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PESCA

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KATIVIK REGIONAL GOVERNMENT

FEASIBILITY STUDY
RECYCLING OF SCRAP METAL AND HAZARDOUS WASTE IN NUNAVIK

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Final Report

Feasibility Study

Recycling of Scrap Metal and Hazardous Waste in Nunavik

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EXECUTIVE SUMMARY

This feasibility study assesses the viability of a project that aims to recuperate valuable non-degradable materials (more specifically scrap metal) and hazardous waste from dumpsites and other locations in Nunavik communities. The main objectives of the project are to extend the lives of the dumpsites, minimise environmental impacts from hazardous waste and seek potential revenue from the scrap metal. An evaluation of the cost to collect and treat all types of hazardous wastes encountered in the communities (outside the existing dumps) was also made.

This report presents the various steps taken to prepare a cost estimate for waste material and hazardous waste recycling and a project that aims to establish sustainable waste management practices for upcoming generations.

The present feasibility study proposes to first establish a management plan for used oils. Nunavik has an estimated 175 000 litres of used oil presently threatening the environment and an estimated 28 000 litres are produced every year. This represents an important source of energy that can be recuperated using a used oil furnace. The present study recommends the construction of new used oil furnaces in the largest communities in order to save energy locally and save costly treatment. The total cost associated with the construction of four new used oil furnaces and the management of used oils is estimated at $520 000 with important yearly energy savings that could exceed the initial investment after only four to five years.

The next step will be to supply each community with a hazardous waste container and establish a permanent hazardous waste collection site. At the same time, in each community a recycling manager will be appointed and trained to collect hazardous waste and send it to certified recycling centres. This measure will significantly reduce the environmental impact from hazardous waste. The estimated cost for the complete hazardous waste management is $175 000 per year plus $230 000 in capital expenses to supply additional hazardous waste containers and prepare permanent storage sites. The collect would be conducted annually; as for transportation, and treatment of hazardous waste, it could be done every four years.

Thirdly, since there are no precise figures available on the total volume of recyclable scrap material in Nunavik, a pilot project should be conducted. This project, with an estimated total cost of $450 000, should be conducted in one village. The goal will be to sort out the recyclable waste material and hazardous waste and then, estimate volumes for each type of waste. A progress report prepared as part of this pilot project will then be used to adjust cost estimates presented in this study. A detailed survey of the present condition of dumpsites will also be completed and used to evaluate anticipated investments for the next 20 years and then, compare these costs to the cost of recycling all the scrap metal and hazardous waste from the communities.

Based on preliminary scrap metal and hazardous waste quantity estimates and actual marine shipping costs, the total cost estimate of a scrap metal and hazardous waste recycling campaign for all fourteen communities in Nunavik over a ten year period, lies within a range of $5 to $9.25 million ($500 000 to $925 000 per year) including capital costs and savings made from the hazardous waste management plans and pilot project (if they are undertaken first).

1. INTRODUCTION

Nunavik's isolation from the Quebec road network and the high cost of marine shipping have prevented the recycling of solid waste and hazardous materials since the communities were established in the 1960s, 1970s and 1980s. Many scrap vehicles (water trucks, heavy equipment, cars, snowmobiles, ATVs, etc.), household appliances (refrigerators, stoves, washers, etc), barrels and other cast-off items have been accumulating at existing dumps or other sites near the villages. There are no scrap metal recyclers in Nunavik and materials are only recycled on an informal basis: individuals go to dumps and search for parts to meet their personal needs.

The practice has always been to dispose of scrap metal, appliances, used vehicles and hazardous waste in old quarries, at abandoned informal dumpsites and at the more recently-established municipal government-approved dumps. Since these materials are left at the dumps without any formal waste management plan, the resulting toxic leachate–including acid from old car batteries, used oils, antifreeze and many other hazardous products–presents a major threat to the surrounding environment.

A considerable proportion of the dumpsites opened in the 1980s are nearing their maximum capacity. Dumpsites in Nunavik are costly to establish since, in most cases, access roads must be built in order to site the dump outside the village catch basin area, downstream from its drinking water source, and at a reasonable distance from the airport. A Kativik Environmental Advisory Committee report presented in 1996 called for four new sites by 2001 and two more by 2005. Since 1996, one new site has been built in Kangiqsujuaq and another site has been upgraded in Ivujivik. In Kuujjuaraapik, the lack of space and of environmentally safe waste management remains an important as yet unresolved issue.

Since space at many Nunavik municipal dumps is becoming scarce and because the environmental and economic costs associated with opening new dumps are relatively high, the Kativik Regional Government (KRG) has commissioned a feasibility study to examine the procedure and the costs associated with a program to recycle specific types of waste and hazardous material at all dumps in Nunavik municipalities. This study also includes recommendations that should be integrated in a general waste management plan to prevent further contamination and prepare resource recovery for future generations.

2. CURRENT SITUATION

2.1 Solid Waste with Recycling and Recovery Potential

Presently all Nunavik municipalities have a fenced dump and are in charge of the waste and site management. The garbage truck driver is usually responsible for the management of the dump. The main activities at the dump consist of controlling weekly burning of the waste and conduct occasional site operations to manage the space. A recurrent problem is the poor condition of the fences around the dump (see figure 1), which do not confine the waste within the dump area. In addition, there are no gates or disposal control in these dumps. An individual or contractor can enter the dump at any time of the day and dispose of his waste without any form of control. Even without any control, most dumps have fairly well sorted waste where the domestic waste is burned in one sector of the dump and the scrap metal, large appliances, barrels, wood and other waste are stored in another section of the dump. In some communities one sector of the dump is allocated for used snowmobiles, ATV's and other types of motor vehicle wrecks in order to allow residents to search for spare parts (see figure 2). The use of the dump as a source of material varies from one community to another. Communities such as Ivujivik and Quaqtaq are good examples of this type of organisation.

Figure 1. Damaged Fences in the Dump of the Village of Puvirnituq (Spring 2003)

Figure 2. General Overview of Part of the Solid Waste with Recovery and Recycling Potential in Inukjuak (Spring 2003)

There is no detailed inventory on the types and quantities of recyclable wastes encountered in each one of Nunavik's municipal dumps.

The following table presents a summary of the dumps in Nunavik, including their size and a rough estimate of the quantity of recyclable waste located in each dump. The estimate was calculated from the percentage of occupied space, which was last evaluated in 1999 by the consulting firm Jobin Courtemanche.

Table 1. Estimated Quantity of the Recyclable Material in the Dumps

Community	Total Surface of the Dump [1] (m^2)	Surface Allocated to Recyclable Material [2] (m^2)	Percent of Occupied Surface in 1999 [3]	Estimated Quantity of Recyclable Material [4] (metric tons)
Kangiqsualujjuaq	15 000	14 000	N/A	---
Kuujjuaq	60 000	14 000	60	680
Tasiujaq	10 000	2 500	70	90
Aupaluk	10 000	13 000	N/A	---
Kangirsuk	10 000	3 250	60	140
		2 500	40	
Quaqtaq	10 000	2 100	70	70
Kangiqsujuaq	30 000	N/A	N/A	---
Salluit	10 000	21 400	N/A	---
Ivujivik	11 100	2 800	90	120
Akulivik	20 000	6 000	5	45
		600	100	
Puvirnituq	45 000	7 500	10	200
		1 200	30	
		3 000	100	
Inukjuak	45 000	17 500	20	285
		5 000	40	
		500	80	
Umiujaq	15 000	1 500	N/A	---
Kuujjuaraapik	80 000	12 000	80	460
ESTIMATED TOTAL [5] (metric tons)				**3 750**

[1] *The total surface corresponds to the surface that was allocated for the dumpsite as indicated in the Certificate of Authorization prepared by the Ministère de l'Environnement for each site.*

[2] *Scrap materials include scrap metal, steel barrels, motor vehicle wrecks, appliances, wood and any other material not suitable for burning with residential solid waste. The corresponding surface was measured and reported by Jobin Courtemanche in 1999.*

[3] *The estimated occupied surface of each dump was estimated in 1999 by Jobin Courtemanche. These figures were estimated following a visual inspection of each dump in the summer of 1999. It is not clear how this estimate was measured.*

[4] *The average height of the material in the dump is estimated at 1.5 metres. The quantity of scrap material (including metal, wood, porcelain, plastic,etc) in the dump that can be recycled is estimated at 50%. The compression factor is estimated at 10 and the bale density is estimated at 640 kg per cubic metre. All recyclable scrap metal located outside the surface allocated to recyclable material is not included in the estimate.*

[5] *The total quantity of recyclable scrap metal was estimated by projecting quantities for the communities for which data was not available. A value of 350 kg per person was used for the estimates.*

In June of 2003, the KRG invited Jacques Landry, a scrap metal specialist, to visit the dumps in Inukjuak and Kuujjuaraapik. During the visits, the following estimates of the quantities available for recycling was made, including motor vehicle wrecks, scrap ferrous and non-ferrous metal:

Inukjuak	1 600 tons
Kuujjuaraapik	3 450 tons.

From table 1, the quantity of potentially recyclable material (mainly scrap metal) per person is evaluated at 350 kg per person for all of Nunavik (total population of 10 700 including Whapmagoostui since their dump is shared with Kuujjuaraapik). As a comparison, the above quantities estimated by the scrap metal specialist were 1 450 kg and 2 450 kg per person for Inukjuak and Kuujjuaraapik respectively. This represents an average of approximately 2 000 kg per person, almost six times more than the quantity estimate presented in table 1.

Larger and older communities such as Kuujjuaraapik, Kuujjuaq, Inukjuak, Puvirnituq and Salluit will most certainly have a greater quantity of recyclable material per person. Also, it is important to note that the study by Jobin Courtemanche (1999) did not take into account other informal dumpsites in the villages. For example, Puvirnituq and Kangirsuk both have sites where scrap metal and motor vehicle wrecks are abandoned outside the official dumpsite area (see figure 3).

Figure 3. Solid Waste with Recovery and Recycling Potential Outside of the Dumpsite Area in Puvirnituq (Spring 2003)

The difference between the two types of estimates is very important and justifies the need to evaluate the quantity of recyclable material with greater precision. Since there is no scientific method to evaluate the quantity of recyclable materials present in a dump, only a pilot project will allow the KRG to obtain reliable estimates of the quantities.

2.2 Hazardous Waste

Since there is no formal hazardous waste management plan in Nunavik, these types of wastes are disposed of in different ways. Some are sent to the municipal dump with the domestic waste, some are stored in the vicinity of the municipal garage and others are stored in the special containers that were supplied to eight communities in 2000 by the KRG (see the list of communities below). These containers were designed to store and to transport, to treatment centers, hazardous waste, such as batteries, used oil, antifreeze, etc. The containers have been used for storage of hazardous waste by only a few communities. Because of the absence of a formal waste management plan, very few have yet disposed of their hazardous waste to specialized treatment centres.

Table 2. List of the Communities with a Special Container for Hazardous Waste

Communities
• Kangiqsualujjuaq
• Kuujjuaq
• Aupaluk
• Quaqtaq
• Ivujivik
• Inukjuak
• Umiujaq
• Kuujjuaraapik

Since many types of hazardous waste have been or are stored in the municipal dumps, the probability that the municipal dumpsites are contaminated with hazardous waste such as battery acid, used oil and other types of toxic materials is very high.

In North America, household hazardous waste usually represents 0.5 to 2.0 %[1] of the domestic waste stream, depending on the various consumer types, urban or rural regions and the socio-economic portrait of the population. If in 2002 an estimated 470 kg per person of municipal waste were generated in Québec[2] and the household hazardous waste generation for Nunavik is estimated at 0.5 %, the equivalent quantity generated annually would be approximately 2.5 kg per capita.

The municipal waste generation rate per capita in Nunavik is presently unknown, but it is expected to be lower than for Southern communities. Consequently, the household hazardous waste generation rate is also expected to be lower. From the above statistic, the equivalent quantity of household hazardous waste generation for Nunavik would be estimated at 26 tons per year, but it is most certainly lower than this value.

For Nunavik, there are no reliable statistics on the amount of household hazardous waste and other hazardous waste that can be found in each community. However, recent efforts in the Northern Village of Inukjuak have allowed collecting and storing various types of hazardous waste. An estimated 200 vehicle batteries, 15 barrels of water contaminated with oil and a few barrels of old paint are stored at the municipal garage. This waste was collected by the municipal authorities and is presently stored near the municipal garage.

[1] Guide de la collecte des résidus dangereux, Gouvernement du Québec, 1994.
[2] Bilan 2002 de la gestion des matières résiduelles au Québec, Recyc-Québec, November 2003.

Household hazardous waste does not include used oils from garages and motor vehicle repair centres. For the province of Quebec only, an estimated additional 15 000 tons (17 000 000 litres) of used oils were recuperated in 2002.[3] In Nunavik, these types of used oils come from the municipal garages and a few private motor vehicle repair centres (excluding used oil produced by Hydro-Québec thermal plant in each community). Hydro-Québec presently sends all the used oil they produce to a certified treatment centre outside Nunavik except for Inukjuak where it is burned locally.

According to a survey completed in 1998 by the KRG, at least 115 000 litres of used oils mixed with other contaminants such as antifreeze, diesel, water and tar were stored in the fourteen communities of Nunavik (three communities did not reply to the survey). The only community to presently burn used oils is Inukjuak (since 2001). Considering Inukjuak has burned most of the 20 000 litres of used oils stored in the community, and since the community now burns all of the used oils that it produces, the quantity of used oils (mixed) stored in the fourteen communities of Nunavik in 2004 is estimated at 205 000 litres (183 000 kg). This quantity is equivalent to approximately 1 000 barrels (205 litres each) and estimating that 75% is used oil good for burning, this represents approximately $150 000 in potential energy savings.[4]

Table 3. Summary of the Estimated Generation of Hazardous Waste for Nunavik

Type of Hazardous Waste	Estimated Existing Quantity (kg)	Estimated Annual Generation (kg)	Estimated Annual Average Generation per Village (kg)
Household Hazardous Waste	Unknown	Less than 26 000	Less than 1 900
Used Oils (only)[1]	140 000	19 000	700 to 2 200

[1] *Estimated from data collected in a survey presented to all Nunavik communities, completed in 1998 by the KRG (excluding used oil from Hydro-Québec).*

[3] Bilan 2002 de la gestion des matières résiduelles au Québec, Recyc-Québec, November 2003.
[4] Calculated with 750 barrels of 205 litres each and a unit price of $1/litre for heating oil.

3. TYPES OF RECYCLABLE AND HAZARDOUS WASTE

3.1 Types of Recyclable Waste

The following is a short list of the various types of waste material found in the section for waste with a recycling and recovery potential in the municipal dumps of Nunavik:

- Heating oil steel tanks
- Scrap metal (steel rods, pipes, etc.)
- Water and sewage tanks
- House appliances (refrigerator, washer, dryer, etc.)
- Used cars, trucks, heavy equipment, snowmobiles and ATV's
- Wood
- Tires
- Barrels (205 litres)
- Toilets and tubs
- Construction, renovation and demolition material
- Large steel tanks.

It is not feasible to recycle all of this material especially because of the important transportation and transformation costs, and the low resale value of some of the material. The choice of the material for the present feasibility study has to meet the following main objectives:

- Extend the life of the dumps
- Reduce the environmental hazard
- Provide sale revenue.

The following table presents an evaluation of each selected type of recyclable waste (excluding hazardous waste) in terms of the above objectives. Each waste material is evaluated on a scale of 1 (low) to 5 (high).

Table 4. Evaluation of Selected Types of Recyclable Waste

Type of Waste	Size Factor	Environmental Hazard Factor	Recycling $ Value Factor	TOTAL
Used Vehicles	5	5	3	13
Scrap Metal (ferrous and non-ferrous)	3	2	5	10
Barrels	4	2	3	9
Steel Tanks (water, oil)	4	2	3	9
House Appliances	3	2	3	8
Demolition Material	4	2	1	7
Tires	2	3	1	6
Wood	2	1	1	4
Porcelain	2	1	1	4

From this analysis, used vehicles, scrap metal, barrels, steel tanks and house appliances represent the five most interesting waste materials to include in the feasibility study, because of their size, environmental hazard and recycling value factor. Most of the other types of wastes in the above table presently have a very poor resale value, if any, and are not feasibly recyclable, because of the important transportation and transformation costs. However, some demolition wastes and wood can have a potential local reuse value within each community.

The resale value of each waste material is directly related to the form in which these materials are prepared (bulk, sorted, crushed, shredded, etc.). For example, motor vehicle wrecks shall be prepared according to very stringent requirements, because of the various types of hazardous waste present in a used car wreck. Once the vehicle is ready for baling, it must be baled to a specific density to minimize transportation costs and to respond to the recycling broker's needs. The value of the recyclable waste is also directly related to the quality of the bale. The quality of the bale refers to the type of metals that can be baled together. For example, if one piece of steel is found in a bale of aluminum parts, the bale may be rejected by the recycling broker and induce an important lose of sale (aluminum is 15 times more valuable than steel).

Table 5 presents the market value of each type of waste. The prices can vary significantly from one month to another, because the demand for used steel is directly related to the demand for new steel products (used steel is required in the production of new steel products).

Table 5. Market Value of Various Types of Metals

TYPE OF WASTE		PRICE CAD / TON
Scrap Metal		
Ferrous Metal	Mixed Steel	$113 ($0.056/lb)
	Stainless Steel	$718 ($0.36/lb)
Non-Ferrous Metal	Aluminum	$1 888 ($0.94/lb)
	Copper	$2 700 ($1.35/lb)
	Brass	$1 383 ($0.69/lb)
Motor Vehicle Parts and Bodies		
Radiators		$985 ($0.49/lb)
Whole Transmissions		$212 ($0.10/lb)
Motor blocks		$86
Used vehicles (all hazardous waste removed)		$86

As of February 18, 2004. Source: Automotive Recycling Index

As an example, a typical car has 66 % iron and steel (750 kg for a 1 150 kg car). On the other hand, household appliances contain approximately 35 kg of steel each.

3.2 Types of Hazardous Waste

According to Health Canada, products are considered hazardous if they have one of the following characteristics: toxic, flammable or corrosive.

Hazardous waste disposed of directly in the dump or contained in motor vehicle wrecks and various containers present a direct threat to the environment. In order to minimize negative environmental impacts it is important to collect hazardous waste for treatment and safe disposal. Many hazardous waste may be found in household waste (paint, batteries, solvents, used oils, etc.) On the other hand, most of the hazardous waste that can be recuperated from the dump will be found in used vehicle wrecks and barrels.

A certificate of authorization from the *Ministère de l'Environnement* must be obtained by the promoter in order to collect hazardous waste from households and the dump, and also to recuperate used vehicle wrecks (because of the many hazardous materials present in motor vehicles).

Hazardous waste that may be found in households or in waste disposal sites are:

- Used solvents
- Residential paint in metal containers
- Tar in barrels
- Aerosol cans
- Batteries
- Acids and bases
- Expired medical drugs
- Refrigerants from household appliances.

According to the regulation respecting hazardous materials (Q-2, r. 15.2) the following materials that may be encountered in a motor vehicle wreck are considered as hazardous and shall be dealt with accordingly:

- Gasoline (unleaded fuel and diesel)
- Used oils (hydraulic, motor, brake, power steering, suspension, transmission)
- Anti-freeze
- Windshield washer fluid
- Motor vehicle battery
- Used oil filter
- Motor vehicle wreck parts containing mercury
- Air coolant products for air conditioning systems
- Used air bags.

The main types of hazardous waste are listed in the following table with their corresponding approximate disposal cost.

Table 6. Approximate Hazardous Waste Disposal Costs (excluding marine shipping and transport from port to treatment center)

Type of Hazardous Waste	Form	Unit	Disposal $/unit[1]
Tires	Bulk (in container)	Tire	$0[2]
Antifreeze	Barrel on a crate	Barrel	$115
Lead acid batteries	In wood crate (4'x 4' x 4')	Kg	$0.19
Paint	In wood crate (4'x 4' x 4')	Wood crate	$0
Tar	Barrel on a crate	Barrel	$250
Oil filters	Barrel on a crate	Barrel	$110
Used oil (only used oil)	Barrel on a crate	Barrel	$50
Used oil (mixed)	Barrel on a crate	Barrel	$120
Regular domestic batteries	Barrel	kg	$1.46
Expired medical drugs	-	-	$0[3]

[1] *Indicated disposal prices are for small quantities. Important savings may be obtained for large quantities.*
[2] *The disposal price per tire is free only for tires with a diameter smaller than 123 cm.*
[3] *The nursing stations and hospitals have a system to collect and eliminate them adequately.*

According to Recyc-Québec, an average treatment cost of $2 000 per ton can be considered for the disposal of hazardous waste. This price excludes all transportation costs and assumes the wastes are treated in certified treatment centers.

4. REVIEW OF THE REGIONAL AND PROVINCIAL REGULATIONS AND AUTHORIZATION REQUIREMENTS

4.1 Regulation Review

Municipal dumps in Nunavik must respect the Regulations Concerning Waste Disposal Sites in the North as presented in Division X.I, in the *Regulation Respecting Solid Waste* (Q-2, r. 3.2). According to article 100.7 of the *Regulation Respecting Solid Waste* (Q-2, r. 3.2), only solid waste, and urine and excrements collected in containers may be disposed of in waste disposal sites in the North. Article 1, e) 1° of the Q-2, r. 3.2, mentions that motor vehicle wrecks are not considered as solid waste, hence it is assumed they should not be accepted in waste disposal sites in the North. Furthermore, according to the regulation, motor vehicle wrecks are treated as hazardous waste as long as they include hazardous waste such as used oil, used oil filters, antifreeze, batteries or any other hazardous waste as defined in the hazardous waste regulation. Once all hazardous waste products are removed from the wreck, it is no longer considered as hazardous waste. The wreck must then be stored according to the recommendations of the *Ministère de l'Environnement* until it is sent to a motor vehicle wreck recycling broker. If the wreck is purchased by the recycling broker, he must, prior to storage, inspect the vehicle in order to make sure it is free of any hazardous products. In our case, the inspection will be made in each village prior to the shipment in order to control the value of the metal that will be sent to the recycling broker.

However, because of the geographical isolation of the communities from the Quebec road network, the absence of motor vehicle wreck recyclers and the lack of a waste management plan for Nunavik, it has been tolerated to store scrap metal, vehicle wrecks and used tires in the section of the government approved site, where waste is not burned.

Other residual material not considered as hazardous material but for which a special attention must be taken are: tires, vehicle wrecks without hazardous materials and used fuel reservoirs.

According to the *Act respecting Northern Villages and the Kativik Regional Government* (V-6.1), the Council of a Northern village has the power to make by-laws to "construct, equip and operate plants for the elimination or recycling of waste" (article 174, 12).

First of all, for all Nunavik communities, it is important to make sure all motor vehicle wrecks and other large scrap materials are stored in the same approved site in order to have a better control over any environmental impacts that may be linked to spills of hazardous products.

Secondly, it is clear that the long term storage of motor vehicle wrecks in waste disposal sites present an environmental hazard to the surrounding environment as long as the hazardous material have not been removed from the vehicles. Once the hazardous material is removed, the motor vehicle wrecks are not classified as hazardous waste according to the regulation and no longer presents an environmental threat.

4.2 Authorization Certificate Requirements

All of the dumps in Nunavik presently have a certificate of authorization for a specific location and area. It is important to note that some dumps may not be located at the authorized sites. The exact location of the existing sites should be verified by means of a GPS measurement in order to verify the conformity of each site.

As per article 22 of the *Environment Quality Act* (EQA), any dismantling or flattening firm of motor vehicle wrecks is required to obtain a certificate of authorization from the *Ministère de l'Environnement.* The information normally required to complete the request for a certificate of authorization is presented in appendix A.

Since the project takes place in Nunavik, the project shall also concurrently be presented to the Kativik Environmental Quality Commission (KEQC) for approval. According to schedule A of the EQA, any system of collection or disposal of residual material is automatically subject to the assessment and review procedure by the KEQC.

It is strongly suggested to prepare the request for certificates of authorization and initiate discussions with the KEQC, as soon as possible, in order to allow the pilot project to take place as soon as possible. The estimated cost to prepare the first request and answer all questions from the KEQC and the Ministère de l'Environnement *is $5 000. It may be prepared by the appointed project manager or external consultants. Since the activities will be the same from one community to the other, the content of each request will be repeated and adapted to the physical aspects of each site.*

5. SELECTION AND PREPARATION OF SCRAP METAL AND HAZARDOUS WASTE

5.1 Scrap Metal

In order to obtain the best market price with the lowest required equipment investment and preparation, each type of recyclable material shall be prepared according to specific requirements agreed upon in the contract with the selected recycling broker. This contract shall be prepared with great care, in order to ensure the KRG is in agreement with the recycling broker. As a reference to assist the KRG in the preparation of the sales contract, the *Guidelines for Metal Transactions* prepared by the Institute of Scrap Recycling Industries Inc. are included in appendix B. Only one recycling broker shall be chosen in order to simplify the administration and negotiations related with the sale of the various waste products.

To optimize the loading of the containers for maritime transportation, 10 metric tons of material per 20 foot container is required (total weight of 12 metric tons including the container). In other words, the transportation of an empty 20 foot container will be billed for an equivalent 12 freight tons, because of its volume. Furthermore, in order to meet the land transportation requirements, a maximum of 10 metric tons of metal or other recyclable products can be loaded in one container.

In order to evaluate the economical feasibility to recycle each type of material, the cost to transport the material shall be compared with the potential revenue that can be obtained from the sale of the material to a recycling broker. For example, if the transportation cost is $200/ton and the market value of mixed steel (ferrous) is $130/ton, one container containing 10 tons of mixed steel will cost $2 000 to transport and will provide $1 300 in revenue. This example does not include capital costs, operation costs and salaries and a deficit of $700 per container already has to be overcome. Although other metals such as aluminum and copper will generate more sale revenue and cover most expenses, total transportation costs from Nunavik to the recycling broker will generally surpass any potential revenue that can be generated from this type of project.

The following presents the main steps required for the preparation of a recyclable product that will be sent to a recycling broker:

1- Site preparation to set-up the equipment and the tools.

2- Designate and prepare an area inside the dump to remove all hazardous material from the motor vehicle wrecks or any other contaminated scrap material.

3- Sort material found in the dump and strip it of hazardous waste and any other valuable parts (copper, aluminum, stainless steel, etc.). Many large scrap trucks and heavy equipment will have to be dismantled and cut in pieces prior to their preparation for recycling. Sorting will be completed with a loader, screens or manually. Figure 4 provides an indication on how the sorting of the different types of wastes will require time and appropriate equipment.

Figure 4. Partial View of the Dump in Kuujjuaraapik

4- Prepare packaging for non-compressible materials (wood crates, nylon bags or steel containers).

5- Bale and log compressible materials together in a baler/logger. The baling of the scrap metal is done to compress the material in order to reduce transportation costs. In order to fill containers with the required 10 tons of material, the bales and logs shall have a density of at least 30 pounds per cubic foot. Waste materials presently without an interesting recycling potential may be compacted in bales and logs in order to save space in the dumps.

6- Prepare all recuperated material for marine shipping. Carefully weigh and identify each bale or container.

The presence of a scrap foreman on site is of utmost importance. This person will be responsible for the quality management for sorting the various types of materials.

5.2 Hazardous Waste

The handling of hazardous waste requires an excellent understanding of the dangers associated with different types of hazardous waste. In order to prevent accidents and spills, the project manager and the foreman shall have received a full training on the handling of the various types of hazardous waste that may be encountered, and on the response techniques for any spill or accident that may occur during the handling of the waste.

Prior to the project, a clear procedure shall be established for the handling, storage and shipping of the various types of hazardous materials. This procedure shall be followed carefully.

In order to dispose of the hazardous waste in a way to have the lowest possible treatment cost, the sorting and preparation of the hazardous waste is a crucial aspect of the project. For example, the treatment cost for used oil mixed with other contaminants (such as antifreeze and water) may cost more than twice as much as to recycle used oil only.

The type of hazardous waste, which will be collected and prepared for recycling in each community shall be clearly identified and packaged according to the requirements of the shipping company and the recycling broker, in order to prevent any unnecessary extra costs or very important fines. Each community shall be equipped with a hazardous waste container (see appendix C for container specifications).

Tires, which are found in large quantities in Nunavik's dumps, are very costly to transport and presently do not provide any sale revenue. In other Quebec regions except for Nunavik, tires are collected by the provincial government. Until funds are made available to collect the tires, they should be stored in small isolated piles to prevent important risk of fires and eventual contamination.

6. DETERMINATION OF THE WASTE HANDLING AND TRANSFORMATION EQUIPMENT REQUIREMENTS

The preparation of the scrap metal and hazardous waste for transportation and recycling requires various types of equipment and tools. The following list presents the equipments and tools required to complete the project and the general specification requirements.

- **Baler/Logger**

This is the main piece of equipment. This equipment is essential to optimize the quantity of steel per container and reduce the transportation costs. The baler/logger shall be chosen for its portability, durability, ease of operation and versatility. The baling chamber shall be of sufficient size to log cars and other large pieces. It shall be mounted on a trailer to facilitate transportation and it shall include a crane with a grapple. This machine shall compress metals in logs to a density of at least 20 to 40 pounds per cubic foot (pcf). As for metal bales, the machine shall be able to prepare them to a density of up to 75 pcf. It is important to determine the density requirement with the metal recycling broker, since the ease to process a bale through a metal shredder depends on the density. Appendix D presents a list of the main suppliers of new equipment including a budget price and the expected delay for delivery. The appendix also includes each manufacturer's specifications, as a reference.

Figure 5. Typical Baler/Logger in Operation

- **Scale**

In order to prepare the containers for shipment and keep a precise record of the metal sent for recycling, a scale will be required. The scale shall have a capacity to measure up to 10 000 lb (5 metric tons).

- **Loader**

A loader equivalent to a John Deere 544H Model is required to handle the recyclable material and to execute various types of operations in the dumpsite. A set of forks and a regular size bucket shall be included. The loader shall also be supplied with a set of extra tires, in order to prevent any loss of time that would be caused by an occasional flat tire.

Every community in Nunavik has at least one loader equivalent to this type of loader. Since the working season is very short and since it is often difficult to obtain the municipal equipment full time, it is recommended to purchase one loader for the exclusive use of the project. However, since the productivity rate is yet to be verified, the loader could be rented from the community during the pilot project.

- **Small Loader**

The small loader will be handy to carry bales and log. It shall be used in locations where the regular loader can not have access, such as inside containers. This loader is recommended once the project will start officially with the use of a baler/logger.

- **Pick-Up Truck**

The pick-up truck shall have a crew cab to transport all of the workers from the village to the job site.

- **All Terrain Vehicle (ATV) and Trailer**

The ATV (commonly called Honda) will become handy to carry equipment, tools and the oxygen and propane tanks all over the dumpsite.

- **Tools and Equipment**

A general list of the suggested types of tools and equipment required for the project is presented in appendix E. These tools and equipment are essential in order to dismantle and handle the various recyclable products encountered in the dumps.

- **Hazardous Waste Container**

The hazardous waste container shall be designed according to the Transport Canada and IMO (International Maritime Organization) regulations. The design specifications for the special hazardous waste containers, which were purchased by the KRG in 2000, are presented in appendix C.

- **Vehicle Rack for Dismantling Operation**

This is a custom-made rack to remove all hazardous waste from vehicle wrecks and remove any valuable parts prior to placing in the baler/logger. This rack shall be designed to fit in a container and take the least space possible for transportation.

- **Oil Separator**

The oil separator shall be used to remove the oil from the water accumulated in various containers such as steel barrels.

- **2 000 Litre Capacity Double Wall Reservoir for Used Oil**

This reservoir shall be used to transport used oil to specialized recycling firms or to communities with an operating used oil furnace.

7. SAFETY AND TRAINING REQUIREMENTS

Working in the dump environment requires many precautions. The workers shall always be dressed with the appropriate clothing and footwear. The use of protective goggles shall be compulsory at all times. Furthermore, the work shall be very well structured and organised. Only trained employees shall be admitted onto the site.

Prior to the start-up of the project, a training session on safety shall be conducted in each community. Every worker shall be assigned specific responsibilities and only trained operators shall operate the baler, the loader or any other heavy equipment. Welding and steel cutting shall be done by certified welders only. The sorting of waste in the disposal site will most certainly lead to the discovery of various hazardous waste products. Each type of hazardous waste shall be identified, handled and stored in a safe manner. Any activity that can create sparks or danger for ignition shall be done in a designated area of the dump away from any possible hazardous products.

Safety will be an important aspect of this kind of project. The foreman will have to organize the different tasks in order to keep the risk of injuries to a minimum. The planning of the project shall be prepared so as to always think of safety first.

A specialized training in the handling and identification of hazardous waste shall be provided to the project manager, to the main foreman and to each designated community recycling manager. This training shall cover every aspects of the treatment of hazardous waste, from the handling to the various transportation modes and the storage specifications. Special attention shall be given to the removal of hazardous waste from motor vehicle wrecks. At no time will the marine shipping company accept hazardous waste which is not packaged or identified accordingly.

The cost associated with the required training is estimated at an annual average of $15 000. This includes consultant fees, airfare and lodging.

8. SCRAP METAL AND HAZARDOUS WASTE RECYCLING PROGRAM COST ESTIMATE

8.1 Main Cost Influence Variables

The four main variables, which will influence the final cost of the project significantly, are presented below.

- ***Marine Shipping Cost***

Efforts shall be made to negotiate the lowest possible transport cost and to seek special funding that may cover the costs associated with the transportation of the recyclable material to a recycling center. According to current project estimates, transport costs represent on average 25% of the total project costs (see table 14 on page 46). The current approximate unit cost per 1 000 kg for containers going northbound is $310 and for backhaul (north to south), the price is $200. [5]

- ***Quantity of Recyclable Material Collected from Each Community***

The quantity of recyclable material that can be salvaged from the disposal sites shall be evaluated more accurately following the completion of the pilot project. Current estimates of the quantity of recyclable scrap metal in Nunavik vary from 3 900 to 13 000 tons. The lower value was estimated by making various hypothesis on the salvageable metal in the dumps and by using dump size and percentage of usage of the dumps as estimated by Jobin Courtemanche in 1999. The higher value is a projection of the quantity estimation in two communities by a scrap metal specialist in 2003.

[5] The indicated price is approximate and varies according to the quantity stipulated in the contract with the marine shipping company. See appendix F for detailed 2004 Desgagnés Transarctik Inc. sealift rates.

- ***Market Value of the Various Recyclable Materials***

The current market for scrap metal has been undergoing a very important increase over the past few months. The demand for scrap metal is highly dependant on the economy. The need for scrap metal is directly related to the quantity of metal that has to be produced since used metal is required in the manufacturing of metal products.

- **Productivity**

The productivity will be dependent on the availability of appropriate equipment and human resources. Team work and good communication between the foreman and the local workers is essential to effective productivity.

8.2 Proposed Pilot Project and Project Start-Up Phase

In order to succeed in this type of project, the whole community must become involved and participate in the various stages of the project. This involvement must start in the first year for all of Nunavik. The first step shall be to appoint a Project Manager for Nunavik and 14 Community Recycling Mangers (see section 8.4 for description), one for each community. A recycling committee will be created and meet to discuss, create and implement a waste management plan for recyclable wastes and hazardous waste in Nunavik. This waste management plan will include the choice of a strategy to manage used oil.

During the summer of 2005, two or three communities shall be chosen to implement actions to reorganize the dump, transport all scrap material located outside the dump area to the authorized dump and make an inventory of the existing used oil barrels. These actions will be made under the supervision of the project manager who will visit these communities during the summer (one week per community). The expenses incurred by the communities for these activities are not estimated.

Concurrently, a pilot project will be required the first year in order to better evaluate the quantity of scrap metal and hazardous waste that can be recuperated from the dumps in Nunavik. This evaluation will then allow the project manager to make the necessary adjustments for the budget planning and financial feasibility of the project. Sorting and metal preparation for baling is suggested to begin in Inukjuak because the community has already demonstrated interest by collecting hazardous materials in the municipal dump and because of the size of the village. The community recycling manager, scrap foreman and a local team of workers will take part in the pilot project. The minimum required equipments for the pilot project are the following (see tables 10 and 11 on pages 39 and 40 for cost of each item):

- Loader (rented in the community)
- Tools and equipment in container
- Propane and oxygen
- Scale
- Vehicle rack for dismantling
- ATV (four-wheeler) with trailer
- Pick-up truck.

The baler/logger is recommended for the pilot project. However, since delivery delays are important (4 months and more) and sufficient funds might not be available rapidly, the purchase of this equipment may be postponed to a subsequent year.

The pilot project will take place from July 1st to September 1st. Three local workers are required in addition to the community recycling manager. The estimated cost for the pilot project is presented in table 7 at the following page.

Table 7. Estimated Cost of the Pilot Project (July-August 2005)

Type of Expense	Cost
Capital	$200 000
Consumables	$100 000
Labour	$105 000
Unforeseen (10 %)	$45 000
TOTAL	**$450 000**

If possible, the cost to purchase and send six additional hazardous waste containers to the communities without one, should be included in the 2005 pilot project (see table 10 on page 39 for estimated cost).

8.3 Proposed 10-Year Work Schedule

According to the current metal quantity and the productivity estimates, the project to remove all recyclable scrap metal and hazardous waste from all fourteen communities in Nunavik is planned over a ten (10) year period. However, this schedule shall be revised following the results from the first year pilot project. It is difficult to visit more than one community per year because of the short working season and the limited marine shipping schedule.

The village of Inukjuak is chosen for the pilot project since they already made efforts to collect hazardous waste. The proposed schedule was prepared by selecting larger communities in the first years since the potential revenue from the sale of scrap metal will be greater. If the conclusions of the pilot project correspond to current productivity estimates, recycling activities could be completed in two small communities in the same summer. If productivity is lower than estimated, the project might have to be extended to a 14 year period. The pilot project proposed in the previous section will determine the productivity rate.

The following is a proposed schedule for the recycling project.

Table 8. Proposed Schedule (10 years)

Year	Community
2006	Inukjuak
2007	Kuujjuaraapik
2008	Puvirnituq
2009	Kuujjuaq
2010	Salluit
2011	Akulivik, Umiujaq
2012	Kangiqsualujjuaq
2013	Quaqtaq, Kangirsuk
2014	Aupaluk, Tasiujaq
2015	Ivujivik, Kangiqsujuaq

Since the Cree community of Whapmagoostui will certainly be interested in participating in recycling activities in collaboration with Kuujjuaraapik, one complete summer is scheduled for Kuujjuaraapik.

The first summer, recycling operations shall take place in only one community, considering the baler/logger will be received by ship only in the last two weeks of July if it is ordered in 2006 or late 2005. Since the pilot project will have taken place in Inukjuak on the previous year, the on-site work schedule is estimated to last 6 weeks. On other years when only one community will be visited, the work schedule is planned from June 1st to September 15th, for a total of 14 weeks.

Once the equipment is received, the baling of the various scrap metals and the removal of all types of hazardous waste will be done concurrently. Large metal items will be cut in several parts in order to reduce the volume. The metal will be prepared for maritime transportation according to the available containers on site.

The remaining baled metal shall be sent to a recycling broker in subsequent years according to the available containers for rent that will arrive each year on the first ships. The baled metal can then be inserted into the rented containers and sent on the next ship. For some communities it might take a few years to send all of the prepared metal to a recycling broker because of the important quantities collected.

The years where two communities are planned, a period of 6 to 7 weeks per community is allocated to complete the recycling operations. This planning takes into consideration that all the equipment will be sent on the last ship of the previous year in order to begin operations as soon as the snow melts.

8.4 Labour Requirements

The labour requirements for the recycling team are:

- One (1) project manager
- One (1) community recycling manager per community
- One (1) scrap foreman
- Five (5) local workers including one metal cutter and one loader operator.

The following is a description of each required position.

Project Manager

The first person to hire is a *project manager* who shall work for the KRG or for a non-profit organization created to manage the recycling project. This person shall have very good project management skills, an excellent understanding of the logistics specific to Nunavik and a good understanding of the scrap recycling industry.

The project manager will have the following main responsibilities:

- Coordinate all activities and logistics of the project
- Prepare and conduct all of the calls for tenders for the equipment purchases and prepare the contracts with the recycling brokers
- Conduct hiring procedures for the required workers
- Supervise the recycling committee and recycling team
- Provide quality assurance control for all of the recycled products and hazardous waste
- Control budgets and make adjustments to maintain recycling and operation expenses at a minimum.

The project manager will be required from January to October on the first year and from May to October on subsequent years. The project manager shall be present for the first two weeks of the project in each community in order to provide technical assistance and supervise the working methods on site.

Community Recycling Manager

The success of the project will be highly dependant on the involvement of local workers. In order to allow Nunavik's residents to be involved in this type of project each community shall first appoint a *community recycling manager* responsible for the waste management plan of the community. This person shall be the first person to be hired in each community. He/She will then work in close relationship with the project manager from the KRG and the scrap foreman. The community recycling manager will have the following responsibilities:

- Leader in the local recycling operations
- Implement the waste management plan and keep the waste in the dump sorted according to the recycling needs following the first recycling campaign
- Collect the hazardous waste prior to the disposal of motor vehicle wrecks and other contaminated wastes to the dump
- Conduct public awareness campaigns in conjunction with the KRG.

The community recycling manager will receive training on the handling of hazardous waste and will be trained on site by the scrap foreman on the types of recyclable waste found on site and the preparation required. The community recycling manager will be required during the recycling activities in his/her community and following these activities, the community recycling manager shall be hired part-time to implement the waste management plan, supervise the sorting of the waste in the dump and collect hazardous waste on an on-going basis.

Scrap Foreman

The next important element in the recycling team is a specialized *scrap foreman* who has an excellent understanding of the various types of metal and waste that can be recycled. This person will have an excellent understanding of the recycling market and the preparation specifications of the various recycling companies. The scrap foreman shall have excellent hands on experience and show that he is very safety conscience. The sorting, baling and manipulation of various types of waste in the dump is an activity which requires very good work methods. All the workers shall be well supervised and the foreman shall coordinate the work in order to eliminate any risk of an accident.

The following are the main responsibilities of the scrap foreman:

- Coordinate on site selection and preparation of the recyclable wastes
- Safety on the work site
- Prepare the recyclable waste according to the specifications of the project manager
- Train the local waste management foreman and local workers on the material selection and preparation
- Supervise local workers in conjunction with the community recycling manager.

The scrap foreman shall be hired from May to September in the first year and from June to September on subsequent years. The scrap foreman shall be present at the port where the unloading of the metal will take place and confirm quantities and types of recyclable metal with the recycling broker in order to obtain the anticipated market value for each type of waste product.

Local workers

The other required workers for the recycling project will sort and prepare the waste for recycling. A total of five (5) workers shall be required. One will be appointed as a loader operator, another as a steel cutter and others as general workers who will contribute to the sorting of the various recyclable and non-recyclable products.

The local workers will be required for the whole duration of the project in their respective community. Larger communities will require workers for a period of 12 to 14 weeks and for smaller communities the period will be from 6 to 8 weeks.

When possible, the local workers and the community recycling manager must come from the community where they will work in order to favour local employment in each community and ensure sustainable development of recycling in Nunavik.

The following table is an estimate of the total man-hours that are required per community and overall for the ten year project, in order to recycle the scrap metal and hazardous waste in Nunavik.

Table 9. Estimate of the Man-Hours and Labour Cost Requirements per Community (labour costs includes travel and lodging expenses)

	Man-hours Range per Community	Estimated Labour Cost Range per Community
Local Workers[1]	1 500 to 3 000	$50 000 to $100 000
Project Manager	1 100/per year	$61 000/per year [2]
Scrap Foreman	400 to 750	$23 000 to $43 000

[1] *The time required by the community recycling manager to implement the new waste management plan prior or following the recycling activities is not included in the above figures. The budget required for the long term management of the dumps is not included in the present study.*
[2] *The annual labour cost for the project manager is calculated for a 6 month period.*

8.5 Capital Cost

The start-up of the recycling project requires the purchase of various tools and heavy equipment. The selection of the appropriate tools and equipments is essential to an efficient and safe work plan. The isolation of Nunavik from the Quebec road network and transportation delays that are highly dependant on the weather, requires excellent planning in order to have all the required equipment and replacement parts on site during the execution stage. Time lost due to breakdown of equipment shall be kept to a minimum since the working season is very short. If the equipment cannot be sent on the last ship for various reasons, this could easily end up delaying the project schedule by one year.

Table 10 at the following page presents a summary of the expenditures which shall be spent during the first year of operation.

Table 10. Capital Costs

Item	Quantity	Purchase Cost	Transportation Cost	Comments
Baler/Logger	1	$ 400 000	$ 15 000 (120 m^3 / 35 000 kg)	Cost for new equipment
Scale	1	$ 10 000	N/A	Transported in container
Pick-Up Truck	1	$ 40 000	$ 2 500 (20 m^3 / 2 000 kg)	Crew cab
Loader	1	$ 220 000	$ 6 200 (50 m^3 / 15 000 kg)	John Deere 544H or equivalent
Small Loader	1	$ 70 000	$ 2 500 (20 m^3 / 2 000 kg)	280 Skid Steer or equivalent
Tools, Safety Equipment and Packaging	1	$ 100 000	N/A	See appendix E for details Transported in container
ATV	1	$ 7 000	N/A	Transported in container
Vehicle Rack for Dismantling	1	$ 16 000	N/A	Transported in container
Container	2	$ 6 000	$ 9 000	Used to transport equipment
Hazardous Waste Container	6	$ 60 000	$ 27 000	For all remaining communities
Subtotals		$ 929 000	$ 62 200	
TOTAL		**$ 992 000**		

Note: Marine shipping costs are estimated at a unit rate of $310 per 1000 kg or 2.5 m^3 (Northbound).

If the pilot project takes place as presented in section 8.2, the capital cost for the equipment purchased and the purchase of the hazardous waste containers must be deducted from the above total in order to calculate the capital expenses to include on the year the recycling project is undertaken.

8.6 Consumables

Operation costs include various types of consumables. The total annual expenses related to consumables are estimated at $150 000 to $800 000 at a fixed marine transport rate per container of $2 700 Southbound and $4 500 Northbound. The main variable is the cost associated with the quantity of rented containers that will be required to transport the scrap metal. Table 11 presents a summary of the various annual consumables.

Table 11. Average Annual Consumable Expenses

Item	Estimated Cost	Transportation Cost	Comments
Fuel, Oil, Grease	$ 16 000	N/A	For all heavy equipment
Maintenance and Repairs	$ 10 000	$ 2 500	Most spare parts included in capital cost of each equipment
Wood for Crating and Pallets	$ 5 000	$ 4 500	Fill one rented container
Propane and Oxygen	$ 10 000	$ 9 000	For cutting oversize metals Fill two rented containers
Rental of Heavy Equipment	$ 5 000 (rent)	N/A	Rental of bulldozer or other heavy equipment for site preparation
Rental of Containers	Variable $ 200 per container	Variable $ 2 700 per container	See section 8.8 for explanation on transportation cost estimates. The number of rented containers will vary according to the quantity scenario of recycled scrap metal.
Move Equipment to another village	----	$35 000 to $70 000	The cost is for one or two moves per year.
TOTAL	**$ 55 000 to $ 95 000**	**$ 130 000 to $ 710 000**	

8.7 Recycling Revenue and Disposal Cost

The disposal cost for hazardous waste and the revenue from the various types of metals will be highly dependant on the market price and on the quantities that will be recuperated from the dumps in Nunavik. Since no precise estimation of the quantities of scrap metal found in the dumps has been made, the estimated revenues are calculated using the estimated range in which the quantity of salvageable metal is expected to be found. The following table presents the four quantity scenarios that were used to estimate recycling revenue and cost.

Table 12. Total Recyclable Scrap Metal and Hazardous Waste Quantity Scenarios

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Baled Metal no. 1 and no. 2 [1]	25	45	100	200
Baled Aluminium-Steel	2	3	5	10
Baled Cars and White Goods[2]	15	25	45	90
Mixed Metal (no. 3)	320	715	1 170	2 370
Other Metals	5	10	10	20
Hazardous Waste	10	10	15	26
Total (average per year)	370	805	1 338	2 700
Ton per Person	0.35	0.75	1.25	2.50
Total Nunavik (tons)	**3 700**	**8 050**	**13 380**	**27 000**

[1] *The category of each metal type (no. 1, 2, 3) relates to the quality of the metal. For example, motor vehicle wrecks are classified as no. 3 metal.*
[2] *White goods include stoves, refrigerators, washer, dryers and other similar house appliances.*

Scenario 1 is based on the total quantity estimated from the size of the dump sites as presented in table 1 on page 7 and the types of recyclable scrap metal identified by the scrap specialist. As for scenario 4, the quantities presented are based on the average of the estimates made visually in the summer of 2003 by Jacques Landry, scrap metal specialist, in the communities of Kuujjuaraapik and Inukjuak. Scenarios 2 and 3 are presented as intermediate estimate values.

The proportions for each type of scrap metal and hazardous waste were estimated according to the ratios presented in scenario 4. The hazardous waste quantities were estimated from the annual generation rates presented in section 2.2.

The market price for scrap metal and the disposal cost for hazardous waste fluctuate on a monthly basis. As an example the following figure presents the market price variation for ferrous metals over the past 5 years.

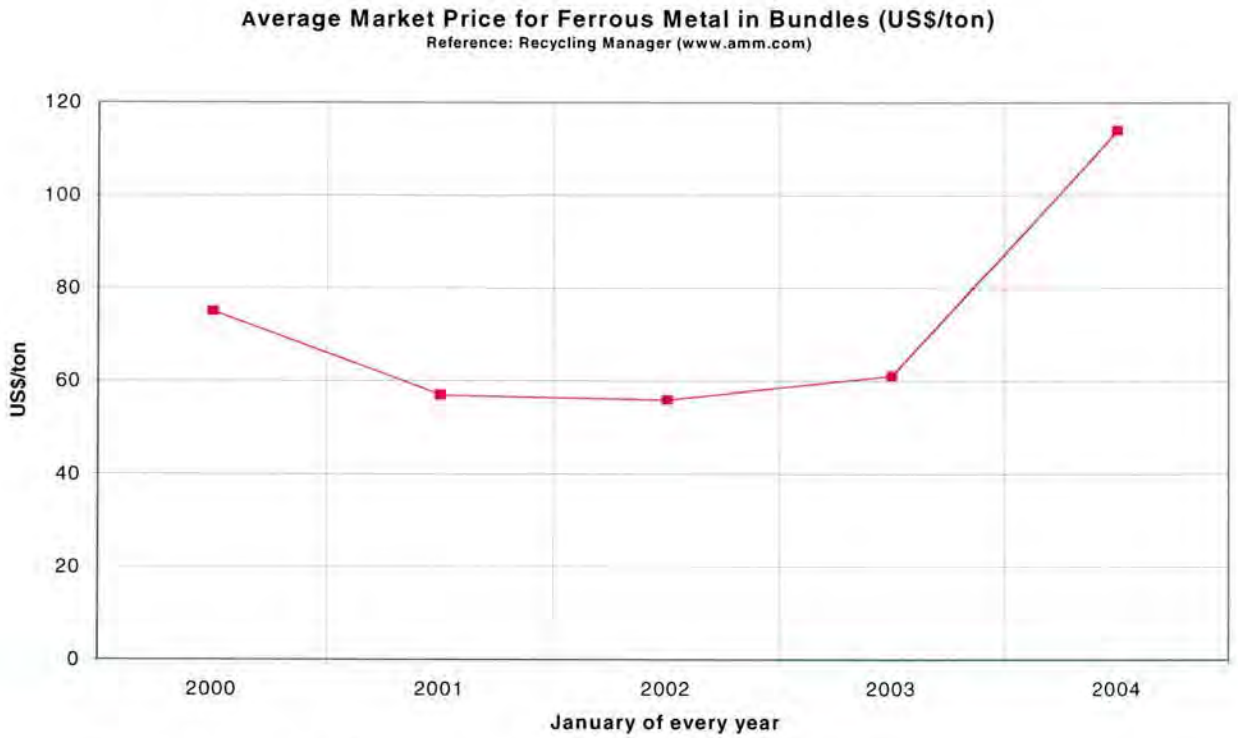


Figure 6. Average Market Price for Ferrous Metal in Bundles

From the present market value for each type of metal, the following table presents the estimated potential recycling revenue and disposal cost for each scenario presented in table 12.

Table 13. Average Annual Potential Recycling Revenue and Disposal Cost for Each Quantity Scenario

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Recycling Revenue	$52 000	$104 000	$175 000	$340 000
Disposal Cost (Hazardous Waste)	$10 000	$10 000	$16 000	$40 000
Net Revenue	$42 000	$94 000	$159 000	$300 000

8.8 Transportation Cost

In 2004, the cargo transportation price for containers on the ships from Montréal to Nunavik is approximately[6] $310 per ton northbound and $200 per ton for backhaul, in other words approximately $4 500 and $2 700 respectively per container (from 0 to 10 tons). If the maximum amount of scrap metal that can be placed in a container is 10 tons, the transportation cost is presently $270/ton (excluding the cost of the container). Since most of the metal that will be collected is ferrous metal, which can presently be sold at $150/ton, the sale of scrap metal remains, by far, below the cost of marine transport. The quantity of other more valuable metals such as aluminum and copper ($1 900/ton to $2 700/ton) are not expected to be found in sufficient quantities to balance the transport cost deficit that will be induced by collecting ferrous metal. An important amount of money will be required to finance the transportation costs involved in this project.

[6] The price varies according to the quantities.

In Nunavik there are very few containers available to transport scrap metal to the South. Since a very important quantity of containers will be required to send the scrap metal to a recycling broker, and the transport need is only from North to South, the purchase of containers would not be economically feasible. The suggested solution is to rent containers that are used to transport material on the first ship. These containers, which belong to the shipping company, usually return empty. Every year, one village might receive from 10 to 50 containers that return empty. This obviously is not sufficient to transport all the scrap metal since the four quantity scenarios presented earlier assume somewhere between 35 and 265 containers will be required annually. In order to reduce costs, the scrap metal shall be sent gradually every year according to the availability of containers. The rental cost for a container is estimated at $200. However, in order to respect the budget planning, all scrap materials shall be sent within the project's 10 year time frame.

The shipping unit price is obviously influenced by the quantity of material to transport. The project manager shall take time to investigate all forms of subsidies that may be applicable and the final price shall be negotiated with the marine shipping company in order to obtain the best possible price.

8.9 Training

The cost associated with training is estimated at an average of $10 000 per year in consulting fees, salaries and airfare. Training for the identification, handling and transportation of hazardous waste will be required for the project manager and the community recycling managers of each community. The scrap foreman and the workers will have to be trained every year for safety on the work site.

8.10 Unforeseen

A provision of 20% is included for any unforeseen costs that may have to be added. This provision includes changes in scrap metal market prices that may occur, up to a reduction of 50% from current prices. In other words, if the price of scrap metals decreases by 50% from actual prices (see table 5 at page 14), the unforeseen covers this decrease in sale revenue which in turns becomes an increase in total project cost.

8.11 Summary of Project Costs

Table 14 at the following page presents a summary of the annual costs to expect for this type of recycling project. The costs assume no savings from other projects (pilot project or hazardous waste management project).

Table 14. Summary of Estimated Annual Cost Ranges[1]

EXPENSE	ANNUAL COST RANGE		% TOTAL COST
	Minimum (Scenario 1)	**Maximum (Scenario 4)**	
Capital Cost[2]	$99 000		16% to 10%
Consumables	$55 000	$95 000	9% to 10%
Labour Cost[3]	$200 000		34% to 20%
Transportation Cost[4]	$150 000	$680 000	17% to 35%
Treatment Cost	$10 000	$40 000	2% to 4%
Training	$10 000		2% to 1%
Subtotal	*$520 000*	*$1 120 000*	80%
Unforeseen	$105 000	$224 000	20%
Recycling Revenue	($52 000)	($340 000)	
TOTAL[5]	**$570 000**	**$1 005 000**	**100%**

[1] *The maximum and minimum values presented in this table correspond to scenarios 1 and 4 respectively.* ***Applicable taxes are not included.***

[2] *The total capital cost ($992 000) to spend the first year is divided in 10 in order to estimate the total annual cost.* ***Interest on loans are not included.***

[3] *The labour cost is fixed since no assumption was made to change the productivity rate.*

[4] *The transportation cost used is $270/ton northbound and $200/ton for backhaul. The recycling revenue is deducted to calculate the percentage.*

[5] *The total includes the revenue from the sale of the recyclable material.*

8.12 Sensitivity Analysis of the Total Project Costs

The total project cost is dependant on the four main variables as presented in the beginning of this section. In order to better understand how the total cost of such a project will vary according to these variables, the sensitivity analysis of the total project cost was completed. The total cost includes all of the types of costs presented in this section.

Each variable was given the following values:

- Maritime shipping cost — The cost was varied from $0 to $400 per ton and was applied to all of the marine shipping costs (Nunavik to Montreal).
- Quantity of recyclable material collected — The quantity of material collected varies according to the four quantity scenarios presented in section 8.7.
- Market value of the scrap metal — The market values for each type of recyclable waste is not varied (see table 5 at page 14 for unit prices) in the present sensitivity analysis since the variation in the market value of the scrap metal is covered by the unforeseen costs presented in section 8.10.
- Productivity — The on-site sorting and waste preparation work is estimated at 14 weeks for large communities and 6 to 7 weeks for small communities.

Table 15 presents the results of the sensitivity analysis for the total project costs. The only variable which is not considered in this analysis is the productivity. If the current productivity estimates are too high and the project is extended to a period of 14 years instead of 10 years, the total project cost may increase by up to $1 000 000. The main additional cost associated with a lower productivity rate is labour.

Table 15. Sensitivity Analysis of the Total Project Cost

	TOTAL PROJECT COST[1]			
Marine Shipping (Retrograde) Unit Cost ($/freight ton)	***Scenario 1*** 3 700 tons recycled waste	***Scenario 2*** 8 000 tons recycled waste	***Scenario 3*** 13 400 tons recycled waste	***Scenario 4*** 27 000 tons recycled waste
0	$4 650 000	$4 500 000	$4 050 000	$3 350 000
100	$5 100 000	$5 450 000	$5 700 000	$6 650 000
150	$5 350 000	$5 950 000	$6 500 000	$8 300 000
200	$5 550 000	$6 450 000	$7 350 000	$9 950 000
250	$5 800 000	$6 950 000	$8 150 000	$11 600 000
300	$6 000 000	$7 450 000	$8 950 000	$13 200 000
400	$6 500 000	$8 450 000	$10 600 000	$16 500 000

[1] *Total project costs are slightly different from total annual cost ranges presented in table 14 because of numbers rounded off in table 14.*

According to this analysis, the total cost for the recycling project can vary from $3 350 000 to $16 500 000. In order to estimate a total cost for the project, the quantities collected in the first year shall be projected to all of Nunavik. The first year will become an indicator of the productivity and the total amount of waste that will be recycled.

Figure 7 presents graphically the results of the above sensitivity analysis. This presentation indicates that for a marine shipping retrograde price of $50 per freight ton, the quantity of scrap metal collected has no influence on the total project cost. In other words, the only way higher recycled scrap metal quantities will have a chance to diminish the total project cost, because of the higher quantity of sales, is if the retrograde price is lower than $50 per freight ton.

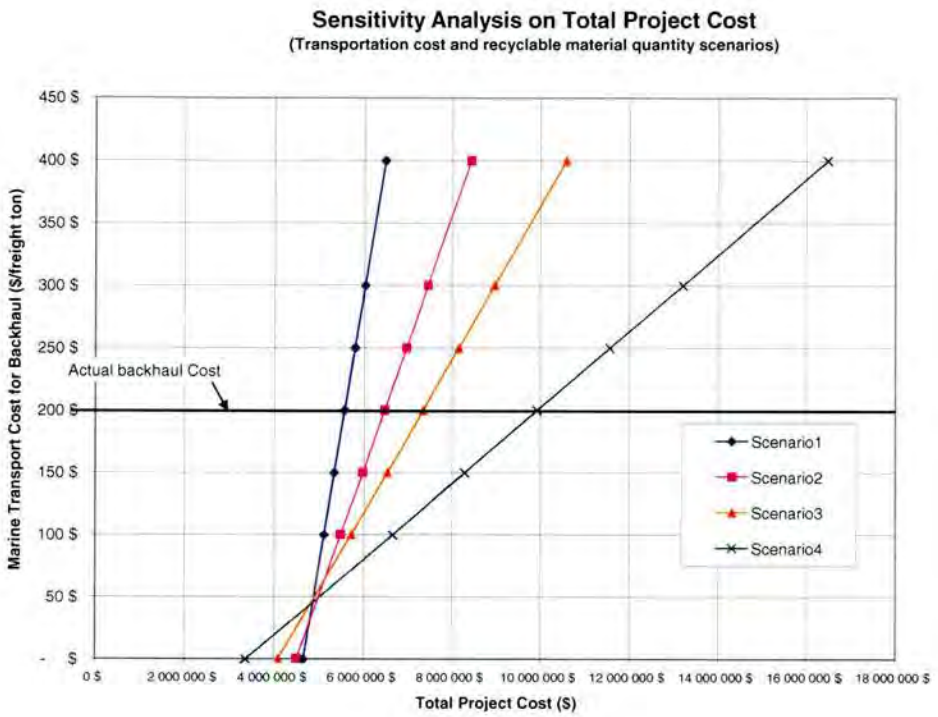


Figure 7. Graphical Representation of the Sensitivity Analysis for the Total Project Cost

In the case of the actual backhaul price ($200/freight ton), the total project cost almost double from $5 550 000 in scenario 1 to $9 950 000 in scenario 4. Of the four main cost influence variables presented in section 8.1, the quantity of scrap metal collected and the cost of the marine shipping are two crucial factors that influence the total project cost.

9. HAZARDOUS WASTE MANAGEMENT

9.1 General

If the required funds to undertake the proposed scrap metal and hazardous waste collection program from municipal dumps presented in section 8 are not presently available, the elaboration of an integrated management plan for hazardous waste only is strongly recommended. This plan would not require any important investment in equipment of various kinds and can begin to provide valuable expertise for Nunavik in terms of hazardous waste handling techniques.

First of all, a distinction shall be made between the various sources of hazardous waste. The following is a list of the various sources of hazardous wastes and the estimated quantity.

Table 16. Hazardous Waste Sources and Estimated Quantity

Hazardous Waste Source	Estimated Quantity (Nunavik)
Accumulated used oil[1]	150 000 kg
Municipal Garage (used oil only)[2]	19 000 kg/year
Hazardous waste in motor vehicle wrecks and municipal dumps	Not available
Domestic	Less than 26 000 kg/year
Commercial	Not available

[1] *See section 2.2 for more details.*
[2] *Estimated from data collected in a survey to all Nunavik communities completed in 1998 by the KRG.*

The complete hazardous waste management plan shall include all of the above sources in order to provide a complete hazardous waste management program.

In order to estimate the commercial hazardous waste produced in each community, each commercial establishment shall first of all be required, by municipal regulation, to supply an inventory of the estimated annual generation of hazardous waste products. New commercial establishments shall be required to pay for the disposal of their hazardous waste and existing commercial establishments could be given a 2 to 3 years grace period where the collection and treatment of hazardous waste could be paid by the program up to a previously established quantity.

9.2 Used Oil Management Options

The existing used oil and the annual generation of used oil in each community will be treated according to the option selected from the present section.

According to a survey by the KRG in 1998 and estimated projections, Nunavik presently has 850 barrels of potentially recyclable used oil and each municipality generates, on average, from 5 to 15 barrels of used oil annually. One barrel of oil is equivalent to approximately 205 litres. The used oil includes motor oil, hydraulic oil, transmission oil, and various other kinds of oils used for the maintenance of the municipal equipment. Since very few measures are presently taken to recuperate used oil, and since used oils are the most important source of hazardous waste in the communities in terms of its volume, the establishment of a management plan for used oils should be a priority in the management of hazardous waste.

The first step shall be to make sure every community takes the necessary measures to always dispose of the different hazardous products in separate containers. This will significantly reduce treatment costs. Furthermore, these containers shall be in good condition in order to prevent spills.

Secondly, each community shall have a safe location, preferably near the municipal garage, to store the used oil until the integrated comprehensive management plan for used oils and other hazardous wastes is established and proper disposal measures can be taken.

Since used oil has an interesting energy saving potential, an alternative to direct disposal to a hazardous waste treatment center is to burn the used oil generated locally using a used oil furnace. The regulation concerning hazardous waste (Q-2, r. 15.2) mentions in article 26 that "fuel-burning facilities of less than 3 MW may be used in a territory that is not linked to the Québec highway system...". This statement includes Nunavik.

As an example, the community of Inukjuak presently burns used oil in a special used oil furnace installed at the municipal garage. The used oil that is burnt comes from the municipality, residents, technical school and from Hydro-Québec's power plant in Inukjuak. Presently, a total of approximately 60 barrels (12 000 litres) of used oil are burned per year. This represents energy savings of $12 000 per year (approximately $1/litre). In order to heat the municipal garage all winter an additional 40 barrels (8 000 litres) of oil are required.

The following are three possible options for the disposal of used oils and corresponding steps to follow.

OPTION A - Burn the Used Oil in the Village Where It Is Produced

1) Build a used oil furnace and separation tanks to remove other products from the used oil.
2) Collect used oil from the dump and other locations in the community.
3) Separate used oil from other contaminants such as anti-freeze, tar or gasoline using the separation tanks. (Once all the accumulated used oil in the community is collected, the used oil will always be stored in separate containers)
4) Mix 500 ml of oil from 10 different barrels and send a sample of the mixture for analysis to a certified laboratory.

5) If the quality is acceptable according to provincial standards, store in a safe location near the building with a used oil furnace and burn to heat the building. If the quality is not suitable for burning, the used oil shall be sent to a certified treatment centre, in a double wall reservoir, for proper treatment and disposal.

OPTION B - Burn the Used Oil in Another Nunavik Community

1) Build a temporary separation tank to separate used oil from other products.
2) Collect used oil from the dump and other locations in the community.
3) Separate used oil from other contaminants such as anti-freeze, tar or gasoline. (Once all the accumulated used oil in the community is collected, the used oil will always be stored in separate containers)
4) Mix 10 barrels into a double wall reservoir constructed for marine shipping and send a sample of the mixture for analysis.
5) If the quality is good, send to another village for burning, if the quality is not suitable for burning, the used oil shall be sent to a certified treatment centre by ship for proper treatment and disposal.

OPTION C - Send the Used Oil Directly to a Certified Treatment Centre

1) Build a temporary separation tank to separate used oil from other products.
2) Collect used oil from the dump and other locations in the community.
3) Separate used oil from other contaminants such as anti-freeze, tar or gasoline. (Once all the accumulated used oil in the community is collected, the used oil will always be stored in separate containers).
4) Pour the oil into a double wall reservoir constructed for marine shipping.
5) Send by ship to a certified treatment centre for proper treatment and disposal.

In order to transport safely all used oil, at least five (5) specially constructed double wall reservoirs with a capacity of 2 000 litres each shall be purchased and shared by all the communities in order to send used oil to other communities for burning or to a certified treatment centre for proper treatment and disposal. The estimated cost of such a reservoir is $5 000 and is not included in the comparative cost summary presented in table 17 below, which includes only the following costs:

- Cost to analyse the oil: $325/sample or $32.50/barrel
- Return transport cost for the 2 000 litre reservoir: from $500 to $700 per route, depending on the route
- Treatment cost for used oil only: $75/barrel for small quantity and 25$/barrel for large quantity. An intermediate cost of 50$/barrel was used for the present estimate.
- The cost of the permit to burn used oil ($1 200 for five years) is assumed negligeable since the fuel economy by burning used oil from Hydro-Québec and others will cover these costs within the first year.

Table 17. Comparative Savings for Each of the Proposed Options (excluding capital costs)

Option	Fuel Economy if burned in Nunavik[1]	Transport and Treatment Costs for disposal	Total Savings if Burned in Nunavik[2]
A – Burn oil in same village	$170/ barrel	$200/ barrel	$370/barrel
B – Burn oil in another village	$50/ barrel	$200/ barrel	$250/barrel
C – Send oil to a treatment centre	N/A	$170/ barrel	N/A

[1] *The fuel economy is calculated using a $200 purchase value for the oil and subtracting the analysis and transportation fees.*
[2] *The total savings assumes the premise that all used oil must be sent to a certified treatment center.*

As an example, if one village produces 10 barrels of used oil per year, the corresponding economy (fuel and treatment) will be $370 per barrel of used oil ($3 700 per year) if the oil is burned in the same community and $250 ($2 500 per year) if the oil is burned in another community. Additional fuel economy will come from the burning of used oil from other sources such as Hydro-Québec.

In the evaluation of the above costs, the labour in the communities, the purchase of a used oil furnace and the management of the used oil recycling program are not included. Once the system is in operation, the municipal garage manager will be responsible for the used oil furnace. He/she will have to send samples of used oil for analysis prior to burning the oil. Regular maintenance of the furnace shall be made by one designated maintenance worker for all used oil furnaces. The annual maintenance cost associated with one used oil furnace is estimated at $5 000.

Prior to building a used oil reclaiming system, the management and control required to operate the system, remove the impurities correctly and keep the permit to operate such a system must be seriously considered.

The purchase and set-up of a used oil furnace and reservoir is estimated at $100 000, if built by a contractor. Construction by municipal employees could reduce costs significantly. In Inukjuak, this set-up was built by the community in 2002 at a total cost of approximately $50 000.

From the above results, the recommended options are:

- Encourage larger communities to purchase a used oil furnace and burn locally all the produced used oil (option A). The communities for which a used oil furnace is possibly financially feasible are Kuujjuaq, Puvirnituq and Salluit. Kuujjuaraapik could also be financially feasible if the used oil from Wapmagoostui is also reclaimed.
- All other communities shall send their used oil that is acceptable for burning directly to a certified used oil furnace in another Nunavik community (option B).

- The management of the used oil as an energy source in Nunavik should be locally managed and technical support shall be provided by a regional authority if possible.
- Communities who choose to install a used oil furnace shall keep the existing furnace as a back-up.
- Complete all the authorization requirements to be able to burn all the used oil from Hydro-Québec produced in Nunavik.

The total capital cost for Nunavik to build the required used oil furnaces according to the above recommendations is estimated at $350 000. This cost includes the construction of 4 used oil furnaces by local employees and temporary separation tanks for communities without a used oil furnace. According to actual used oil estimates and if Hydro-Québec provides all of its used oil to local used oil furnaces[7], the energy and disposal savings could cover the capital cost to build these systems within a period of approximately 5 years.

Table 18 presents a cost estimate of the proposed used oil management program.

[7] According to Hydro-Québec Installations Boréal, approximately 430 barrels of used oil were produced in 2002 in Nunavik by Hydro-Québec thermal plants. At a purchase cost of $200 per barrel for furnace oil, this represents approximately $85 000 in potential annual energy savings for Nunavik.

Table 18. Summary of Estimated Costs and Savings Associated with the Proposed Used Oil Management Plan for Nunavik (excluding Inukjuak)

	ITEM	COST
1.	Project Manager	$90 000
2.	Capital cost and local labor to build four used oil furnace systems	$350 000
3.	Five double wall used oil reservoirs (including transport)	$30 000
4.	Unforeseen (10%)	$47 000
	Total Costs	**$517 000**
5.	Energy and treatment savings from existing used oil	$260 000
6.	Energy savings from locally burned oil	$7 700/year
7.	Energy savings from oil burned in another village	$3 400/year
8.	Energy savings from oil from Hydro-Québec	$70 000/year
9.	Treatment savings for all locally burned used oil	$22 000/year
	Potential Initial Savings	**$260 000**
	Potential Annual Savings	**$103 000/year**

9.3 Hazardous Waste Management Plan (excluding used oils)

Since used oils represent a valuable source of energy for Nunavik communities, it is suggested to treat them differently from other types of hazardous wastes and follow the recommendations presented in the previous pages. As for other types of hazardous wastes (domestic and commercial), the following is a proposed action plan and estimated budget.

First of all, as in any project, a project manager must be appointed.

Secondly, in order to collect hazardous waste, each community must have a designated area to store the waste until its shipment to a treatment center. This area should be fenced and cover an area of approximately 400 square meters. Inside this fenced area each community should have a special hazardous waste container with emergency measure equipment. The location of this site shall be determined in collaboration with each municipal council. The capital cost related to these needs is estimated at $230 000 ($90 000 for the six remaining containers and $10 000 per storage site (fences, gravel, etc.).

The following is a brief description of the various items to consider in the cost estimate of a hazardous waste management plan that should be planned over a four year period.

1) Project Manager

A KRG employee shall be appointed to manage and supervise the hazardous waste management plan. This person shall also conduct the communication and awareness program to promote the recovery of all types of hazardous wastes. For the first year, a start-up period of 420 man-hours is estimated. For the subsequent years only 140 man-hours annually would be required. The hourly rate is estimated at $60/hour and transportation expenses are included in the total estimate.

2) Communication and Awareness Program

This program shall be prepared and supervised by the project manager. This program shall be conducted by project manager with the participation of the local suppliers of hazardous products. Since suppliers must become responsible of the outcome of hazardous product they commercialize, their participation is essential.

3) Community Recycling Manager

A municipal employee shall be appointed as a community recycling manager for each village. This person shall take part in the communication and awareness program conducted by the project manager. The main responsibility of this person will be to conduct two hazardous waste collection days per year in September and prepare all the hazardous waste for shipment in a specialized container. A total of 100 man-hours per year per community are estimated (excluding training) at an hourly rate of $35/hour.

4) Training

A specialized consulting firm shall be hired once every 2 years to train all new community recycling managers. The consultant fees, airfare, food and lodging as well as the salary for all the community recycling managers are included.

5) Marine and Land Transportation

This item includes the transportation cost to send each container once every four years from Nunavik to the treatment centre and back to Nunavik.

6) Treatment Cost

At an estimated 75% recovery rate and for domestic hazardous waste only, the treatment cost is estimated at $12 000 per community over a period of four years. This amount is based on an estimate of the quantity of hazardous waste in each community and should be evaluated following the collection of hazardous wastes in each community.

7) Packaging Material

Various packaging materials that may be required such as barrels, pallets, or others are covered by $1 000 per community.

8) Hazardous Waste Containers and Storage Site

Containers for hazardous waste will be required for each community. These containers will be required to store and transport safely the hazardous waste. In order to have a safe location to store the hazardous waste prior to their shipment, a site shall be prepared in each community. This site shall have a minimum surface area of 400 m2 and be fenced. Finally, the site shall be carefully selected in order to reduce any associated contamination risk. A total of $90 000 is required to purchase and send the six (6) remaining containers and $10 000 per community to prepare each storage site.

Table 19 summarizes the various elements to consider with their associated estimated cost considering a 75% recovery rate.

Table 19. Summary of Estimated Costs Associated with the Hazardous Waste Management Program for a 4 Year Period for all of Nunavik[1]

	ITEM	ESTIMATED TOTAL COST
1.	Project Manager (KRG employee)	$70 000
2.	Communication and Awareness Program	$20 000
3.	Local Community Recycling Manager (municipal employee)	$200 000
4.	Training in Nunavik	$70 000
5.	Marine and Land Transportation (Nunavik to treatment centre, return)	$90 000
6.	Treatment Cost (excluding used oils)	$170 000
7.	Packaging material	$14 000
	Unforeseen (10%)	$63 000
	TOTAL (4 years)	**$700 000**
	Average Annual Cost	*$175 000*
8.	**CAPITAL COST (hazardous waste containers and storage site)**	**$230 000**

[1] *The hazardous waste management plan for Nunavik includes domestic hazardous waste and hazardous waste other than used oil generated by municipal authorities.*

Since the quantity of hazardous waste is not know, this project could be undertaken in two communities and quantities may then be extrapolated in order to obtain the sufficient funds to dispose of the hazardous waste in a certified treatment centre.

If this project is undertaken prior to the recycling program presented in section 8, up to $500 000 in total savings can be deducted from the total recycling program project cost.

10. PROPOSED ACTION PLAN, RECOMMENDATIONS AND CONCLUSIONS

10.1 Proposed Action Plan

The objectives targeted for the actions described in this report are to:

1) Extend the life of existing waste disposal sites in Nunavik;

2) Control and minimize the environmental impact of hazardous waste present in municipal dumps and in the community;

3) Generate revenue from the energy savings obtained by burning used oil presently stored and produced in the communities and also from the sale of the scrap metal, in order to offset some of the total project cost;

4) Provide employment opportunities for local residents.

Table 20 at the following page summarizes the costs and benefits for each waste management program presented in this report:

Table 20. Cost and Benefit Summary for Each Waste Management Program

Waste Management Program	Scrap Metal & Hazardous Waste Recycling[1]	Used Oil Reclamation[2]	Hazardous Waste Recycling and Treatment[3]
Total Cost	\$950 000 Capital \$520 000 to \$1 120 000/year	\$520 000 Capital \$20 000/year[4]	\$230 000 Capital \$175 000/year
Duration	10 to 14 years	Continuous	Continuous
Potential Revenue	\$50 000 to \$350 000/year	\$0	\$0
Energy and Treatment Savings	0\$	\$260 000 for existing used oil[5] \$105 000/year[6]	0\$
Environmental Benefits	Medium	High	High
Local Employment	4 100 man-hours/year	1 200 man-hours for the first year and 250 hours annually for maintenance	1 600 man-hours/year

[1] *See chapter 8 for details.*
[2] *See section 9.2 for details.*
[3] *See section 9.3 for details.*
[4] *The annual cost only includes maintenance costs. Other costs are deducted from the potential revenue.*
[5] *An additional 850 barrels of used oil are estimated to be stored in various locations in the communities. A new survey must be conducted in order to estimate the existing quantity.*
[6] *This includes \$35 000 in potential energy and treatment savings from the communities and \$70 000 in potential energy savings from Hydro-Québec.*

Since the scrap metal and hazardous waste recycling program presented is very costly and requires important capital investment, the following is the proposed action plan which best suits the targeted objectives and appears to be the most feasible strategy :

1) Prepare a used oil management program and build additional used oil furnaces in Nunavik in order to provide energy savings and eliminate all uncontrolled storage of used oils.

2) Concurrently to the used oil management program, a hazardous waste recycling program should be implemented in all of Nunavik. This can be done in all communities in the same year.

3) On the same or subsequent year, a pilot project to recycle scrap metal and hazardous waste contained in municipal dumps should be undertaken (see section 8.2 for details). This project should be conducted in one community and provide valuable information on the type of scrap metals, quantity estimates and productivity rates in order to assess the feasibility of a full scale scrap metal recycling program. The conclusions of this pilot project will allow the project manager to prepare an accurate estimate of the total project cost.

4) According to conclusions of the pilot project and availability of funds, the project to recycle all the scrap metal and hazardous waste from municipal dumps in Nunavik could be undertaken.

The savings made from the hazardous waste management plans and pilot project represent approximately $700 000 or $70 000/year for the 10 year scrap metal and hazardous waste recycling compaign.

10.2 Recommendations for the Maintenance of Existing Dump Facilities

- The exact location and size of the existing sites should be verified by means of a GPS measurement in order to validate each site with the certificates of authorization. At the same time, an estimate of investments such as new fences to build and repair should be made.

- Funds should be provided to repair damaged fencing and build additional fences where needed. If fences are kept in good condition and surround the area needed to manage all waste materials, the dump manager will most certainly be able to improve site management practices. All the waste material abandoned outside the dump perimeter should be collected and confined within a fenced area according to a specific waste management strategy. According to the KRG, the average cost of building fences at airports in Nunavik in recent years was approximately $75/meter.

- Gates are not recommended since they are usually damaged during winter. If a municipality requests a gate for its dumpsite, more control will be needed. In such cases, new regulations should be prepared to give the municipality the authority to fine individuals or contractors if they dispose of waste outside the dump perimeter or if hazardous waste is not treated in accordance with the hazardous waste management plan.

- Access to the dump should be controlled, and a person appointed to collect used oil, oil filters, antifreeze, and any other hazardous waste found in scrap motor vehicles prior to sending them to the dump.

- Once recyclable products have been removed from the dumps, the available space in each dump will be evaluated in order to determine the expected life of each dumpsite and prepare any required site expansion request that must be submitted to the *Ministère de l'Environnement*. The required space may be estimated for all Nunavik communities following the completion of the pilot project to recycle scrap metal. A detailed assessment of the required investments for the dumps within a time frame of 10 or 20 years will then be made.

- Since the dump site in Kuujjuaraapik is shared with the Cree community of Whapmagoostui, the possibility to share the cost of waste disposal activities with the Cree community should be examined.

10.3 Conclusions

10.3.1 Prevent Environmental Cost for Future Generations

The proposed action plan in this report answers the urgent need to prevent further environmental contamination and to provide a safe environment for future generations.

10.3.2 Waste Management Calls for a Structured, Comprehensive Approach

First and foremost, a structured comprehensive waste management plan should be prepared specifically for Nunavik. This plan will help establish more clearly the needs of the communities and a clear long term plan for waste management as required for other regions in the province. Furthermore, such a plan will become essential for requesting financial assistance to carry out the plan, as most funding agencies require a clear long-term plan with specific objectives before getting involved financially in this type of project.

10.3.3 Need for a pilot project

The pilot project proposed for 2005 will provide an opportunity to estimate and characterise existing volumes and annual waste generation in Nunavik. Concurrently to this pilot project, a detailed survey of each dumpsite will be conducted to determine the present condition, expected life, required investments, and community needs. The survey will also help local recycling managers in their interventions. Using data gathered during these visits and the volumes measured during the pilot project, a precise evaluation of the expected cost of continuing operations will be prepared, and this cost will be compared to the cost and savings that would be generated by the scrap metal and hazardous waste recycling project.

10.3.4 Need for Public Consultations

Communities should be consulted prior to undertaking operations to empty municipal dumps since some communities have already set up sorting systems permitting residents to search for motor vehicle parts when they are needed. The dump management plan for each community will be drawn up jointly by the community's recycling manager and the KRG project manager. Public consultations are therefore strongly recommended to ensure that the plan proposed will meet the needs of Nunavimmiut.

10.3.5 Need to Invest in Human and Financial Resources

Once an integrated recycling management plan has been accepted by local authorities, the involvement of many local contributors will be needed to make the plan successful. Furthermore, important financial resources must be allocated in order to start-up the projects and ensure the success of each waste management plan.

REFERENCES

- Feasibility on the Wastewater Treatment Needs and Solid Waste Disposal for fourteen Communities in Nunavik, prepared by Jobin Courtemanche, 1999.

- Guide des bonnes pratiques pour la gestion des véhicules hors d'usage, Service des matières dangereuses, Ministère de l'Environnement, September 2001.

- Bilan 2002 de la gestion des matières résiduelles au Québec, Recyc-Québec, November 2003.

- Perspective de gestion des huiles usées au Nunavik, Administration régionale Kativik, 1999.

- Région éloignée, milieu nordique : les caractéristiques de la gestion des matières résiduelles au Nunavik, Comité consultatif de l'environnement Kativik, Septembre 1996.

- Guide de la collecte des résidus domestiques dangereux, Ministère de l'Environnement et de la Faune du Québec, 1994.

APPENDIX A

REQUIRED INFORMATION FOR THE PREPARATION OF A REQUEST FOR A CERTIFICATE OF AUTHORIZATION

The following information is presented in French since the request for a certificate of authorization will most certainly be presented in French.

Annexe VI - Informations requises pour une demande de certificat d'autorisation

LOI SUR LA QUALITÉ DE L'ENVIRONNEMENT

RÈGLEMENT RELATIF À L'APPLICATION DE LA LOI SUR LA QUALITÉ DE L'ENVIRONNEMENT

(L.R.Q., c. Q-2, a. 23, 31, par. e, f, g et m, a. 66 et a. 124.1)

SECTION II
DEMANDE DE CERTIFICAT D'AUTORISATION

7. Toute demande de certificat d'autorisation doit être adressée par écrit au ministre de l'Environnement et, outre les prescriptions de l'article 22 de la Loi sur la qualité de l'environnement et de toute disposition d'un autre règlement pris en vertu de cette loi, comporter les renseignements et documents suivants :

1° s'il s'agit d'une personne physique, ses nom, adresse et numéro de téléphone ;

2° s'il s'agit d'une personne morale, d'une société ou d'une association, son nom, l'adresse de son siège social, la qualité du signataire de la demande ainsi qu'une copie certifiée d'un document émanant du conseil d'administration, de ses associés ou de ses membres, qui autorise le signataire de la demande à la présenter au ministre ;

3° le numéro matricule du fichier central des entreprises assigné à l'entreprise du demandeur par l'Inspecteur général des institutions financières ;

4° s'il s'agit d'une municipalité, une copie certifiée d'une résolution du conseil qui autorise le signataire de la demande à la présenter au ministre ;

5° la désignation cadastrale des lots sur lesquels sera réalisé le projet ;

6° une description des caractéristiques techniques du projet ;

7° un plan des lieux où le projet doit être réalisé, indiquant notamment le zonage du territoire visé ;

8° une description de la nature et du volume des contaminants susceptibles d'être émis, rejetés, dégagés ou déposés ainsi que leurs points d'émission, de rejet, de dégagement ou de dépôt dans l'environnement ;

9° dans le cas d'une mine à ciel ouvert, un plan de réaménagement du terrain indiquant :

a) la superficie du sol susceptible d'être endommagée ou détruite ;

b) la nature du sol et de la végétation existante ;

c) les étapes d'endommagement ou de destruction du sol et de la végétation, avec une estimation du nombre d'années ;

d) les conditions et les étapes de réalisation des travaux de restauration.

8. Celui qui demande un certificat d'autorisation doit également fournir au ministre un certificat du greffier ou du secrétaire trésorier d'une municipalité locale ou, s'il s'agit d'un territoire non organisé, d'une municipalité régionale de comté, attestant que la réalisation du projet ne contrevient à aucun règlement municipal.

APPENDIX B

Scrap Specifications Circular 2003

Guidelines for Metals Transactions

These Guidelines are intended as a reference to assist members in carrying out their business obligations in a manner consistent with accepted industry practices. While the Guidelines are not obligatory, it is suggested that potential problems and misunderstandings may often be avoided by following these recommended procedures, in conjunction with ISRI's scrap descriptions.

At times, the respective parties to a transaction may be unaware of the differences in trading practices of the other party. This diversity of interpretation often leads to misunderstandings, disputes, and in some instances expensive lawsuits. It is with the objective of providing members the means of avoiding such friction that ISRI has published these Guidelines, which are based on those practices most common and current in the industry.

On these points where it is impractical to provide recommendations, it is advised that the points be mutually agreed upon by the parties involved.

PART I
GUIDELINES FOR CONTRACTS

A contract is an agreement between two or more parties to perform a legally enforceable act.

Therefore, all contracts should be in writing and set forth in **specific** terms. Before signing a contract, one should carefully read and understand all terms of it. No discrepancies or ambiguities should exist at the time the contract is executed. If you receive a contract with terms that are objectionable, you should immediately notify the other party in writing of your objections. An attorney should be consulted when legal advice is needed.

It should be kept in mind that if a dispute arises under a contract, and a court is called in to interpret its terms, certain general rules will be applied. First of all, contracts will be construed as a "whole," and specific clauses will be subordinated to the contract's general intent. Secondly, courts will construe words according to their "ordinary" meaning unless it is clearly shown that they were meant to be used in a technical sense. Also, where provisions appear to be inconsistent, the courts will determine whether some of the provisions are printed (indicating a form contract), as compared to others which are written or typed. The latter kinds of provisions will prevail.

It should be remembered that where you and a buyer (or seller) have reached verbal agreement on a transaction, your failure to sign and return a contract which is sent to you in confirmation of that verbal agreement may not relieve you of the obligations of the terms and conditions enumerated in that contract.

This Guideline was developed to cover routine transactions. It is essential that any unusual arrangements must be completely spelled out in a contract. With these factors in mind, the following list of items is enumerated as a **Checklist** for you to follow, either in the construction of a contract, or for the review of another party's contract proposal. We cannot overemphasize the need for accuracy and specificity.

Checklist Items
(Be specific at all times)

I. **Parties to Agreement:**
Indicate full name and address of buyer and seller. Include name of individual person or persons involved. Buyer's and seller's signatures are fundamental.

II. **Date of Contract:**
(a) Give date the initial agreement was reached
(b) Give Contract Number.

III. **Description of Material:**
Use NF code names or clearly describe what is being traded. Any allowable quality variation to be so stated. Ex: "X percent moisture allowed" or "Minimum CU content to be X percent" or "X percent Painted Material allowed."

IV. **Quantity:**
State exact quantity expected and indicate allowable tolerances or minimum/maximum limitations Ex. "40,000 lbs. (5% More/Less allowed)" or "38.000 to 42,000 lbs."

V. **Packing:**
State type of packing allowable and restrictions if such are required. Ex: "Bales not to exceed 60 inches"; "Bales not to exceed 3.500 lbs."

VI. **Delivery:**
Show complete address of shipping or delivery point, including where applicable, specific rail siding or junction. forwarding warehouse, and party to be notified. Ex: "FOB (Actual Point of Shipment) Chicago, Ill."; "FOB (Actual Point of Delivery) St. Louis. Mo."; "FAS Baltimore Container Yard"; "C&F Tokyo. Japan." If these details cannot be furnished at the time of writing of contract, it should state "shipping/delivery instructions to follow." State means of conveyance to be employed. State size and type of truck, rail car, container or number of shipments expected or permitted.

VII. **Shipment:**
Time allowed for shipment or delivery should be clearly stated. Ex: "Shipment by Jan. 15, 1989 LATEST"; or "delivery by Jan. 15, 1989." Indicate at whose option, buyer's or seller's, shipment shall be made in time period stated.

VIII. **Price:**
State price per unit. Ex: "$20.00/CWT"; "20.00 Cents/ Pound"; "$400.00/Net Ton"; "$440.92/Metric Ton." and' indicate where appropriate "Clean and Dry"; "Full Copper Content." If applica-

ble, state exact processing, smelting, refining charge, or unit deductions for impurities. (Avoid the use of the word "penalties.")

IX. **Payment:**
Terms of payment should be explicit. Ex: "Net 30 days after shipment"; "Net 15 days after mill receipt." Avoid phrases such as "usual." "Net 30." "Net Cash." Documents required to effect payment to be clearly stated. Ex: "Bill of Lading. Invoice. Weight Certificate." State how payment shall be made. If there is discussion of compensation for delayed payments, it should be included in the contract. If Letter of Credit is called for as a means of payment, it would be advisable that the terms to be included in the Letter of Credit also be stated in the contract. When applicable, contract should state whether buyer or seller is responsible for payment of taxes, duties, or any other levies to which a shipment could be subjected. Contract should state whether the seller's or buyer's weights shall govern the basis of settlement.

X. **Assignment:**
The contract may state whether the buyer and/or the seller has the right to assign the contract. If it does, it should emphasize that the obligation arising under the contract shall be equally binding on his assignee.

XI. **Notice:**
The seller should specify how notice to be given under the contract should be received—i.e. by hand, by telegram, by certified or registered mail. One should also specify when notice is deemed to be received by the party to whom it is given.

XII. **Disclaimer of Warranties:**
Depending on the type of transaction, or the metal involved, the seller may want to limit his liability by disclaiming any warranties of merchantability or of fitness for a particular purpose.

XIII. **Default:**
The contract should contain a provision setting forth the events which would result in a default of the contract. This provision might also contain a clause stipulating damages and/or setting forth available remedies (i.e. specific performance) in the event a default does, in fact, occur.

XIV. **Force Majeure:**
This item is related to the item of default, as indicated in paragraph XIII. Seller or buyer may enumerate, either generally or specifically, what events (i.e. strikes, fires, accidents) constitute circumstances beyond its control and thereby absolve him/her of any liability for damages or delay.

XV. **Non-Waiver:**
The seller or buyer should state in the contract that his/her failure to insist upon strict performance in any given instance shall not be construed as a waiver or relinquishment for the future of any of the terms, covenants and conditions contained therein.

XVI. **Claims:**
The seller may specify that any claims involved in a metals transaction for contaminated materials, weight shortage, or for any other cause is waived by the buyer unless brought to the seller's attention within a certain number of days after delivery.

XVII. **Arbitration and Applicable Law:**
The contract should set forth which state's or country's law will apply in the event of a legal dispute under the contract. It should also provide for arbitration procedure. (If ISRI Arbitration is desired, the contract should so stipulate.)

XVIII. **Benefit:**
The contract should stipulate on whom it is binding. For instance, the seller or buyer may want to specify that the contract inures to the benefit of the parties, their legal representatives, successors and assigns.

XIX. **Entire Agreement:**
This provision is especially important in the area of metals transactions, which frequently involve extensive preliminary negotiations. A clause may be inserted into the contract stating that the contract constitutes the parties' entire agreement and supersedes all prior agreements and understandings with respect to the subject matter of the contract.

XX. **Modification:**
A clause may be included in the contract stating that the contract's requirements can only be modified by a written instrument signed by the parties or their respective agents. This insures that the parties' informal discussions will not later be construed as affecting an alteration of the contract.

PART II
PACKING, WEIGHING, SHIPPING AND RECEIVING

It is recommended that strict adherence to contract terms will minimize many of the potential problems in this area. If there is a question about any item, one should communicate with his/her buyer/seller and clarify the situation prior to shipping. Listed below are some specific guidelines to be used in avoiding the most frequently reported problems.

PACKING (ALL SHIPMENTS)

Seller's Responsibility:

a. Pack in the manner and form agreed. Example: In sound bales, briquettes, boxes, pallets, drums, loose, etc.
b. Be sure that buyer agrees with your definition of words and phrases, i.e. Bale, Briquette, Coil, etc. as well as allowed dimensions and weights of such.
c. Material and packages should be securely tied or supported so that packages will hold in transit and normal handling.

Buyer's Responsibility:

a. Advise seller of any specific prohibitions, i.e. type or method of packing, size or weight of pieces, units or packages, etc.
b. Be sure that seller agrees with your definition of words and phrases, i.e. Bale, Briquette, Coil, etc., as well as allowed dimensions and weights of such.

WEIGHING, SHIPPING AND RECEIVING (TRUCK SHIPMENT)

Seller's Responsibility:

a. Each package should be individually weighed and the entire truckload should be checkweighted for comparison. Reconcile or explain any differences. If truck is weighed during inclement weather or wind, make note of this on weight ticket.
b. Trailers should be drop-weighed (both empty and loaded).
c. All equipment should be inspected before loading, and cleaned or repaired where necessary to avoid loss or spillage.
d. Open top trucks or trailers should be tarped or covered.
e. Vans and closed trailers should be sealed and seal numbers indicated on all documents.
f. If your customer requires appointments, make one in advance. Otherwise, as a courtesy, advise the buyer of your anticipated delivery schedules.
g. A complete manifest and packing list should accompany each shipment. This should clearly indicate the order number, items shipped, number and type of packages of each commodity, as well as the gross, tare and net weights of each package. This detailed infor-

mation should be put into an envelope and attached to the inside wall of the truck or van. If this cannot be done, give a complete set of papers to the driver to deliver with the original Bill of Lading covering the shipment. At the very least, notify buyer by telephone, telex or wire of these details on the day shipment leaves.

h. Different lots should always be properly segregated and bulkheaded to avoid comingling. Each package should be tagged or marked to aid in proper identification and segregation at the receiving point.

i. Be aware that someone at the delivery point will have to unload the shipment. Pay particular attention to door areas to assure that material is loaded safely. Proper care should be taken to insure that the material can be unloaded in a safe and expedient manner.

Buyer's Responsibility:

a. If seller requires appointment prior to pickup, make one in advance. Otherwise, as a courtesy, advise the seller of your anticipated pickup schedule.

b. Trailers should be drop-weighed (both empty and loaded).

c. Carefully check shipment advices and compare package count, seal numbers, weights.

d. **Prior to unloading,** if a significant* weight difference is apparent, the seller should be notified promptly and if requested, another weight should be taken to determine if spillage or theft might have occurred.

e. **After unloading,** promptly advise seller of any significant* differences between advised and actual weights, segregation, classification or quality. (Note: Refer to Part IV of the circular for recommended procedures in handling quality problems.)

f. Truck or trailer should be completely unloaded including any spilled material which should be picked up, weighed and identified as spilled from original containers. Buyers should cooperate in every way to help minimize losses.

WEIGHING, SHIPPING AND RECEIVING (RAIL SHIPMENT)

Seller's Responsibility:

a. Each package should be individually weighed and the entire rail car should be checkweighted for comparison. Reconcile or explain any differences. If rail car is weighed during inclement weather or wind, make note of this on weight ticket.

b. Railroad cars should be uncoupled and at rest (if possible) before weighing.

c. All equipment should be inspected before loading, and cleaned or repaired where necessary to avoid loss or spillage.

d. Railroad cars should be sealed and seal numbers indicated on all documents.

e. A complete manifest and packing list should accompany each shipment. This should clearly indicate the order number, items shipped, number and type of packages of each commodity, as well as the gross, tare and net weights of each package. This detailed information should be put into an envelope and attached to the inside wall of the railroad car. If this cannot be done, mail a complete set of papers to the buyer on the day shipment leaves.

f. Different lots should always be properly segregated and bulkheaded to avoid comingling. Each package should be tagged or marked to aid in proper identification and segregation at the receiving point.

g. Be aware that someone at the delivery point will have to unload the shipment. Pay particular attention to door areas to assure that material can be unloaded in a safe and expedient manner.

Buyer's Responsibility:

a. Railroad cars should be uncoupled and at rest (if possible) before weighing.

b. Carefully check shipment advices and compare package count, seal numbers, weights.

c. **Prior to unloading,** if a significant* weight difference is apparent, the seller should be notified promptly and if requested, another weight should be taken to determine if spillage or theft might have occurred.

d. **After unloading,** promptly advise seller of any significant* differences between advised and actual weights, segregation, classification or quality. (Note: Refer to Part IV of the circular for recommended procedures in handling quality problems.)

e. Rail car should be completely unloaded including any spilled material which should be picked up, weighed and identified as spilled from original containers. Buyer should cooperate in every way to help minimize losses.

WEIGHING, SHIPPING AND RECEIVING (EXPORT/IMPORT SHIPMENT)

Seller's Responsibility:

a. Each package should be individually weighed and the entire container load should be check-weighed for comparison. If container is weighed during inclement weather or wind, make note of this on weight ticket.

b. Container and chassis should be drop-weighed, if possible, both empty and loaded.

c. Prepare and send to buyer a complete manifest and packing list indicating the order number, items shipped, number and type of packages of each commodity, as well as the gross, tare and net weights of each package and the seal numbers.

d. If shipment is against a Letter of Credit, pay strict attention to **all** terms.

e. Place seals on all container doors and indicate seal numbers on documentation.

f. Material and packages should be properly stowed and braced to prevent movement during shipment.

g. Be aware that someone at the delivery point will have to unload the shipment. Pay particular attention to door areas to assure that material is loaded safely. Proper care should be taken to insure that the material can be unloaded in a safe and expedient manner.

Buyer's Responsibility:

a. Container and chassis should be drop-weighed, if possible, both empty and loaded.

b. Carefully check shipment advices and compare package count, seal numbers, weights.

c. **Prior to unloading,** if a significant* weight difference is apparent, the seller should be notified promptly and if requested, another weight should be taken to determine if spillage or theft might have occurred. Seller should be given opportunity to appoint surveyor or representative to verify weights.

d. **After unloading,** promptly advise seller of any significant* differences between advised and actual weights, segregation, classification or quality. (Note: Refer to Part IV of the circular for recommended procedures in handling quality problems.)

e. Container should be completely unloaded including any spilled material which should be picked up, weighed and identified as spilled from original containers. Buyer should cooperate in every way to help minimize losses.

**For purposes of this section, the meaning of the word "significant" shall be determined by agreement between buyer and seller, depending on the commodities and their values.*

PART III
TRANSPORTATION GUIDE

The mode and type of conveyance should be specified in the contract. If it has not been, then it is important that buyer and seller agree upon the mode and type to be used. These guidelines will assist in determining the appropriate means of transportation to employ.

A. Mode-Truck/Trailer

1. Type:
   a. Dump
   b. Removable sides
   c. Van-open or closed
   d. Dimensions of unit (20 ft., 40 ft., etc.)
   e. Determine if truck/trailer capacity meets minimum weight specified on contract.

B. Mode-Rail Car

1. Type:
   a. Box car or gondola
   b. Size of door opening, i.e. single or double door
   c. Special type D.F., Hi Cube, etc.
   d. Dimensions of car (40 ft., 50 ft., 60 ft., etc.)
   e. Determine if rail car capacity meets minimum weight specified on contract.

C. Export Shipments

1. Container:
   a. Type of container, i.e. closed, open-top, flat rack, hi-cube, etc.
   b. Size of container (20 ft., 35 ft., 40 ft., 45 ft., etc.)
   c. Determine if container capacity meets minimum weight specified on contract.
2. Breakbulk

PART IV
REJECTIONS—DOWNGRADES—CLAIMS

A brief explanation of these items will help one understand and implement the procedures recommended in this section.

Rejections: Rejections can occur when a buyer refuses to accept a shipment of material that does not conform to the description specified in the contract. Usually in such cases, the buyer cannot utilize the material and the seller is asked to remove the material from the buyer's place of delivery. A rejection can occur prior to unloading, but often the cause of the problem cannot be determined until the material has been off loaded and graded. Any part, or all of the shipment, may be subject to rejection.

Downgrades: Downgrades can occur when all, or part, of the material in a shipment is not in conformity with the description specified in the contract. Often, in such cases, the buyer can utilize the material and is willing to accept delivery of the material, subject to a price commensurate with its value.

Claims: This term is used mostly in export-import movements, and is used generically to encompass both **rejections** and **downgrades**, as well as **weight shortages.**

Strict adherence to contract terms can minimize the common causes of these difficulties. However, if a problem arises, it should be given prompt attention and settlement should be attempted as quickly as is practical. It is essential that both parties cooperate and keep communications open to minimize expenses and to preserve the relationship. Negotiations should not be conflicting but mutually beneficial and fair. Listed below are some recommended steps to be taken when a problem arises.

DOMESTIC SHIPMENTS

Buyer's Responsibilities:

a. In the event of a **rejection** buyer must notify seller immediately by telephone or telex. If seller fails to respond within two business days, buyer may return material in most prudent manner. Subject to contract provisions, buyer should promptly advise seller concerning replacement of rejected material.
b. In the event of a **downgrade** buyer must notify seller immediately by telephone or telex and afford seller an opportunity to inspect the material prior to its use. If material is to be inspected by seller or his/her representative, buyer should agree to a mutually convenient time to do so.
c. Buyer must give seller option of removing material if he/she does not agree to downgrade. (All costs of unloading and reloading are for seller's account.)

Seller's Responsibilities:

a. In the event of a **rejection** seller should respond promptly and advise buyer of his intentions. Seller must reply within two business days. Subject to contract provisions, he/she must advise buyer promptly concerning replacement of rejected material.
b. In the event of an unacceptable **downgrade** seller must advise buyer within two business days if he/she wishes to inspect material and agree upon a mutually convenient time to do so.
c. If seller wishes to remove downgraded material from buyer's delivery point, he/she must advise buyer promptly. (All costs of unloading and reloading are for seller's account.)

EXPORT-IMPORT SHIPMENTS

Buyer's Responsibility:

a. In the event of a **claim,** time is of the essence and notification should be given to seller within a reasonable period of time after arrival of vessel in receiving port.
b. In the event of a **claim,** the material should be held intact until agreement has been reached. The acceptable portion of the material may be consumed and/or arrangements may be made to sample a portion of material, i.e., 10-25% with balance held intact pending resolution of claim.

Seller's Responsibility:

a. In the event of a **claim,** seller should respond to buyer's notification promptly by telephone, telex, wire, or cable.
b. When a claim settlement has been agreed upon, terms of settlement must be followed promptly.

APPENDIX C

SPECIFICATIONS FOR THE CONTAINER TO TRANSPORT HAZARDOUS WASTE

The following pages present the specifications for each hazardous waste container that will be required for the six communities that do not possess such a container. The specifications were left in their original French version since the call for tender documents will most certainly have to be prepared in French.

PARTIE 2

SPÉCIFICATIONS

Unité d'entreposage et de transport de matières dangereuses

2.1. Norme

Tout le matériel doit être conforme aux exigences stipulées dans les spécifications ci-dessous.

2.2. Vérification des spécifications

Le soumissionnaire doit indiquer par un "oui" ou un "non" dans la marge de droite si le matériel offert satisfait à la norme exigée. Toute information ou documentation pertinente doit être annexée à la soumission.

	Spécification Satisfaite (oui ou non)
2.2.1. Caractéristiques de la remise de base	
a) Dimension: 20' x 8' x 8'	_____
b) Condition du conteneur: Type A	_____
c) Porte double à une extrémité avec joint étanche en caoutchouc	_____
d) Louvres d'aération protégées (4)	_____
e) Base avec encrage pour fixation lors du transport (conforme ISO)	_____
f) Crochet de manutention	_____
2.2.2. Modifications demandées	
a) Plancher de rétention sur toute la surface	_____

	Spécification Satisfaite (oui ou non)
b) Volume minimum de la cuvette: 1500 litres	____
c) Caillebotis 1.5" x 1.5" ayant une résistance minimale de 300 lbs/po^2 et pouvant s'ancrer en place pour les opérations de transport	____
d) Support d'assise du caillebotis à tous les 48"	____
e) Les supports doivent être percés afin d'assurer une rétention sur toute la surface du plancher de rétention	____
f) Conteneur passé au sablage et repeint 4 couches: 2 apprêts et 2 finitions uréthane	____
g) Louvre d'aération avec lien fusible approuvées ULC	____
h) Porte de côté simple avec barre panique	____
i) Système d'encrage pour fixer les barils lors du transport, système à attaches type « rochet » capacité de 4 barils par attaches	____
j) Fenêtre encastrée à l'épreuve des chocs, mur du fond Dimension 12" x 12"	____

2.2.3. Conformité

a) Cuvette de rétention et construction conforme ULC	____
b) Procédure de soudage conforme aux normes CSA W47.1	____

2.2.4. Matériels devant accompagner le conteneur

a) Contenants (4) à batteries usées

- Grandeur minimal: 36" x 36" x 18"
- Capacité minimale: 1500 lbs
- Membrane étanche 6 mil.
- Contenant assemblé sur palette de bois franc
- Membrane absorbante pour résidus liquide ____

Spécification Satisfaite (oui ou non)

b) Feuilles absorbantes universelles

- Ballot (1) de 100 feuilles
- Grandeur des feuilles 3/8" x 17" x 19"
- Conformité : 02USMRO1719 ____

c) Trousse de déversement universelle

- Capacité minimale: 80 gallons
- Doit comprendre au minimum : 5 boudins, 100 feuilles absorbantes, 2 paires de gants nitriles, 3 sacs de disposition
- Le tout dans un contenant type baril de plastique 205 litres ____

2.3.4. Garantie

La durée de la garantie doit être d'au moins un an sur le matériel. ____

APPENDIX D

SCRAP METAL BALER/LOGGER

The following list presents the main manufacturers of baler-loggers and the budget price to be expected for new equipment. The prices and delivery delays were provided in February 2004.

Company	Model	Price	Remarks
Colmar USA Inc. Julian G. Marceglia (716-693-9877)	5260PM	239,000 USD	FOB US Border Delivery time: 1 month Volume = 110 m^3 Weight = 30 metric tons
Sierra International Jose Pereyra (1-800-343-8503)	RB5000	310,000 USD	FOB Newark, New Jersey Delivery delay: 4 months Volume = 145 m^3 Weight = 37 metric tons
AL-jon Inc. Jim Spry (1-800-255-6620)	400XL	225,000 USD	FOB Ottumwa, Iowa Delivery delay: 3 months Volume = 120 m^3 Weight = 42 metric tons
AL-jon Inc. Jim Spry (1-800-255-6620)	580CL	345,000 USD	FOB Ottumwa, Iowa Delivery delay: 3 months Volume = 156 m^3 Weight = 42 metric tons
Iron-Ax, Inc. John Kitchens (1-877-247-6629)	Iron Pack	314 000 USD	Delivery delay: 4 months

Each model shall be analysed according to their specifications prior to making a choice. As a reference, the complete specifications for each type of equipment are presented in the following pages.

Balers, Shear-Balers, Cranes, Pedestal Cranes, High-rail Applications

02/12/04

Pesca Environnement
Attn: Stephan Ferrero
574, boul. Perron Est, C.P.11
Maria, QC, G0C 1Y0
Canada

Dear Stephan:

Thank you for your interest in Colmar equipment. For over 50 years, Colmar has been in operation manufacturing heavy equipment to support the recycling industry. Our cranes and balers are built in Italy and sold worldwide, carrying with them a reputation, which has captured a strong percentage of the global market. Colmar takes great pride in the cranes, balers, and shears we are putting into the field. The value and versatility of our product speaks for itself, validating its reputation and market hold around the world.

As per our telephone conversation, I am enclosing technical specifications for our Colmar Baler Model 5260PM. Also, you will find list pricing and delivery information below:

Colmar Baler Model 5260PM	$179,000.00	
With Crane	$30,000.00	
Fixed On Trailer	$30,000.00	
TOTAL	$239,000.00	FOB: U.S. Border

Approximate delivery time is 4 weeks.

Also enclosed, you will find information on the complete line of Colmar equipment. Please call our corporate headquarters in Buffalo, NY (800) 537-5204 if you need further information, as we will be happy to assist you in any way possible. Regarding customer assistance, with over 7,000 sq. ft. of warehouse space in Buffalo, NY, we are able to stock all basic spare parts to facilitate timely deliveries for any service or maintenance needs. In addition, we also have warehouse space in NJ, which enables us to stock new equipment and bulky spare parts. Establishing technical assistance locally in the areas where we have machines is also another priority for us. All together, our system assures the customer of speedy service to minimize any down time.

If you have any additional questions, please feel free to call me directly (609) 254-4778. Again, thank you for your time and interest and we look forward to speaking with you soon.

Kind regards,

Julian G. Marceglia
Chief Executive Officer

COLMAR USA Inc.

JULIAN G. MARCEGLIA
Chief Executive Officer

3790 Commerce Court, Suite 100
Buffalo, NY 14120
Office: (716) 693-9877
Fax: (716) 693-9869
Mobile: (609) 254-4778
E-mail: julimarce@msn.com
Website: www.colmarspa.com

BALER P 5260 PM COLMAR S.p.A.

DESCRIPTION

ENGINE:

Cycle	4 stroke diesel Turbo-charged and after-cooled
Number of cylinders	4
Displacement	270 cu in
Max power	132 HP (97 kW) at 2200 rpm
Cooling	liquid

Sound insulated engine compartment

ELECTRIC SYSTEM:

Operating voltage	24V
Alternator	24V/45A
Batteries	2 x 100 Ah/12V

HYDRAULIC SYSTEM:

- Hi/Low operating system:
  N°1 axial piston pump - Hi pressure/Low volume
  Max flow rate 31 gal/min.
  Max operating pressure 3500 psi
  N°1 gear pump – Hi volume/Low pressure
  Max flow rate 36 gal/min.
  Max operating pressure 1800 psi
- Cooling and filtering independent system
  N°1 gear pump
  Max flow rate 42 gal/min.
  Max operating pressure 1160 psi

  N°1 gear pump
  Max flow rate 3 gal/min.
  Max operating pressure 435 psi

DIMENSIONS:

Overall length	28' - 6"
Length of container	16.4'
Overall width	8' - 4"
Overall height	8' - 5"
Weight of machine fully equipped	48,300 lbs

BALED MATERIAL DIMENSIONS:

Length	(variable, depending on the type of material)
Width	33"
Height	24"
Density	70+ lbs/cu ft
Through-put	9+ tons/h

CONSTRUCTION:

Structure in extra-high strength structural steel WELDOX 700

Baler box of abrasion resistant HARDOX 500 steel

GENERAL DESCRIPTION:

Baler main cylinder
Max force 132 tons

1st door operating cylinders (2), 2nd door operating cylinders (2)
Max force 210 tons

FEATURES:

- Sequential automatic bale extraction
- 3 set compression stages
- Radio remote control with fully automatic functioning

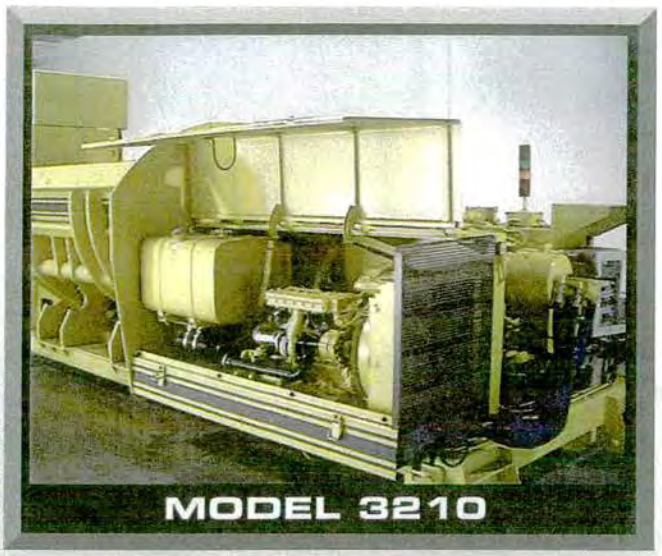
FUEL AND OIL CAPACITIES:

Fuel tank	53 gal
Diesel engine cooling fluid	9 gal
Engine oil	4 gal
Hydraulic oil tank capacity	105 gal
Hydraulic circuit total capacity	210 gal

NOTE: All specifications are indicative only. And the manufacturer reserve the right to change them any time

ROLL-OFF BALERS

MODEL 2210


MODEL 3210

MODEL 4260

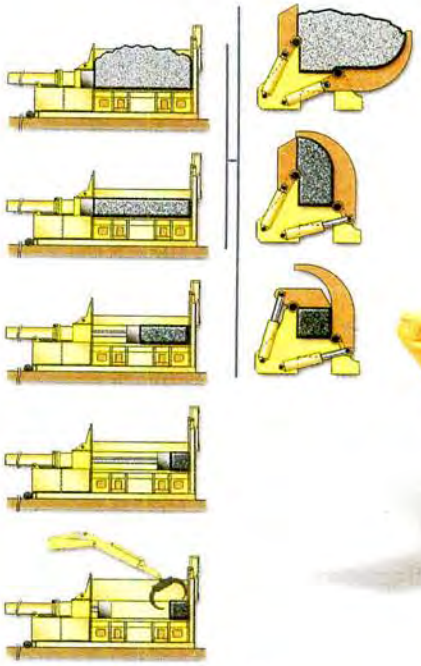
MODEL 5260

Machine Model	Machine Weight	Engine Horsepower	Box Length	Bale Dimensions	Bale Density*	Tons Per Hour*	Optional Crane
2210	30,800 lbs.	119	6.5'	12" x 12" x V.	90 lbs./cu. ft.	1.50-3.25	N/A
3210	37,400 lbs.	119	10'	18" x 18" x V.	90 lbs./cu. ft.	3.75-6.50	N/A
4210	48,500 lbs.	142	15'	18" x 18" x V.	75 lbs./cu. ft.	7.50-8.50	N/A
4260	45,100 lbs.	132	13'	25" x 32" x V.	65 lbs./cu. ft.	7.50-8.50	Yes
5260	49,500 lbs.	132	16.5'	25" x 32" x V.	65 lbs./cu. ft.	7.50-8.50	Yes
5260 HD	50,000 lbs.	167	16.5'	25" x 32" x V.	75 lbs./cu. ft.	7.50-8.50	Yes
5.5260	55,000 lbs.	132	18.5'	25" x 32" x V.	75 lbs./cu.ft.	7.50-8.50	Yes
6260**	91,000 lbs.	167	19.5'	25" x 32" x V.	65 lbs./cu. ft.	8.50-11.0	N/A

* Variable depending on the material type
** Stationary Only

BALERS

Our balers (**P 2210, P 3210, P 4260, P 5260, P 6260**) are used as compactors in the vehicle-scrapping sector, for the recovery of industrial production materials or in the differentiated collection of aluminum cans or compressed materials.
The balers can mount a mechanical arm for the autonomous loading of the materials or an industrial loader can serve them.
The baler, at the end of the compacting cycle opens to allow the extraction of the cube formed by the materials or by the dismantled vehicles, drastically reducing the costs of transport to other destinations or the storing of these materials.



Compacting baler sequence
(for **P 2210** and **P 3210**)

Radio remote control with automatic function.
• After the loading the machine can operate according to a programmable sequence for compacting the material, which is remotely controlled.
This apparatus is indispensable when the operator is on the autonomous loader that serves the baler.

Optional accessories:
- Radio remote control.
- Lifting hydraulic system.
- Fixed moulder on trailer.
- Loading boom arm with operator's cab.


Pushing hydraulic cylinder

P 3210 Diesel engine and hydraulic pump

Electrical plant and radio controller


Door operation hydraulic cylinder

Hydraulic bulkward

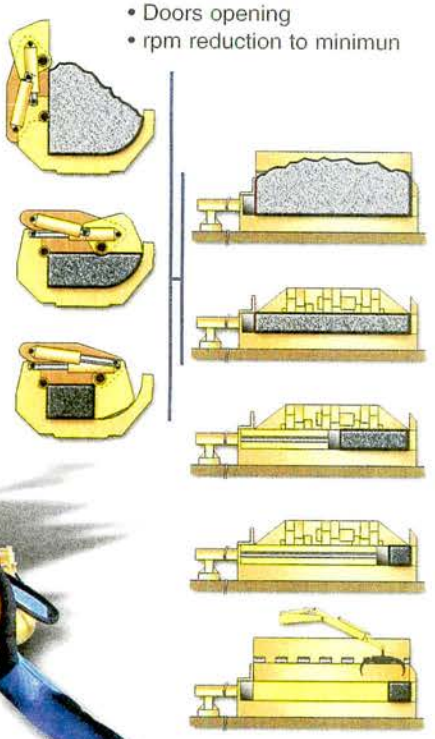
Loading boom arm:
rotation produced by radial piston hydraulic motor coupled to single-stage epyciclic speed reducer driving pinion in mesh with externally toothed slewing ring supported by a double row ball bearing. Shock-proof valves incorporated in hydraulic motor.

- Slewing ring diameter 620 mm
- Maximum outreach 7000 mm
- Non-continuous rotation 270°
- Rated load capacity with standard grab 950 kg, limited by Colmar (increasable)
- Grab 280 l
- Total weight of crane with end attachment 2000 kg

Trasportability:
These balers (apart from P 6260) are transportable, through simple hydraulic features, on normal trucks for use in many demolition depots (the loading and the unloading is carried out by truck) or they can be fixed to the truck itself.

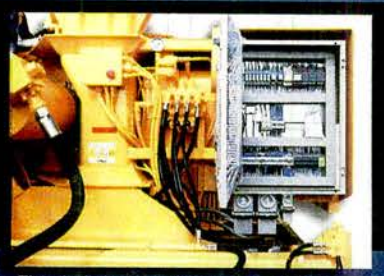
Baler automatic sequence:

- Baling
- Doors opening
- rpm reduction to minimun



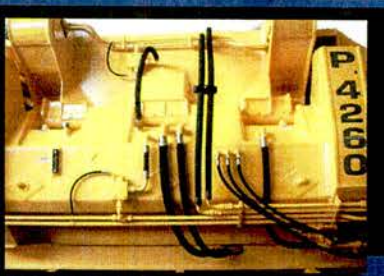
Compacting baler sequence

Secondary door hydraulic cylinder



Electrical plant and secondary distributors

P 5260 Diesel engine and hydraulic pump



Door hydraulic plant system

Loading boom arm hydraulic cylinders

TECHNICAL SPECIFICATIONS SIERRA RB5000 BALER / LOGGER

POWER:	CUMMINS 6BT5.9, 6 CYL. TURBO DIESEL 150 H.P. @ 2000 RPM
HYDRAULIC:	REXROTH VARIABLE DISPLACEMENT PUMP DENISON VANE TYPE PUMP MAXIMUM OPERATING PRESSURE 3200 PSI 100 % FILTRATION WITH 20 MICRON FILTERS COMPLETE SYSTEM RELIEF PROTECTION MANUAL AND AUTOMATIC CYCLES DIRECTIONAL VALVES SERVO CONTROLLED HYDRAULIC OIL COOLING SYSTEM (AIR) FOUR HYDRAULIC OUTRIGGERS
HYDRAULIC:	TOTALLY SEPARATE FROM BALER CONTINUOUS ROTATION 2000 LBS CAPACITY (FULLY EXTENDED) 24' 8" BOOM REACH, FOUR POINT ORANGE PEEL GRAPPLE ON X WITH ROTATOR
CYLINDERS:	(2) MAIN COMPRESSION (6) FOLDING BOX RAMS
CYLINDER FORCES:	MAIN COMPRESSION, 168 TONS FOLDING BOX, 240 TONS EACH SIDE (3 X 80)
FOLDING BOX DIMENSIONS:	16 '5" X 8'1" OPEN 16' 5" LONG X 40" WIDE X 24" HIGH - CLOSED
BALE SIZE:	40' X 24" X VARIABLE
BALE DENSITY:	75-90 LBS/CU FT AVERAGE
BALE WEIGHT:	850 LBS AVERAGE
LOG SIZE:	40" X 24" X VARIABLE
LOG DENSITY:	25-35 LBS/CU FT AVERAGE
LOG WEIGHT:	1200-1400 LBS AVERAGE
CAPACITIES:	DIESEL TANK, 80 GALLONS HYDRAULIC TANK, 280 GALLONS
OTHERS:	WEIGHT, APPROX. 81000 LBS WITH 3 AXLE TRAILER

Main Office: 1620 East Brundage Lane • Bakersfield, CA 93307 • 1-800-343-8503 • 1-661-327-7073 • E-mail: info@sierraintl.com

- 310 000 $ US

F.O.B. NEWARK, NEW JERSEY

DELIVERY DELAY : 4 MONTHS

Contact: M. Jose Pereyra

Phone : 1 800 343 8503

RB 5000 Portable Car Logger

"THE MOST DURABLE CAR LOGGER IN THE WORLD"

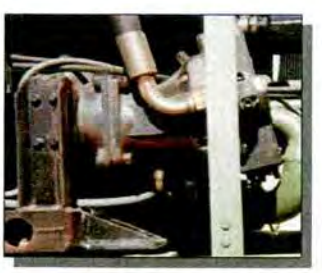
Applications

Baling - **White goods, tin, clips**

Logging - **Car Bodies, White goods, Sheet Iron**

Power and Hydraulic Specifications

Power - Cummins 6BT5.9, 6 cylinder Turbo Diesel



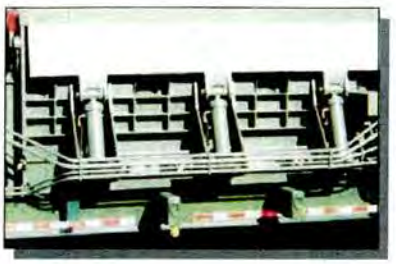
Hydraulics– (1) Rexroth variable displacement pump
98.7 gallons per minute each pump
(1) Denison double vane type pump
52 gallons per minute each
Maximum operating pressure 4020 PSI
100% filtration with 20 micron filters
Complete system relief protection
Hydraulic oil cooling
Automatic Cycles (Baling & Logging)

Hydraulics – (Crane)
Full function, independent of Baler
Continuous Rotation
2200 LBS. Capacity (Fully Extended)
24 Ft. 8 Inches Boom Length
Four Point On X Grapple with Rotor.

Cylinder Specifications

Cylinders - 2 Main Compression Rams
6 Folding Door Rams

Cylinder forces - Main Compression, 154 Tons Each
Folding box, 6 cyl., 88 Tons Ea.
264 Tons Each Side
Stabilizers – Four hydraulic cylinders



Folding Box Dimensions

Open - 16 Ft.5 Inches X 8 Ft 6 Inches

Closed - 16 Ft.5 Inches X 40 Inches X 20 Inches
Liners – Hardox 400 Steel

Bale / Log Dimensions

Bale size – 40 Inches X 24 Inches x Variable
Bale weight – 850 LBS. Average

Log size – 40 Inches X 24 Inches x Variable average
Log density – 25-35 LBS./Cubic Foot Average
Log weight – 1200 LBS. Average

Machine Weight 81,050 LBS. (including trailer)

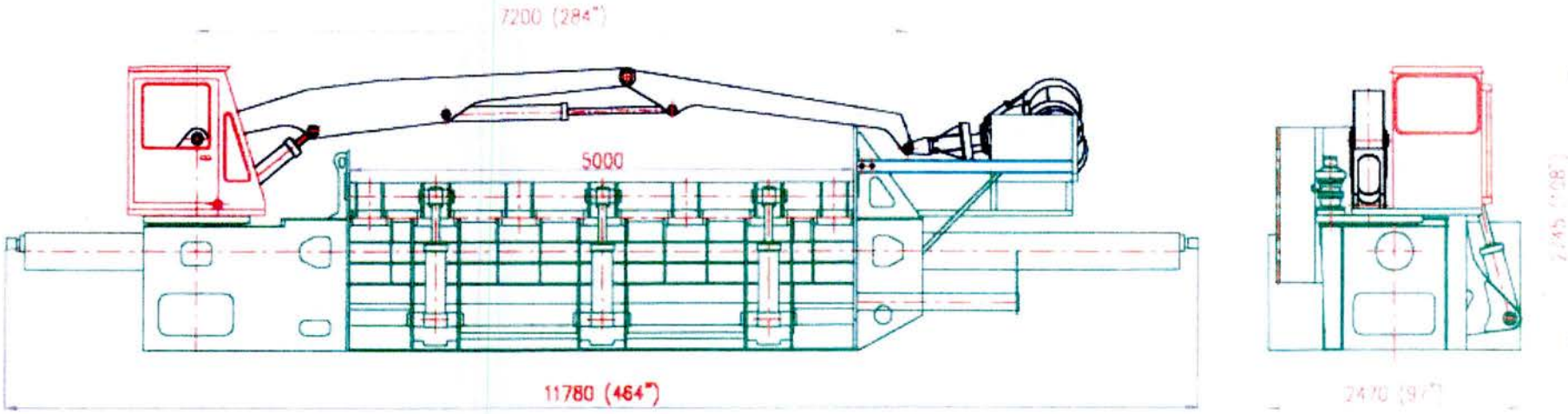
SIERRA RESERVES THE RIGHT TO CHANGE SPECIFICATIONS WITHOUT NOTICE.

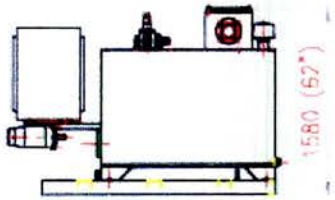
Bale

Log

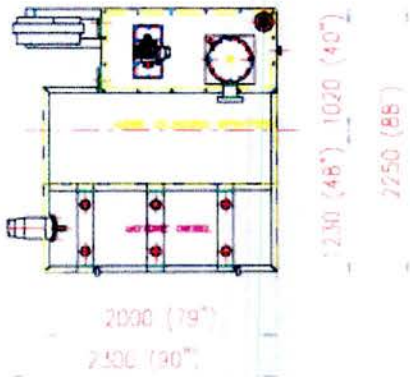
PROCESS CARS WITH EASE !!!

"Leading the way into the next century"



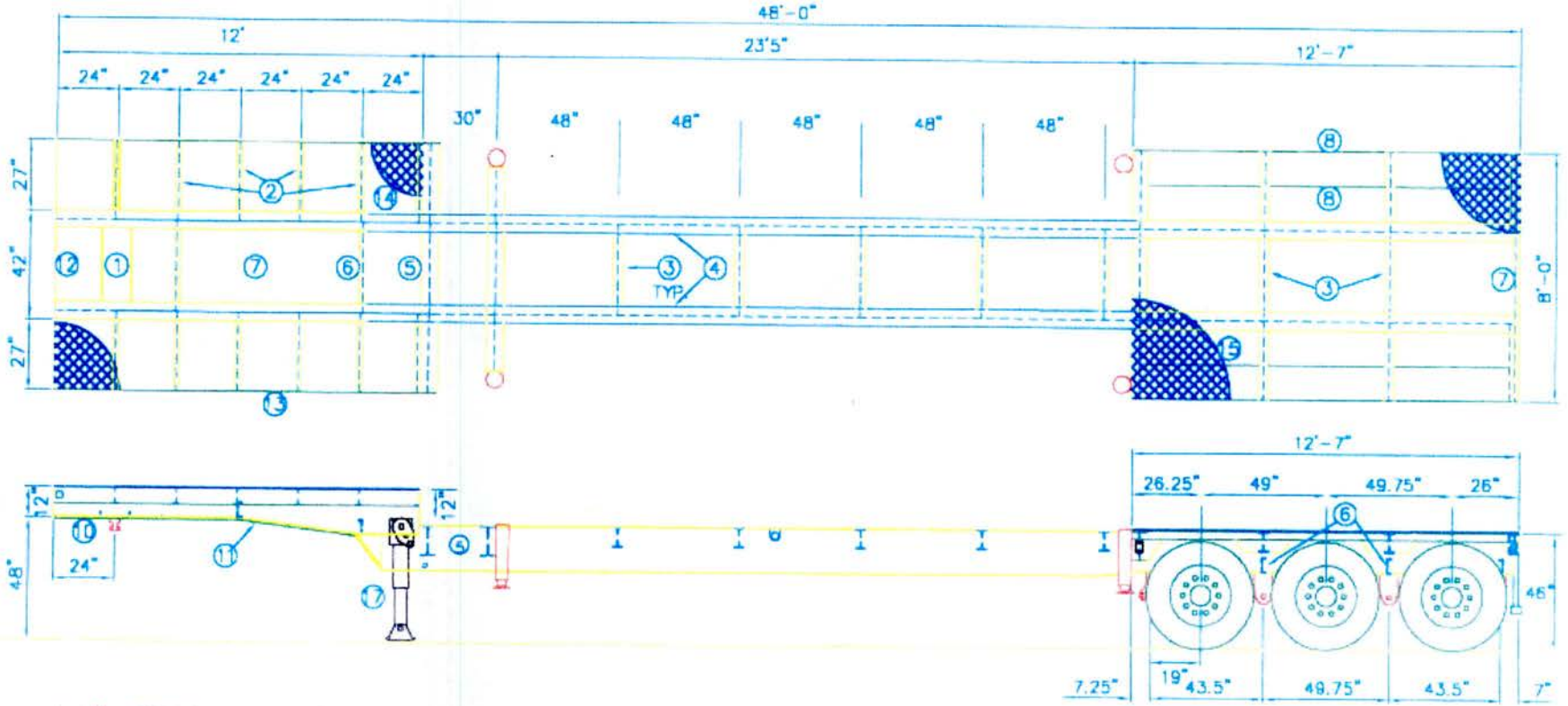


HYDRAULIC UNIT



SIERRA INTERNATIONAL MACHINERY

RB 5000 CAR LOGGER / BALER



1	12 x 20.7 CH	9	1/4 X 5 FLAT
2	W6 x 9	10	3/8 PL 42 x 48
3	W8 x 10	11	3/4 x 8 FLAT
4	18x55# DC	12	1/4 PL
5	18x55# DC	13	1/4 x 6 1/2 FLAT
6	6 x 8.2 CH	14	1/8 TREAD PL
7	8 x 11.5 CH	15	1/4 TREAD PL
8	3/8 X 3 FLAT	16	2 IN. PIPE
		17	LG-75

TOKA

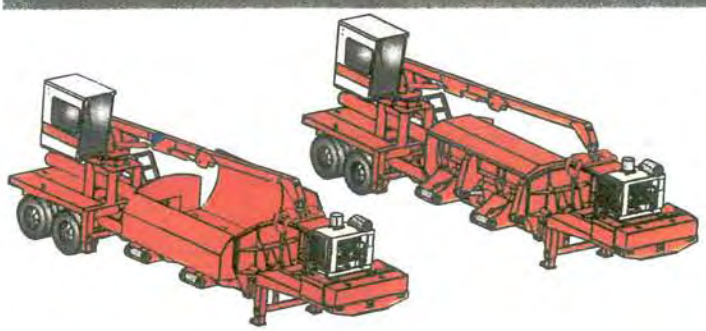
TRAILER & MFG

SIERRA INT. MACH.	RB5000	8/27/01

Aljon 400XL BALER

CERTIFIED ISO 9001:2000

Portable One Man Operation



STANDARD FEATURES

- L Box Design
- 540° Crane Rotation
- Fully Portable & Road Legal
- Four Corner Hydraulic Outriggers for Stability
- One Man Operation
- High Visibility Operator's Station
- Murphy Gauge Auto shut-down for Engine Protection

KEEPING IT SIMPLE, BUILDING IT STRONG

FEATURES ▸ BENEFITS ▸ SPECIFICATIONS

Al-jon 400XL BALER

NEW

With 40 years of experience building portable scrap equipment, Al-jon is uniquely qualified to manufacture this rugged high production machine. The 400XL Baler's curved box design and larger loading chamber efficiently process bulky loose scrap, white goods and gauge material down to manageable 20" x 32" x variable bundles (20" minimum). The operator controls the 3-way compression process from the cab. Final compression is fully automatic. Increased hydraulic power allows the operator to sort and stack material during the automatic baling cycle eliminating lost labor time and minimizing the labor cost per ton. Solidly-built to withstand the demands of the job, the 400XL proves there is no substitute for iron!

SPECIFICATIONS

HYDRAULICS:

Filtration:	Kidney Loop 5 Micron
Operation Pressure:	2500 to 2800 PSI
Circuit Type:	Energy Conserving Hi-Low Multiple Relief
Protection:	2800 PSI
Direction Valves:	Baler - Electrically Controlled Hydraulic
Lid Cylinders:	7" Bore x 29" Stroke -- 4" Chrome Rods
Compression Ram:	12" Bore x 128" Stroke - 9" Chrome Rod

CAPACITIES:

Fuel:	90 Gallons
Hydraulic:	250 Gallons

ENGINE:

Quality 6 Cylinder Diesel Engine
(Cummins, John Deere, or Caterpillar)

ELECTRICAL:

Heavy Duty 12 Volt Battery
Solenoid Controlled Hydraulic Functions -
- 12 Volt Fuse Protected
All Solenoids and Control Boxes are Sealed And Water Tight

Auto Cycling of Compression Ram & Lids
Throttle inside the Cab
Pressure Selection Switch (Log or Bale) Inside Cab

DIMENSIONS:

Height:	13' 6"	4.1
Width:	8'	2.45
Length:	39'	11.90
Tires:	11:00 x 22.5 Tubeless Radial Tire	
Loading Area:	8' X 12' 4"	
Log Size:	20" x 32" x Variable	
Density:	25-60 lbs/cu ft	

120 m³

CRANE:

23' Boom Reach
Cab with heat, Air Conditioning, and Stereo
Load Stall Piston Pump

Al-jon Inc.
14599 2nd Ave.
Ottumwa, IA 52501

Ph. 641-682-4506
888-255-6620

Visit our website
www.aljon.com

Aljon 580CL CAR LOGGER

FEATURES

- L Box Design
- 540° Crane Rotation
- Throttle Inside Cab
- Pressure Switch (Log or Bale) Inside Cab
- Fully Portable & Road Legal
- Four Corner Hydraulic Outriggers for Stability
- One Man Operation
- High Visibility Operator's Station
- Fully Auto Cycle (Ram In & Out-Doors Open)

KEEPING IT SIMPLE, BUILDING IT STRONG

580 CL CAR LOGGER

FAX 418-759-5524

SPECIFICATIONS

With 40 years of experience in building portable scrap equipment, Al-jon is uniquely qualified to manufacture this high production machine. Weighing in at 95,000 pounds, the 580 CL Car Logger is the true heavy weight in portable balers and loggers. There is no substitute for iron.

SPECIFICATIONS

ENGINE:
166 HP John Deere Diesel Engine.
Rear Mounted for Easier Maintenance Access.

HYDRAULICS SYSTEM:
Double Pump (Baler) 120 GPM at 2100 RPM
Filtration: Kidney Loop 5 Micron Filtration

Multiple Relief Protection at 2500 PSI.
Operating Pressure 2500 to 2800 PSI.
Lid Cylinders: 8" Bore x 29" Stroke--
4" Chrome Rods
Ram Cylinders: 1 - 12" Bore x 129" Stroke--
9" Chrome Rod
1 - 12" Bore x 88 1/2" Stroke-
9" Chrome Rod

REAR AXLE:
Tri-axle with 11:00 x 22.5 Tubeless Tires

CAPACITIES:
Fuel: 90 gal.
Hydraulic: 290 Gal.

CRANE:
Model 1010 Knuckle Boom Material Handler.
Large Modern Crane Cab.
- AC/Heater.
- Joy Stick Controls.
- Fully Adjustable Seat.
- 25' 8" Reach
- 4,000 Pounds Lifting Capacity at 20' Reach.
- Load Sensing Piston Pump
- 540° Direct Manually Controlled Hydraulics

ELECTRICAL:
Heavy Duty 12 Volt Battery
Solenoid Controlled Hydraulic Functions -
- 12 Volt Fuse Protected
All Solenoids and Control Boxes are Sealed Water Tight

BALING CHAMBER:
Dimensions - 10'W x 19'L.
"L" Box Design with Stress Relieved Welds.
Lower Baling Chamber Allowing Better Operator Visibility.

BALE SIZE:
40"W x 26"H x Variable Length.
Bale Density: 30 - 80lbs. Per Cu. Ft.

HEIGHT:
13' 6'

WEIGHT:
95,000 lbs.

43 Ton

PRODUCTION:
25 Car Bodies Per Hour.

CERTIFIED ISO 9001:2000

Al-jon Inc.
14599 2nd Ave.
Ottumwa, IA 52501
Ph. 641-682-4506
888-255-6620
Visit our website
www.aljon.com

Can We Have 1 Minute Of Your Time?

All It Takes Is One Minute...
To Go From This

To This

Finally! The Baler You've Been Waiting For.

The Iron Pack Baler is the most unique portable baler on the market today. With programmable pressure settings it allows bale densities that will easily meet your consumer's requirements whether you are logging automobiles and light metal or making #1 and #2 bundles for direct mill delivery.

- Remote Control
- Programmable Pressure Settings
- Produce #1 and #2 Bundles
- 200 Horse Power Cummins Power Unit
- Rear Mounted Crane Available
- Hydraulic Outriggers Allow For Quick Setup
- Log Full Size Automobiles Up To 20 Ft.
- High Speed Baling With Minimum Fuel Consumption

A low center of gravity makes it easy to transport at interstate speeds. This is the machine that will obsolete auto flatteners. The size of the automobile is greatly reduced allowing for maximum weights per load. High pressure, high volume hydraulics and digital electronic controls put this machine on the leading edge of technology.

For More Details Give Us A Call
Toll Free At 877-247-6629

IRON AX

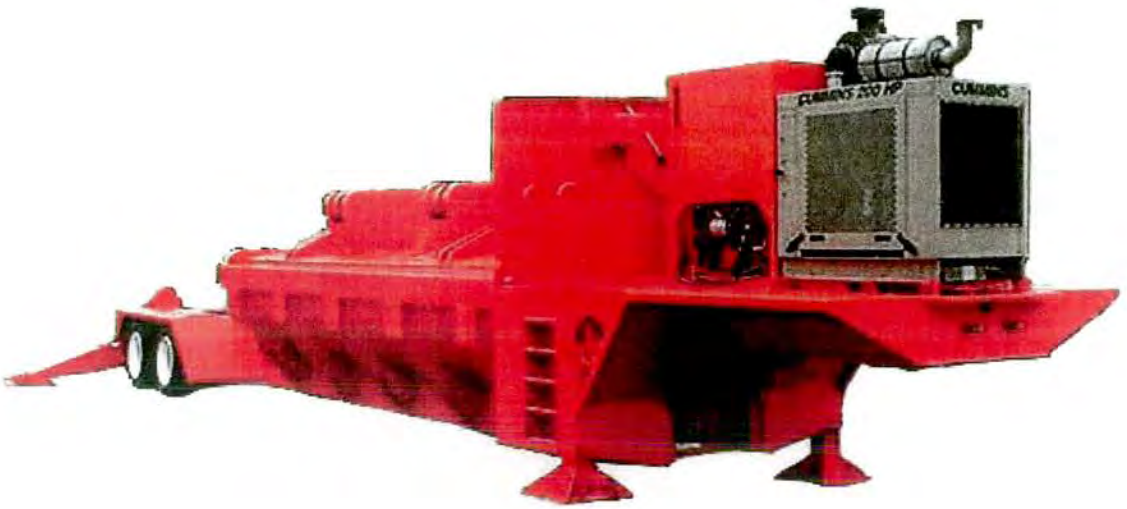
Proudly Made In America

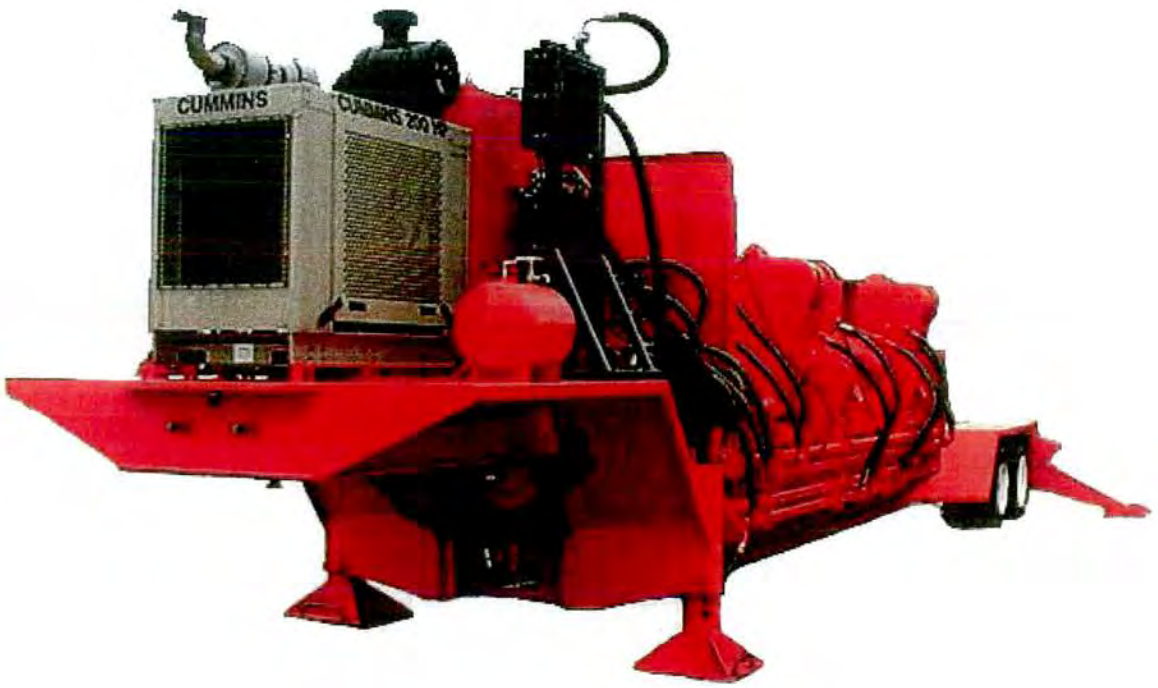
Iron Ax, Inc.
P.O. Box 190 • Wadley, GA 30477
478-252-0022 • Fax: 478-252-9030
Toll Free: 877-2IRONAX (877-247-6629)
Website: www.ironax.com
E-mail: ironax@ironax.com

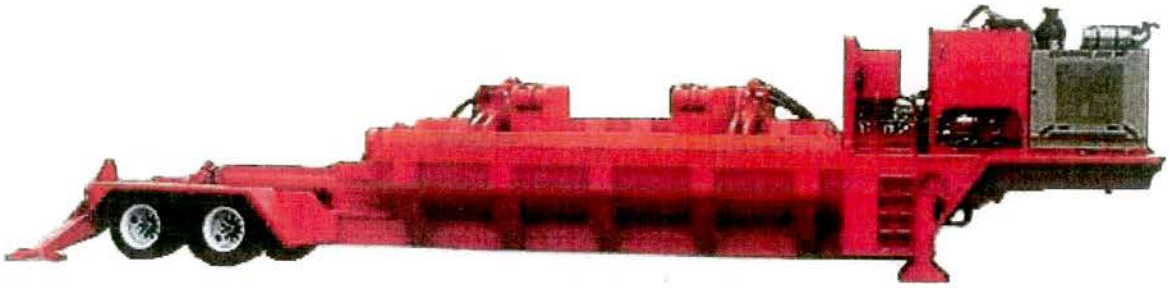
IRON AX

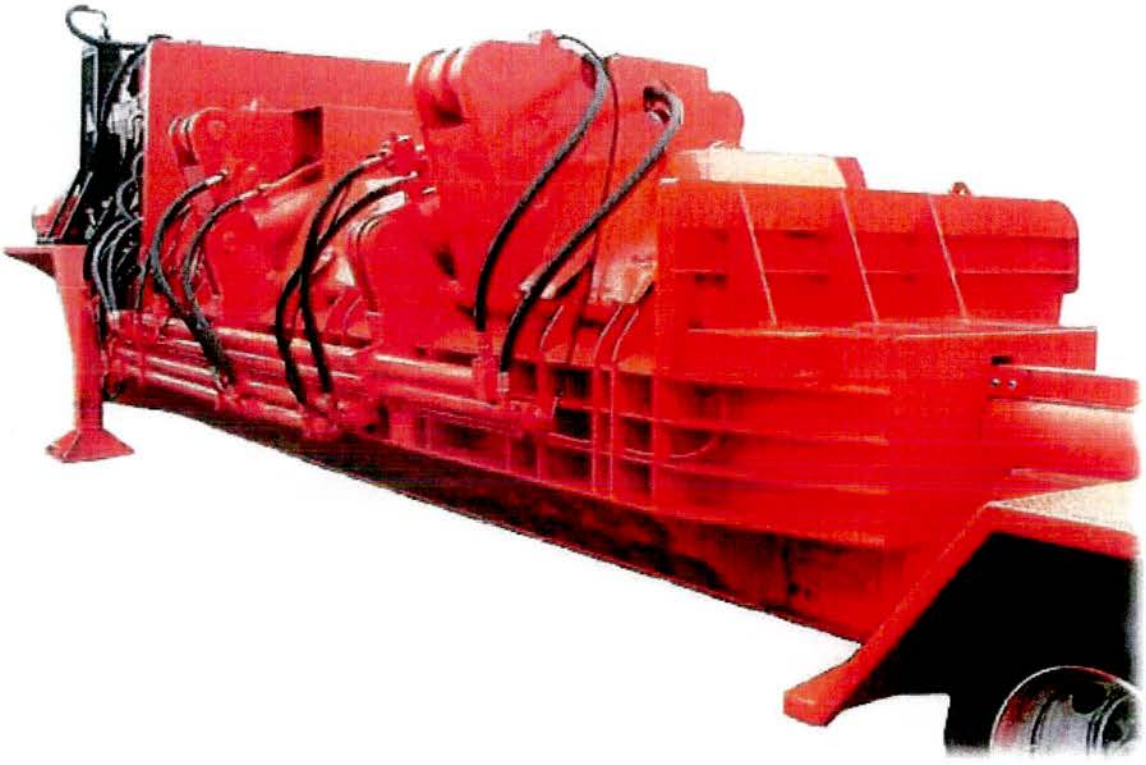
Scrap Processing and Demolition Equipment

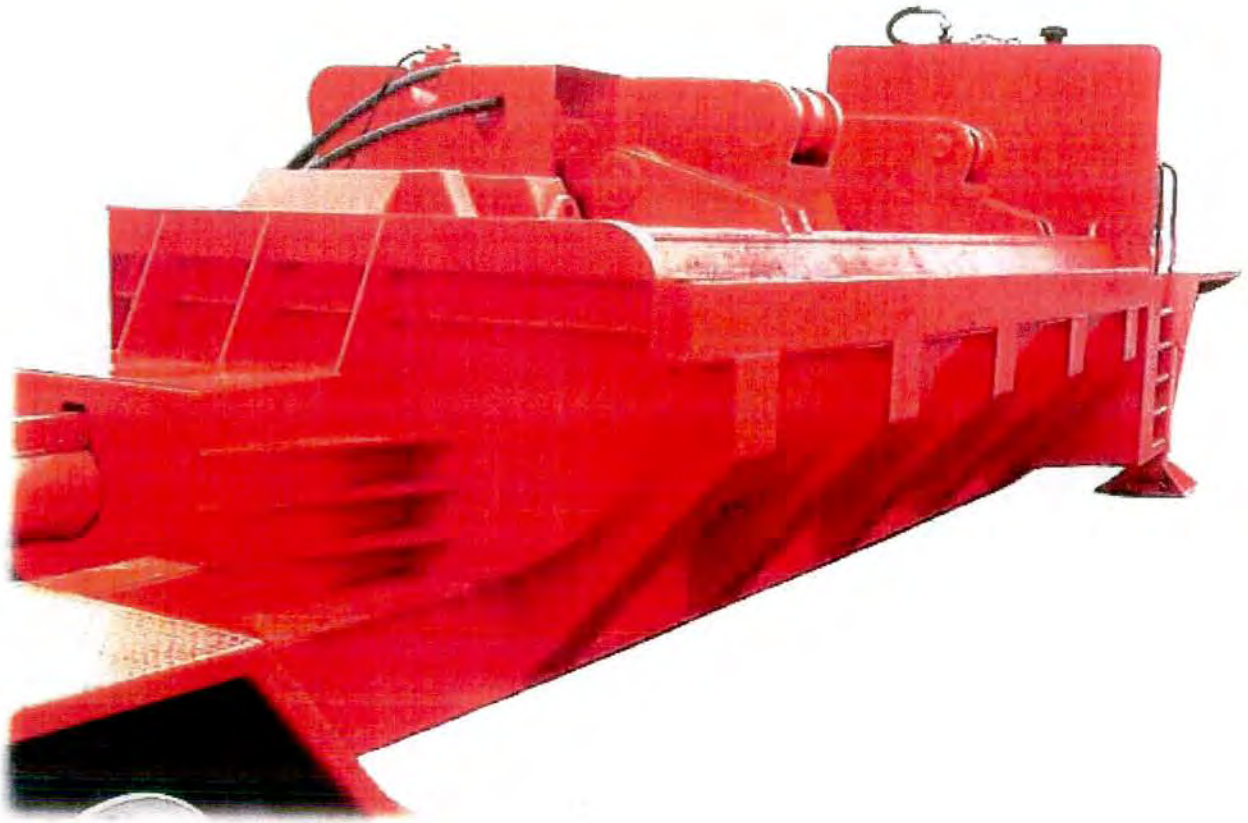
The Iron Pack Baler











Home | About Us | Product Line | Mobile Shear | Virtual Demonstration | Enviro-Rack | Material Handlers | Daewoo Equipment | Compact Equipment | Concrete Crushers | Grapples | Booms | Auto Flatteners | Balers | Guillotine Shear | Demolition | Lowboy Trailers | Used Equipment | Search

Iron Ax, Inc. P.O. Box 190 Wadley, GA 30477
(478) 252-0022 voice - (478) 252-9030 fax
E-mail us at: ironax@ironax.com

Send mail to **webmaster** with questions
or comments about this web site.
Information is subject to change without notice.

With crane : 314 000 $ US
Delivery delay : 4 months
Contact : John Kitchens

Stéphan Ferrero

De : "John Kitchens" <ironax@ironax.com>
À : <sferrero@pescaenvironnement.com>
Envoyé : 12 février 2004 12:45
Joindre : Baler (Master Copy).jpg
Objet : Iron Ax, Inc. (Iron Pack Baler)

S. Ferrero

Dear Mr. Ferrero:

Thank you for your interest in Iron Ax and our products.

The price of an Iron Pack Baler without the crane is $268,000.00 and with the crane is $314,000.00. All Iron Pack Balers have three axles.

The Iron Pack Baler is the most unique portable baler on the market today. This baler features programmable digital control pressure settings in 30 lb. increments that will allow bale densities that will easily meet your consumer's requirements whether you are logging automobiles and light metals or making #1 and #2 bundles for direct mill delivery.

Bale sizes are 25" x 40" x variable length. The unit is 102" wide and 47 ft. long. The overall weight without a crane is 75,000 lbs. The main ram and the lid both have 10" cylinders.

The baler is powered by a 200HP cummins engine and a 200GPM variable displacement hydraulic pump producing up to 4,350 lbs. of hydraulic pressure.

This unit features unitized construction in which the baler and the trailer are incorporated into one unit. It has a low center of gravity and low profile design and is built for interstate speeds.

The baling chamber is 20 ft. by 6 1/2 ft. and is manufactured with high strength steel featuring a hardox liner for durability. An environmental friendly design has oil catch pans that will catch any liquids that drain during the baling process.

All hinges and moving parts are located above the scrap rather than being in the bottom so they are protected from the dirt and grime that is created during baling.

The automatic cycle is operated by a small computer that allows the baler to go through the baling cycle and then return to the start position. This computer is a small modular unit (6 1/2" x 8 1/2" x 4"). This unit can easily be replaced by unplugging the wiring harness and plugging in a new one. This same control box contains the remote control receiver and automatic cycle unit. The remote control

can be powered by a 12 volt lighter receptacle. The baler can be operated either manually or with automatic cycle.

We offer the Iron Pack Baler with or without a crane. Other options include, but are not limited to, three axles, automatic lubrication system, and other power units besides Cummins. The cranes are self contained with there own power unit and feature an air conditioned and heated cab.

Please review the enclosed material and give us a call at 478-252-0022.

Sincerely,

John Kitchens
Iron Ax, Inc.
--
John Kitchens
Iron Ax, Inc.
ph. 478-252-0022
fax 478-252-9030
www.ironax.com

APPENDIX E

GENERAL LIST OF TOOLS AND EQUIPMENT

Type of Equipment/Tools
Electric and Hand Tools
Diesel Powered Welding Machine and Trailer
Welding Equipment
Safety Equipment
Cutting Equipment (For use with Oxygen and Propane)
5000watt Generator
Slings and Shackles
Small Compressor 2 HP Portable (For Impact Wrench Air Gun)
Various Gasoline Powered Tools
Acid Tester for Stainless Steel
Trailer for ATV
Nylon Bags and Wood Pallets for Packaging

APPENDIX F

Desgagnés Transarctik Inc.

Per ton of 1000 kg or 2.5 cubic metres

SEALIFT RATES - SEASON 2004

NUNAVIK EASTERN ARCTIC RESUPPLY OF DRY CARGO

MUNICIPALITES	Northbound rate per ton of 1,000 kg or 2.5 cubic meters	Northbound rate per 20 foot container per unit	Retrograde cargo per ton of 1,000 kg or 2.5 cubic meters	Retrograde cargo per 20 foot container per unit	Retrograde Empty containers per unit	Lateral (between 2 ports)
Akulivik	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Aupaluk	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Inukjuaq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Ivujivik	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Kangiqsualujjuaq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Kangiqsujuaq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Kangirsuk	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Kuujjuaq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Kuujuaraapik	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Puvirnituq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Quaqtaq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Salluit	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Tasijuaq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00
Umiujaq	$309.92	$4,774.00	$225.00	$2,700.00	$525.00	$240.00

PLEASE COMMUNICATE WITH OUR SALES DEPARTMENT FOR A LARGE SCALE PROJECT OR LARGE VOLUMES TO BE SHIPPED.

Rates are applied per metric ton of 1,000 kilograms or per 2.5 cubic meters, depending on which method produces the greater income per package.

Site delivery: $45.00 per metric ton of 1,000 kilograms or per 2.5 cubic meters, depending on which method produces the greater income per package, minimum charge: $60.00

RETROGRADE = BACKHAUL

Dangerous goods

In accordance with the rules and regulations concerning dangerous goods, which came into effect on August 15, 2002, Desgagnés Transarctik Inc. and/or Nunavut Sealink & Supply (NSSI) Inc. **will at no time, accept to transport dangerous goods** if the merchandise sent is not accompanied by the duly filled declaration. Maritime transportation is governed by the International Maritime Dangerous Goods code. Therefore, all shippers and/or suppliers sending dangerous goods via Desgagnés Transarctik Inc. and/or Nunavut Sealink & Supply (NSSI) Inc. must comply to this code.

RULE

The rule for the transportation of dangerous goods applies to handling the material, the request for transportation and/or all means of transportation for such dangerous goods. Transportation Canada's Inspectors may at any time request proof of compliance, confiscate or take samples and duplicate documents. Please be advised that any transportation company not complying with this rule will be liable to a fine of up to $50,000.00 for the first offence and $100,000.00 for a subsequent offence; Company Officials may also be liable of imprisonment for a period of 2 years. Moreover, the transportation company's licences for cargo handling may be revoked for 1 year.

TRAINING

Any person either handling, transporting or requesting transportation for dangerous goods must be adequately trained according to his/her functions, or be in the presence of, or under direct supervision of a person appropriately trained. The training must be updated and completed according to the rules and regulations, and to the employer's satisfaction.

ALL CONCERNED PARTIES' COMMON RESPONSIBILITIES

The shippers, transportation companies and packaging companies' common responsibilities are to ensure that all requirements are met and to refuse the handling of any non compliant cargo. It is also their responsibility to affix, remove and verify any danger indication, and keep in file for 2 years.

1

Information taken from **-The compliance Center Inc. - *Products and Services for Total Compliance.*** The transaltion of this document has been done by Desgagnés Transarctik Inc.

SHIPPER'S RESPONSIBILITIES

The shipper must:

- Classify, pack and identify the cargo
- Comply with the limits, special arrangements and exemptions
- Supply with the required notices/labels to be affixed
- Prepare shipping documents
- When required, record a contingency plan

Note:

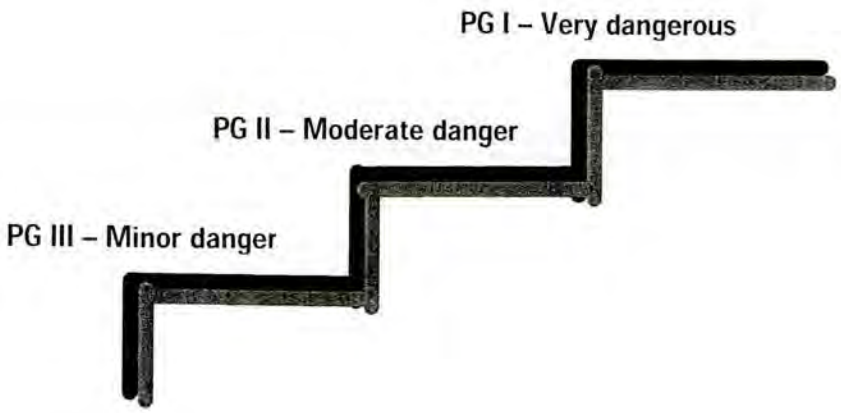
Consignees and importers returning dangerous goods take on the same responsibilities as a shipper.

DESCRIPTION OF SHIPMENT

A complete description must be included for each dangerous good according to its class, the UN group, the packaging group, the risk group along with the quantity.

PACKAGING GROUP

The packaging group (PG) is an indication of a product's level of danger and the type of handling and packaging required.



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Information taken from **-The compliance Center Inc. - *Products and Services for Total Compliance.*** The transaltion of this document has been done by Desgagnés Transarctik Inc.

UN» NUMBER

- The UN number is a 4 number code:
  - «UN» (United Nations) 0001-3999
- The identification number corresponds to an official transportation reference
-
  - Fuel UN 1203
  - Paint UN 1263

CLASS FOR DANGEROUS GOODS

CLASS 1 – EXPLOSIVES

CLASS 2 – GAZ

CLASS 3 –FLAMMABLE LIQUIDS

CLASS 4 –FLAMMABLE SOLIDS

CLASS 5 – COMBUSTIVE MATERIAL AND ORGANIC PEROXYDE

CLASS 6 – TOXIC AND INFECTIOUS SUBSTANCE

CLASS 7 – RADIOACTIVE SUBSTANCE

CLASS 8 – CORROSIVE SUBSTANCE

CLASS 9 – VARIOUS PRODUCTS, MATERIALS OR ORGANIMS

MARINE POLLUTANT

It is the Packaging Company's responsibiliy to know the marine pollutants' class number.

1

Information taken from **–The compliance Center Inc. - *Products and Services for Total Compliance.*** The transaltion of this document has been done by Desgagnés Transarctik Inc.

CHOICE OF THE EXACT DESIGNATION

The official transportation designation must appear in **CAPITAL LETTERS** on the dangerous goods list with an added official designation. For example: "Solution" or "Mix", "liquid" or "solid" if there is more than one possible phase, the technical name which must be a recognized technical name.

IDENTIFICATION SHEETS

The Identification Sheets must be provided by the manufacturer and each products must be provided with its own identification sheet according to its composition.

INDICATION FOR DANGER

The dimensions of the stickers and notices/labels must comply to regulations and resist for 3 months if submerged under sea, they must be visible and readable (no obstruction) and must also be affixed on a color contrast background.

DOCUMENTATION

A notification must be dully filled out, there is no pre-established format required, and may be IMDG English or French version, and must be submitted in 4 copies. One copy for the Shipper (2 years), one copy for the Ground Transportation Company, one copy for the Sealift Transportation Company and one copy for the Consignee.

REQUIRED INFORMATION

Shipper and Consignee's names and addresses along with the date. For each dangerous good, the number of packages and the total quantity per type of dangerous goods are to be indicated in metric measures. All is to be attested by the shipper or the person in charge of loading.

BACKHAUL (RETROGRADE) CARGO

Concerning Backhaul cargo (Cargo coming from the North), Desgagnés Transarctik Inc. and/or Nunavut Sealink & Supply (NSSI) Inc., are governed under the same regulation and unless a dully filled notification is included, **they will at no time supply transportation services for dangerous goods.**

For any additional information, kindly refer to Transportation Canada's website concerning dangerous goods at: www.tc.gc.ca, www.imo.org (International Maritime Organization) or www.thecompliancecenter.com

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APPENDIX G

TYPICAL WEIGHTS AND CONVERSION FACTORS

TYPE OF WASTE	WEIGHT (kg/unit)
Tire (car)	9
Tire (truck)	45
Battery (car)	18
Battery (truck)	24
Battery (snowmobile, four-wheeler)	4.5
Motor Vehicle Wreck (car)	1 250
Used Oil	1 litre = 0.89 kg
Antifreeze	1 litre = 1.11 kg
Refridgerator	100
Stove	90
Washer	120
Hot Water Tank	60

Conversion Factors

1 container = 8 feet x 8 feet x 20 feet = 1280 cubic feet = 36 cubic meters

1 lb = 0.453 kg

1 kg = 2.205 lb

1 metric ton = 2 205 lb

1 imperial ton = 2 000 lb

1 US gallon = 3.78 litres

1 lb of aluminum cans = 31 cans

1 imperial ton of aluminum cans = 62 000 cans

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