated, with proper equipment and a modest level of training, survival chances may be increased.

[61] There may have been, in hindsight, several things that could have been done to reduce the chance of a breakthrough. There is also the possibility that if a pilot vehicle was with the truck, Calvin Wood could have waited in the smaller vehicle for fuel to be brought out to him, or if there was a policy of not fueling on the ice, the vehicle would have had to return to land (the community of Wasagamack was only three kilometers away) to await the re-supply of fuel.

Changes After January, 2002

[62] Since the accident happened in January of 2002, there have been several changes in the procedures and policies regarding the construction of winter ice roads:

1. Training. The Department of Transport and Government Services has taken an initiative to provide some sort of formal training procedures for winter ice road workers. In the last year, 2004, there was a training seminar set up and financed by the Department for ice road workers to provide them with the knowledge necessary to work as safely as possible on this type of project. In their testimony to the Inquest, officials from the Department indicated an ongoing commitment to assist in the providing of training for workers. This is also an issue that the government inspectors are now aware of and there is an obligation in the new construction agreement entered into between the parties that training be provided to workers. There now seems to be an acceptance of the idea that this training will involve some costs that will have to be paid for directly or indirectly by the entity for whom the road is being built.

2. Since the accident there has been improved information on ice thicknesses. There is now a requirement that this information be provided to the government inspectors in a timely fashion or the work will be suspended. This new policy has apparently had a salutary effect on the taking and relaying of ice thickness information to the Department. There has also been additional equipment provided to take these measurements. This inquiry heard information that ice augers were sometimes lacking or of the wrong size to effectively and safely make measurements. This problem has apparently now been rectified.

3. I understand there is now a policy in place where the weights of all vehicles used in the construction and maintenance of ice roads are accurately being determined prior to their use.

4. Personal flotation devices are now required by all persons working on ice roads.

5. Individuals are not allowed to work alone during the construction phase so pilot vehicles are being supplied.

6. There have been changes in the agreements entered into between Nor-Win and the various First Nations and the government departments. There are some joint venture arrangements between the

various First Nation communities and construction companies to provide the training, expertise and equipment necessary to effectively and safely work on these types of projects.

7. Pre-construction meetings are now being done in a more effective manner with more information regarding safety plans and equipment available to the projects.

8. Perhaps most importantly, efforts are now being made to ensure that those actually performing the work on the construction and maintenance of ice roads are now recipients of a concerted effort to supply safety information and equipment to them.

9. In a tragedy such as this there is an increased awareness of the risks inherent in this type of a construction project. From the testimony of the witness Don Kuryk, his department clearly recognizes this. The expert witnesses (Donald Hayley and Dr. Daniel Masterson) both testified that the risk inherent in building ice roads can never be reduced to zero but it can be reduced significantly by modern techniques and equipment coupled with safety procedures and programs that have been developed over the years.

Recommendations

[63] In light of the information received at the inquiry into the death of Calvin Wood, it is apparent that significant changes could be made in the manner of constructing winter ice roads that would reduce the risks inherent in this type of construction project:

1. Formal training of all workers involved in the construction and maintenance of winter ice roads be provided.

2. Contractors involved in the construction and maintenance of winter roads be required to establish a safety program that meets a required designated level.

3. A committee be established to review and update the winter road guidelines with a view to making recommendations to the government for mandatory regulations applicable to the construction and

maintenance of winter roads. This committee should meet regularly and consider safety issues, construction and maintenance methods, the type of equipment being used and recommendations regarding any new equipment available including modification to existing equipment. This committee should be given the resources to retain experts to report to it on safety and engineering issues related to winter road construction and maintenance.

4. This committee to be established should specifically consider whether the current Gold Formula A factor of seven is adequate and make specific recommendations that would either maintain or reduce it to a greater level of safety.

5. That all personnel involved in the construction phase of winter roads be required to wear personal floatation devices of a type recommended by the winter road committee.

6. That in the construction of winter roads, all snow removal equipment be accompanied by properly-equipped pilot vehicles during the entire time the snow removal equipment is on the ice during the construction phase.

7. That refueling of snow clearing equipment on the ice be prohibited.

8. That snow removal equipment operators or accompanying pilot vehicles be equipped with satellite telephones or equipment of equivalent capabilities.

9. That all equipment used in the construction and maintenance of winter roads have the gross vehicle weight (including fuel and attached equipment) with the amount of clear blue ice required to support such a vehicle and its equipment displayed prominently in the cab or on the outside door of each vehicle.

10. That official highway traffic signs displaying warnings be prominently displayed at all entry points to winter roads under construction advising of the danger of travel before the official opening of the road.

11. That the contractor's senior foreman or superintendent notify the Department in writing prior to initially commencing snow clearing in the construction of any designated section of a winter road.

[64] An important factor to be kept in mind concerning the purpose of the winter roads was pointed out by counsel for the Wasagamack First Nation, and that is their community regards the building of the winter road to be of prime importance for its well-being. It is most important for this community to have the winter road and the current arrangement whereby the community is involved in its construction is of only secondary importance. The main issue for them is to get the winter road built and the community is only interested in the brief employment benefits provided to the community as a result of the road construction if the construction can be performed safely with proper equipment. Having a winter access road to re-supply the community is the most important factor, not the few weeks of employment that it provides during the construction phase.

DATED at the City of Winnipeg, in the Province of Manitoba, this 23rd day of November, 2005.

Original signed by M. W. Howell

Murray W. Howell, P.J.

WITNESS LIST

1. Sergeant Stephen Frank Charles Walker, R.C.M.P.
2. Don Kuryk, Manager for Technical Services, Department of Transportation and Government Services
3. Robert John McLeary, Project Supervisor, Department of Transportation and Government Services
4. Don Wood, Inspector, Department of Transportation and Government Services
5. Percy Harper, former Chief of Wasagamack First Nation
6. Kelvin Harper, Band Councillor of Wasagamack First Nation and former Foreman of Wasagamack First Nation winter road construction
7. George Junior Harper, member of Wasagamack First Nation
8. Andy McDougall, member of Wasagamack First Nation
9. Murdo McDougall, member of Wasagamack First Nation and former Superintendent for Nor-Win Construction Ltd.
10. Jonathan Atik Flett, Executive Director of Island Lake Tribal Council
11. Norman Shane McCoy, Inspector, Department of Transportation and Government Services
12. Barry Charles Arnason, Vice-President and Director of Arnason Industries Limited
13. Donald Hayley, EBA Consulting
14. Dr. Daniel Masterson, Sandwell Engineering Inc.
15. Dr. Gordon Giesbrecht, PhD
16. Joe Malcolm, Executive Director of Southeast Tribal Council

EXHIBIT LIST

Exhibit No.	Description
1	Book of Documents
2	Report from EBA Engineering Booklet dated Mar/04
3	Report from Sandwell Engineering Booklet dated Dec 2/04
4	Sketch of Island Lake
5A	Videotape of scene of the accident
5B	Videotape of scene of the incident
6	Book of photographs
7	Letter from Mr. Kirouac with attached Registration
7A	Photocopy of page 3 of Exhibit 7 with location of accident drawn in red ink by Murdo McDougall
8	Ice measurement readings
9	Winter Roads Inspector's Daily Diary
10	Resumé of Don Kuryk
11	Letter to Jennifer Mann dated Mar. 1/02 from Deputy Minister Jeff Parr
12	Winter Road Construction Update beginning May 15/01 – Feb. 3/02
13	Dispatcher's Daily Winter Road Report dated Dec. 5/01
14	Winter Road Safety Guidelines (Dec. 1992)
15	Winter Roads Inspector's Guidelines (Nov. 2001)
16	Wasagamack Ice Road map

Exhibit No.	Description
17	Job history of Robert John McLeary
18	Ice Thickness Report
19	Fax dated Jan. 14/02 to McDougall
20	Ice Thickness form provided to the truckers
21	Memo to Don Kuryk/Larry Halayko dated Jan. 12/02
22	Memo to Jonathan Flett and Joe Malcolm dated Jan. 12/02
23	Memo to Jonathan Flett & Joe Malcolm dated Jan. 12/02
24	Ice thickness measurements at Wasagamack
25	Highways Rate Table Blue Ice
26	Manitoba Hydro Rates Table Blue Ice
27	Ice Thickness Report 2002 – St. Theresa to Wasagamack Sec. 8, 17
28	Billing – Invoice WA-241 – Feb. 18/02 ($11,480.46 balance; Total $22,320.00) from Wasagamack First Nation to Island Lake Tribal Council
29	Wasagamack First Nation letter dated Jan. 17/01 hiring Kelvin Harper as foreman for Nor-Win Road
30	Island Lake Tribal Council Inc. letter dated Feb. 1/01 congratulating successful on-time completion of the winter road to Chief Percy Harper and Council from Jonathan Flett
31	Yellow paper with a sketch of measurements by witness Kelvin Harper
32	1992 “Winter Road Safety Guidelines”
33	2004 “Contractors Safety Guidelines for the Construction and Maintenance of Winter Roads”

Exhibit No.	Description
34	Diary of Murdo McDougall – photocopy
34A	Actual 2002 Diary of Murdo McDougall
35	Winter Road Update Report
36	Nor-Win Construction duties and responsibilities for Winter Roads Supervisor
37	Nor-Win Construction Organizational Flow Chart
38	Information from Internet on various safety devices
39	Curriculum Vitae of expert Donald Hayley
40	Mr. Hayley, EBA Engineering Jan. 14/05 Supplementary Report
41	Risk of Ice Failure document
42	Traces from ice measurements
43	Government of Northwest, Highway Maintenance Operating Instructions Procedures for Ice-Bearing Assessment
44	Curriculum Vitae of Dr. D. Masterson, Sandwell PhD, P. Eng.
45	Curriculum Vitae of Dr. Gordon Grant Giesbrecht
46	Inquest into the drowning death of winter roads snowplow driver
47	Cold Water and Ice Safety Seminar
48	CD of cold water experiment
49	Video tape of cold water experiment
50	Winter road contract 2004