

These drill samples are stirring up 'Deep' feelings at Creighton Mine. Find out more on pages 8 and 9.



Communication Kelly Lake drilling continues helps Coleman recovery rate

t Coleman Mine they get it all. • Ore recovery last year at the mine averaged 95.3 per cent, and that's just about as close to all as possible.

In mining you can't go back and get what you left behind the first time.

So getting it right the first time is crucial to ore recovery. Once a stope is mined and backfilled it's usually both unsafe and uneconomical to try again.

Coleman Mine has found that communication, teamwork and creative thinking can make a big difference in ore recovery and reducing production costs.

"The engineering department, general foremen, supervisors and miners are open minded. They try things out, said datasolo driller Dave Berthelot.

"Because of that, we don't miss anything. We get all the ore," he added.

Chris Davis, chief mine geologist at Coleman, explained that in 1996 bulk mining recoveries at the mine were 78 per cent, meaning that 22 per cent of the total ore was not mined because of problems in knowledge of ore location, drilling and blasting techniques.

"This was a significant amount of copper and nickel pounds. Our usual goal for recovery is 90 per cent, which is what the bulk mining method can typically recover,¹ Chris said.

"This low recovery resulted in three additional stopes having to be mined to make our one of the continuing goals for this mine as it equates to a significant increase in mine life and employment," Chris said.

Geologists and engineers are working more closely with the miners.

That's resulted in better planning, layouts of orebodies and more ore coming out of the mine.

Mine planning engineer Louis-Pierre Gagnon explained that during the last six months significant understanding was gained and improvements were made with respect to the mining method.

"A very impressive datacollecting program was put together including gyroing of production holes (to provide more accurate location information), blast monitoring, fragmentation analysis and cavity surveys," Louis-Pierre said.

"This program has given some clues on how problems can be solved. The introduction of bulk emulsion, additional blasting cap periods, surface connectors and better tracking and scheduling of mining activities were also significant factors in the improvements," added Louis-Pierre.

Coleman Mine has also improved the accuracy of its blasting holes and blasting techniques.

Miners slash the bottom sills of a stope ensuring blasting breaks to the edges of a proposed stope. Chris explained, "If the bottom edge of the stope doesn't break you can't go back for it later because it will be filled with sand.



Exploration beneath Kelly Lake near the Copper Cliff South Mine shaft is yielding some encouraging results. Samples near the 900-foot level going down to 5,000 feet below surface show promising drill core results, report the experts with Inco Technical Services. Area geologist Wayne Garland says the Kelly Lake extension, accessible through the existing workings of South Mine, may represent a significant part of Inco's future operations in the Sudbury region. The Ontario Division exploration program concentrates on the search for potential new sources of high grade ore, preferably at shallow depths or adjacent to current

planned production in 1996."

But Coleman people found a way to improve on the situation greatly last year.

"In 1997 our recovery was 95.3 per cent – an increase of 17.3 per cent from 1996."

The improvement was achieved through teamwork - focusing operations, engineering and geology on the goal of increased ore recovery, he said.

"Many important things are being done now that were not done in previous years. Maintaining this increase is

hemists and analytical experts in the Central Process Technoloay lab have found a way to analyze more mill material for half the cost while improving safety and efficiency.

Process Technology's analysis of nickel, copper and other components of material from Clarabelle Mill is also being done more quickly.

Roger Delvecchio, analytical section leader in Process Technology, said "our former method of analysis for Clarabelle Mill was kind of slow and was more labor-intensive."

The old method, called

atomic absorption/combustion analysis, analyzed copper, nickel and sulphur and required two people a day to do the work.

The new method, called sodium peroxide fusion/Inductively Coupled Plasma (ICP) spectrometry, can analyze up to 35 elements.

The new method currently analyzes nickel, copper, sulphur, iron, cobalt, magnesium and silica for the mill and requires only one person a day to do the work.

Not only does the new method require one less person, it also takes less time to

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Lab changes save cash and time

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infrastructure, which may be developed and mined at low cost. Read more about Kelly Lake on page 4.

Voisey's Bay – a study in environmental planning for Canada's mining industry



Baseline studies determine how an industrial operation affects the flora and fauna in the area. Environmental efforts at Voisey's Bay are considered among the most comprehensive conducted anywhere.

I t's really only a speck on the landscape — a dot in the vast, formidable Labrador wilderness, considered so harsh and forbidding that the North Coast of Labrador was described by 15th century European explorers as: "The land God gave Cain."

Yet the Voisey's Bay site, four kilometres long and a few hundred metres wide, has triggered the most extensive environmental baseline survey in mining history. There are huge quantities of nickel, copper and cobalt below the surface. But first, the land and its people must be understood before the mining begins. And the environment, for all its rugged qualities, is fragile. "As a matter of fact, we're still seeing the consequences of the last ice age," says Bill Napier, Vice-President of Environmental Health and Safety for Voisey's Bay Nickel Company Limited (VBNC). "The land is starting to spring back up. Rock chips laid by people 6,000 years ago are still there. This is not like areas where, after 10 or 12 years as a campground, the land grows up again."

centration of caribou in the world. The caribou share the land with wolves, black bears and arctic mammals. Fish such as Arctic charr and salmon swim in pristine streams and rivers and seals and whales inhabit the coastal waters. Delicate arctic plants and fauna flourish in the brief Arctic summer — all are part of the Labrador landscape. For hundreds of generations, the land has also been home to some of the hardiest peoples on earth — the Labrador Innu ind Inuit. Accommodating the land and its people is the first priority for the Voisey's Bay Nickel Company, a wholly-owned subsidiary of Inco Limited. By early next century, when Voisey's Bay will begin to yield the first of its millions of pounds of nickel, copper and cobalt, four years of careful environmental research will be complete. Before mining can begin, an independent panel appointed by the federal and provincial governments and the Labrador Innu and Inuit must review the VBNC's plans for the development of the mine/mill project at Voisey's Bay. Inco and VBNC spent about \$15 million preparing an Environmental Impact Statement (EIS). Teams of scientists worked with VBNC personnel and Aboriginal representatives to examine everything from archaeological sites to the habits of the caribou, black bear and Arctic charr. They studied water chemistry, marine, plant and bird life, habits of seals and whales and ice patterns. At one point in the summer of 1996 there were 300 people studying environmental issues around the Voisey's Bay site.

The research efforts are impressive. Caribou and bear were tracked with satellite collars to determine their exact movements and migration patterns. Radio transmitters were inserted into Arctic charr so their movements could be tracked. Archaeological sites were inspected and marked by teams consisting mostly of Aboriginals from the area. Bevin LeDrew, VBNC's manager for the mine/mill environmental assessment, says that "you have to have a pretty good understanding of your backyard before you can begin an environmental assessment and that involves anything from overturning stones and looking at what's under the stones, to finding out where people hunt and fish." Since 1995, when VBNC began documenting the environment in the area of Voisey's Bay, 35 environmental baseline studies have been completed.

The Environmental Assessment Panel released the guidelines for the environmental assessment of the project in June, 1997 and VBNC submitted its EIS to the Panel in mid-December, 1997. "This is a major milestone for the



Part of the excitement of Voisey's Bay is the magnitude of the discovery. Extensive exploration as well as environmental studies has taken place at the site.

project," said Bill. "Our determination is to have Voisey's Bay as the prime example of how to develop a mining operation into the next century. That means considering every means of environmental protection in co-operation and consultation with our neighbors, the residents of nearby communities."

At the exploration campsite, great care is taken to protect the environment. The exploration workforce, often working in extreme weather conditions where the wind chill reaches -70 degrees in winter, are instructed to use the environment carefully. Each receives an orientation booklet which emphasizes such points as hunting and fishing is forbidden. "We're under the microscope as far as environmental protection is concerned," Bill says. "Everything we do is closely scrutinized." Basically, he says, there is no disturbance of the environment.

Once the mine is up and running, it will be self-contained which will also help to reduce effects on the environment and the Aboriginal way of life. The purpose of the ambitious environmental studies program at Voisey's Bay, says Bill, is to address issues before they become problems.



Fish such as Arctic charr and salmon swim in pristine streams and rivers

Labrador has a diverse mix of wildlife and vegetation. For example, the George River Caribou Herd, which roams widely through Labrador, is estimated at about 800,000 animals and is the largest conand seals and whales inhabit the coastal waters of Labrador. As part of the extensive environmental impact studies at Voisey's Bay, radio transmitters were inserted into Arctic charr to track their movements.

Improved recoveries keep costs down



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And it won't be economical." Communication has been a key to the overall improvement in ore recovery.

Increasing awareness among all employees of the importance of achieving the highest ore recovery possible has focused the workforce.

"We've had meetings with the crews underground and shown them what happened in a stope they've mined. We also ask for input on how to improve," Chris said.

And it's working.

"Everybody wants to do a good job."

Dave described what he does as a driller to do a good job every day.

"We drill wall slashes. We used to try to take the ore from above. But now we take out the remaining ore from the past stope to the stope we're currently working on. So we don't miss anything in between."

The new technique not only improves recovery but has meant less wear and tear on equipment.

"It's easier on equipment, especially scoops on remote," Dave said. "Before scoops were burning off tires trying to muck uphill. And that was harder on the bucket."

The current method of mining the walls of stopes leaves mine floors relatively level and flat.

Jody Leveille, also a datasolodriller, said improved drilling accuracy to create blasting holes is a result of better orebody layouts and teamwork among geologists, engineers and miners.

"The engineers and geologists are giving us excellent plans and layouts. And they're listening to us. That's very important," Jody said. "If you're right on with yourholes, then you cut down on the big chunks of ore. Smaller chunks are easier to muck and crush. It saves money," he explained.

The increase in the amount of teamwork is noticed by employees in many different jobs at Coleman Mine, said **Tracy Miller**, an underground truck driver.

"I think everybody works together well."

Norm Jones, a foreman at Coleman, said "hourly and staff people have shown good cooperation."

Some of that cooperation is due to simply having people meet and talk regularly about how work is progressing and how to improve.

Acting general foreman Marcel Demers said threemonth planning meetings with all foremen, planners and general foremen augmented by weekly short-term meetings, to make sure everything is going to plan, have helped keep everyone focused.

Recovery improvement has been so significant that Marcel said he knows the communication among employees coupled with improved drilling and blasting methods will continue to maintain, if not improve, ore recovery this year.

"There had been a lot of loss of production due to muck being left behind. But since we started slashing out the bottoms of the vertical retreat stopes to make them wider, we've improved recovery."

Mine superintendent Terry VanKempen said the importance of improved recovery can't be underestimated.

"It's part of core business. If we can get additional recovery that's the biggest thing we can do to keep our costs down."

This Datamine drawing from Coleman depicts the challenge the mine overcame. "The lines around the rendered stope show what should have been recovered," said chief mine geologist Chris Davis. "As you can see not much was recovered. This is what we have fixed."



'Recoveries in 1997 increased to 95.3 per cent of







available ore at Coleman Mine, up from 78.4 per cent in 1996. Here are some of the factors that contributed to that success story:

 Increased awareness by all mining personnel of the significance of recovery rates.

· Bottom-sill slashing.

Gyro surveys and three-ring plots of production
holes showing true hole locations.

Improved blasting techniques.

 Detailed cavity surveys and calculations following production.

 Education through presentations of stope results to mining personnel.

 Surveying or measuring location of muck slide nearing stope completion.

 Improved communication between all departments involved in stope planning, geology, blasting and mucking.

Production hole accuracy initiatives.

 Mining of additional opportunity ore that was not part of mineral reserve inventory for various stopes.



Marcel Demers

Norm Jones

Chris Davis

Dave Berthelot



Tracy Miller





Jody Leveille

Kelly Lake drilling yields rich results

t's sort of like drilling un- 🛛 🕷 derwater, but no one gets wet.

And no scuba gear is required either.

In this case, the exploration drilling is occurring under the waterbody of Kelly Lake in Sudbury.

The drilling is somewhat more unusual than most operations, but the eventual mining of it won't be any more difficult.

It will, however, be quite rewarding.

Samples near the 900-foot level going down to 5,000 feet below surface show promising drill core results, report the experts with Inco Technical Services.

"It has above average nickel, copper and precious metals values compared to most mines," said Bob Martindale, manager of Exploration of the Sudbury Basin with Inco Technical Services.

Grades under Kelly Lake vary from one to 2.8 per cent copper and one to 2.2 per cent nickel, with high concentrations of platinum-group metals and gold.

Once exploration of the Kelly Lake orebody is done, it could be mined as an extension of South Mine operations.

But the exploration drilling, being done on contract to Inco by Boart Longyear Inc., is a bit different.

Two drilling stations are set up on the south shore of the lake, just outside Copper Cliff

Rather than attempt to drill from the surface of the frozen lake and incur the unpredictable problems posed by warming and cooling during winter months, the drills are working from the shore on solid ground.

"That's one of the challenges of this orebody," said Gord Morrison, senior geologist with Inco Technical Services.

But drilling from each site continues to show the promise of the Kelly Lake orebody.

"It's the next biggest step in South Mine's future, depending on what the Division decides," explained Wayne Garland, area geologist with Inco Technical Services.

Wayne said the consistency of the mineralization is what's so striking about it.

Boart Longyear's Claude Prevost, drill runner, and Inco's Wayne Garland check how the drilling equipment is doing on a cold January morning.

"And the deeper we go the better it aets."

Not only does the orebody get richer as drilling goes on, but of equal importance is the fact that the orebody starts near the surface, in this case the floor of the lake.

The orebody comes right up to the lake bed," Wayne said.

Gord points out that all of the ore would not be removed when mining does start.

"We can't mine the lake bed. We have to leave a crown pillar."

Bob said the richness of the orebody and its size could provide many years of mining.

"This is exciting because we're still establishing the size of this orebody."

But it's too early to talk tonnage, the exploration experts said.

In fact, the history of Kelly Lake exploration is fairly recent itself.

Bore hole geophysics was done in 1992 when a sulphide body, or mineralization was indicated through the use of

electric current in a one kilometre square wire loop. Sulphides are good conductors, so the fact an anomaly was detected suggested significant mineralization, Bob explained.

Follow-up diamond drilling commenced in 1994 and has continued ever since.

Wayne said, "I don't think the extent and significance was fully appreciated until recent years.

Work at Kelly Lake continues rain or shine, hot or cold, as any of the drillers can attest.

"It was a cold one this morning," said Claude Prevost, a drill runner with Boart Longyear. But the frosty lanuary days, with temperatures down around -27 C, only managed to slow down the start-up of the drill. Work presses on.

One day Kelly Lake will be an active mine site representing a significant part of production at South Mine.

But, Gord added, precisely when that mining will start at Kelly Lake is not up to his department of Inco.

We only take it to a certain level. Then we pass it on to the Ontario Division to acquire the detailed information necessary before deciding if, when and how they

will mine it."

That point is fast approaching, with surface exploration work expected to be wrapped up later this year. Then another chapter in the future of the Ontario Division will be ready to begin.





Getting to know the neighbors



Inco has put up sound barriers and adapted some operations to reduce industrial noise from the Oxygen Plant. Long-time Little Italy resident and Inco pensioner Rolly Veccia of Milan Street said he knows living in Little Italy means having some noise in the area but he's pleased inco listens to and addresses the concerns of its residential neighbors. Rolly was one of several people to tour the Oxygen Plant following a community meeting earlier this month.

"It's the next biggest step in South Mine's future, depending on what the Division decides," explained Wayne Garland, area geologist with Inco Technical Services. "We've had eight holes drilled from this one station," he said, noting that inco is making the most of exploration work at Kelly Lake. Another drilling station is set up a stone's throw away.

Savings snowball from improved analyses



Bob O'Daiskey, senior analyst, performs an assay for Clarabelle Mill as senior analytical section leader Roger Delvecchio looks on.

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get results, Roger said. "It takes two hours less a

day."

That's helped reduce costs and better serve customers, in this case Clarabelle. It has also helped Process Technology deal with the attrition of staff, said chief chemist John Bozic.

"This will help us deal with our attrition since three people have recently left."

Roger said, "We're always

looking to improve our methods – but especially now with people retiring."

Satisfying customers is the priority, Roger added. "The main thing is we're

giving Clarabelle more analysis to help them monitor their milling process."

There are other elements of cost savings associated with the new method of analysis.

"We're saving on analysis consumables (used in the former method) that were used to hold the samples," said chemist Carmen Flora. Roger said the savings don't-stop there.

"There's also been some time savings at Clarabelle Mill because they get daily analysis of cobalt and iron. So they can adjust their process accordingly."

Andy Kerr, superintendent of Process Technology in the mills, said the new method of analysis has been a very good initiative on the part of



Chemist Carmen Flora checks the ICP atomic spectrometer. "We're saving on analysis consumables that were used to hold samples."

the central lab.

Receiving more information from the Process Technology lab will have a positive impact on costs at Clarabelle Mill and in the Ontario Division, said Andy.

"Now we get more information. Our product at Clarabelle has a significant impact on our customer, which is the Smelter."

Having to wait three days for additional assays, of magnesium oxide for example, under the old system wasn't nearly as efficient as the new system.

"Now we get it the same day as the other assays. Now we get a full spectrum of assays. It'll save us a lot of additional work," he said.

The new method of analysis has caused a positive chain reaction in the Division's process.

Clarabelle can now give the Smelter better information on the feed it is receiving, Andy explained. "That helps them to be more efficient in their smelting process. The bottom line is it saves money."

Safety has also been enhanced by the new analytical method, said Carmen.

"Because of the new process, hydrofluoric acid is no longer needed. It's a hazardous substance that we don't have to handle any more. So we've improved safety in that regard."

'Keeping track' key to cutting liner costs



all areas of the mine's muck (ore) circuit, including loading pockets, skips, discharge and feeder stations and crushers. Made of steel, the plates protect the equipment they are lining by absorbing the wear and tear of the muck flow.

As the plates wear out, new ones are installed and the equipment beneath the plates remains unscathed. Monitoring liner plate usage allows the mine to practice preventive maintenance and eliminotes the costs incurred by downtime for unscheduled repairs. The liner plate management system at Coleman was implemented after a survey of the yard crew, mechanics, foremen and warehouse and purchasing personnel to quantify the amount of time and energy spent on liners required for the mine.

muck for end users.

The computer program has allowed Coleman to minimize liner plate inventory, analyze pertinent wear data, predict liner plate replacements, track in-house inventory and test liners accurately.

As data has been collected, the mine has been able to establish how many tons of muck have passed over a specific liner in any piece of equipment. With this information, Bob said the computer program can predict when a liner will reach 80 per cent of its life expectancy. In addition to maximizing usage, cost savings are also derived from not having to keep spare parts available.

"I don't have to keep inventory on hand, which saves a lot of dollars. And I don't have to find it in the snow."

Another benefit of the liner plate management system is the fact that it is based on the same computer program used by suppliers.

"The people I buy liners

As the management system for liner plates, using a computer program called Steelwear, becomes more widely used, Coleman maintenance supervisor Bob Simard said he expects the cost savings to increase.

oleman Mine is maximizing the use of liner plates and anticipating when replacements will be needed by carefully tracking their use and maintenance.

As the management system, using a computer program called Steelwear, becomes more widely used, Coleman maintenance supervisor **Bob Simard** said he expects the cost savings to increase.

"For each piece of equipment the computer program tells you how much ore has been through it. The part of the program that helps me the most is the tracking of cost per ton. That way I know where we stand."

The management system in use at Coleman is a simple matter of "plotting the dots," as Inco's Quality senior advisor Joe Dippong is fond of pointing out.

"When you track exactly what you're using you can control costs much more effectively," Bob said.

The liner plates are used in

The survey showed problems involving costs, excessive delivery time, quality and selection.

A team of Coleman employees and suppliers set out to solve the problems.

A system was set up that utilized the computer program to perform data collection, store a complete set of drawings, predict when liners needed replacing and track the cost of liners per ton of This allows the mine to monitor liner performance as well.

The management program takes the guesswork out of monitoring equipment.

"We're able to view all of our equipment," said Bob.

And that's no small inventory. In all, the program stores information on 1,700 liner plates used at Coleman.

Keeping track of all that information is starting to pay off, Bob added.

"It's worth the time to track the wear on liners. I'm getting to the point where I can predict exactly when each liner is going to wear out. So I can order a replacement in time, while making the maximum use of each liner." So I can order what I need and get it quickly from them."

Frank Catalano, area maintenance engineer at the Levack Complex (including Coleman), said what's happening with liner plate management is a sign of things to come.

"In fact, the liner program is part of a bigger preventive, predictive maintenance program. We want to reduce our costs while trying to maximize the life of components, change those components before they fail and develop data on the components," Frank said.

Tracking the wear on scooptrams and hoisting equipment are two good examples of how the system can be applied elsewhere in mining.

Injured employees welcome production jobs



Mike Paquette, a new sampler in Matte Processing, removes a pulverizer from a shaker as part of a sample preparation. "Learning the process of sampler will be interesting. It won't be boring," said the recently redeployed PPD employee.

t's good to start over again at this point in my career," said 29-year Inco veteran Ray Ranger.

As a Permanently Partially Disabled (PPD) employee, Ray thought his days of working in a production job were over.

"I never thought that I would again," said Ray, who has worked as a cleaner at the Nickel Refinery since a back injury took him out of Frood Mine eight years ago after 20 years underground.

"Iloved underground work. I used to be a bonus miner."

With his back injury, various physical tasks were impossible for him for a few years, he said. And he missed being in the production part of Inco.

Now, as part of an Ontario Division initiative to make better use of PPDs at work, Ray is back in production.

"Now I[†]m at the other end of production in Matte Processing at the Smelter as a sam-



Bill Flora

doing something productive." Mike said learning the process of sampling will be interesting as he is trained in his new job.

"Ánd it won't be boring." Matte Processing supervisor Bill Flora said Mike and making sure they aren't doing more than they can physically handle."

Bill also noted that in the Matte Processing Department there has been an extra benefit for the company.

"We had many experienced people retire after the last collective agreement was settled."

So the retraining of PPDs, most of whom have a lot of experience at Inco, has proven to be an effective way to replace the experience that has recently gone out the door.

Dennis White is another example of an experienced Incoemployee glad to be transferred from janitorial work and returned to the production mainstream.

Dennis had been on modified work for several years after a back injury sustained while working underground.

Now he's returned to mining, this time at Creighton Mine. "I'm getting to like it again. It's more gratifying. You feel like you're doing something productive," Dennis said.

"It's a job I can handle now. Before I couldn't sit down for any lengthy amount of time. But now it's pretty good."

Dennis said he also prefers the 12-hour schedule of his new hoistman's job.

"You get more days off."

Training for the new position was especially important given the responsibility of a hoistman, who controls the cage moving miners from level to level.

"There's a lot of responsibility. I'm getting quite used to it. It's an important job."

Moving PPDs into "important jobs" is what the transfer initiative is all about in the Ontario Division.

Berno Wenzl, maintenance superintendent at the Copper Refinery, said work is no longer going to be created for people who are PPDs, because there's no need.

"We're not making accommodated jobs anymore. Now our PPDs are doing regular jobs. They're doing higher, value-added jobs.

"If someone can't do the bending and lifting of many jobs we can have them writing procedures, ordering material, planning jobs, small repairs and preventive maintenance inspections," he said.

"That way they still use the knowledge of their trades."

Moe Bertrand, contracting out coordinator, said having people with disabilities doing more production-oriented work just makes sense.

"Now they are participating in the day-to-day production of nickel and copper. They're in less physically-demanding work, but of more value."

Ray Ranger weighs a slurry sample on a topload balance to determine the solids content. After mining for 20 years at Frood Mine, Ray said he's glad to be back in production instead of on cleaning duties. "It's good to start over again at this



pler. I've always wanted to see the Smelter and how it operates. When you work underground you hear about the Smelter but you don't go there. So it was nice to get this new job."

Mike Paquette, who also became a sampler at Matte Processing early in the new year, is also glad to be back in production work.

The former Levack miner had been a blaster boss, driller and cagetender until he injured his back and became a janitor.

"It was boring," Mike said bluntly.

"It was a dead-end job. Plus, I used to make big bucks on bonus."

Getting back to a production-related job was important to him as well.

"I wanted to get back to

Ray "were ripe for a change."

The two men represent how channeling PPDs into production work is good for Inco and good for the people involved.

"They were on janitorial duty and they found it boring. They wanted to do something with more meaning," Bill said.

"The potential is there in our PPD pool of employees for them to do more production work to get them back into the mainstream jobs producing copper and nickel-that's what it's all about."

Bill said the PPDs provide a more value-added service to Inco while doing more interesting work.

Financially it's generally better for the employees as well, he added.

"The money is on par or better than what they were making before. And we're point in my career," said the 29-year inco employee.



Dennis White, now a hoistman at Creighton Mine, is another example of an experienced Inco employee glad to be transferred from janitorial work and returned to mainstream production.

'Bullseye' helps unblock ore pass



"We set up the drill the way we were supposed to and we hit it," said South Mine diamond driller Terry Vincent, with some modesty.

't was like finding a needle in a haystack. But luck wasn't a factor in the recent drilling half for two weeks. and blasting of a chunk

of rock that had blocked a South Mine ore pass and cut its production in "We set up the drill the way we were supposed to and we hit the rock chunk," said South Mine diamond driller Terry Vincent, with some modesty.

'It was good planning by the engineers and everybody else. We just did our job," said the 28-year Inco employee.

The chunk had fallen off the wall of the ore pass itself, where the ore is stored before transport to surface for milling and smelting. The rock chunk was large enough to block the passage of about 25,000 tons of ore for two weeks in the last quarter of 1997.

"Time was the issue." said Gerry Lafantasie, operations general foreman.

"It's our main ore pass. Plus the grade in that pass is really high, so it was oxidizing and oxidized ore can't be fully recovered in the milling process."

Each South Mine team member credits others for the success. But

all contributed to clearing up the productioncrippling problem.

Steve Ball, Denis Fournier and Bill Cyr are the supervisors who made it happen," Gerry said.

He was quick to add that diamond drillers Dan Brisson, Serge Dupuis, Don Pullen and Terry deserve much praise for the successful drilling and blasting of the chunk.

Once we had the measurements it was easy," said Paul Rantala, a planner at South Mine.

"We got good information from Gerry. He and Denis put up a helium balloon, which gave us an exact measurement of the hangup."

It took 20 pounds of explosives to free up the ore pass, said shift boss Steve Ball.

"When it blasted we heard a 20-second rumble and it was open."

South Mine superintendent Len Van Eyk



The 182 feet of drilling done from the 3,600 level to the rock chunk holding back 20 tons of ore was cut by a drill bit like this one. "It was like finding a needle in a hay stack," said Len Van Eyk, superintendent of South Mine.

said he was impressed by the efficiency of his team.

The chunk was difficult to access, Len said. "Nothing we tried

from below it could hit it.'

So drilling from another level to the ore pass was determined to be the best way to proceed.

But drilling from a ramp on the mine's 3,600-foot level, 182 feet through hard rock to the ore pass, seemed a difficult job to complete quickly.

"I was hoping they would just hit the ore pass, let alone the chunk itself," said Len. "The chance of hitting the chunk of rock was remote.

"But all of their calculations were 100 per cent and they drilled it perfectly right into the chunk. It was like finding a needle in a havstack."

Others who played key roles in the work included surveyors Orio Gregorini and Bob Dubnewych, geologist Phil Dawson, engineering supervisor George Darling and Frank St. Cyr, an engineer-intraining.







Mineguard is applied quickly and easily through a hose and spraygun. It has an application rate of 1,500 square feet per

A measuring tape is used to provide scale to this photo of a Mineguard-coated rock face. "One of the advantages of Mineguard is it allows you to see the geological structure of the rock and how it's behaving, while still providing support," said Samantha Espley of Mines Research. "Shotcrete, on the other hand, tends to mask everything."

new type of ground support may sweep through the Ontario Division in years to come. Mineguard, a product

of the Mining Industry Research Organization of Canada, has been successfully tested at several mines including North, South, McCreedy East. Coleman and Crean Hill. "I can see it being used Division-wide one day," said Samantha Espley,

neer in Inco's Mines Research Department. She and technical specialist Ken Zeitz, also of Mines Research, have been testing the new form of ground support. So far, the results look very promising.

a rock mechanics engi-

'This is more elastic than shotcrete. Shotcrete is more brittle. Mineguard will stretch," she said.

Mineguard, a two-

component plastic which is sprayed on mine walls in a manner similar to shotcrete, can withstand more movement than shotcrete without cracking.

But shotcrete, which is essentially concrete applied by air pressure, will still have an important role in ground support when and if Mineguard becomes commonly used.

"Shotcrete still has

more blast resistance than Mineguard," said Samantha. "So shotcrete still has a place in the future of ground support."

Shotcrete would continue to be used in areas of more severe blasting blowback, she said.

Minequard is best used in blast-hole mining, rather than vertical retreat mining.

Other than Mineguard's elastic

strength, the new ground support goes on faster, dries faster and costs less than shotcreting.

'The biggest aim is to safely speed up development. Minequard is 200 per cent faster to apply than shotcrete," said Samantha.

At an application rate of 1,500 square feet per hour, Ken said the time saved spraying on Minequard can be used for development and mining activity.

"Thirty seconds after you spray Minequard on it's ready. Shotcrete takes 16 hours before you can blast against it.'

After Mineguard is sprayed on, there's virtually nothing else to be done except to start blasting work, he said.

"There's no clean-up time – unlike with shotcrete."

Mineguard can also be used as a ventilation barricade, being doubly handy because it goes up fast.

The Mineguard testing has been especially interesting to Samantha because she is basing a masters thesis on it at Laurentian University.

Samantha said using Mineguard commonly throughout the Division has the potential of accelerating the drill, blast and muck cycles of mining operations.

Creighton Deep project receives ']



This computer-generated drawing shows a three-dimensional likeness of the Creighton Deep orebody. Results to date have shown a very impressive average grade of six per cent combined copper-nickel.

You might say the ore at Creighton Mine makes the grade.

But that would be a considerable understatement.

The 7.7 million tons of ore between 7,400 and 8,500 feet below surface averages six per cent combined copper and nickel content at what the miners call "Creichton Doon"

"Creighton Deep." And going deep at Creighton Mine is paying off. drilling we discovered 1.7 million tons of highgrade ore in the last year alone.

"It's a six per cent combined grade, compared to three-and-ahalf per cent at the rest of the mine."

The six per cent combined copper-nickel grade is an average, geologist **Mike Dudar** is quick to point out during a tour of the high grade areas.

"Every mine has its jewel box, where the ore sure the mining is on line and on grade," said surveyor **Ken Tellier**.

He uses a Laser Total Station 7,450 feet below surface at Creighton Deep to measure distance and bearings and to help accurately orient ramps and drifts to access the orebody.

The survey lines help guide drillers to the most cost-effective path of mining the high-grade orebody.

Information from Ken is used by jumbo drillers such as **Bob Lafortune** who has recently been working at the 7,450-foot level in a ramp heading to 7,530 feet below surface. "We're at the deepest point here."

mond driller **James** Niemi.

Plans to mine at that level are not in the immediate offing. Going deep means more challenges in mine ventilation and ground support as natural heat and rock pressure build the deeper you go.

But mining at Creighton will certainly go deeper than it already is to get the high grade ore to surface safely and cost-effectively



"The softer it is the better the grade. Around here you can break it easily in your hand," commented scooptram operator **Hugh Duncan**, as he snapped a piece of shiny ore between his thumb and forefinger.

"I've worked at this depth before (with other mining companies) but not with this grade," Hugh observed during a break at the 7,400-foot level of Creighton Mine.

"What we're looking at, from 7,400 down, is our future," said Creighton's chief mine geologist **Don MacKenzie**. "As Creighton people go deeper we are being pleasantly surprised. Through exploration grades go higher than the average. Some of our jewel boxes are 12 per cent," Mike said with pride.

The 7.7 million tons of high-grade ore at Creighton Deep represents a shiny future – one whose lustre will grow as nickel prices rebound from their current low levels.

The 7.7 million tons represents 15 to 20 years of mining activity, not to mention the 21 million tons in total at Creighton Mine.

Safely and cost-effectively mining the high grade, as in any Inco mine, requires people with many different skills.

"My role is to make

Bob is not exaggerating.

In fact, this point is the deepest active mining area in the entire world among mines employing bulk mining methods.

Reaching 7,530 feet below surface will be a unique mining achievement in the Ontario Division.

But those working at Creighton Deep are looking beyond that.

"I'm coring down to 8,800 feet," said dia-

trvciy.

"We found 300 feet of massive ore around 7,900 feet," James pointed out.

"And it's reachable," he added with confidence.

James has seen firsthand the promise of what lies below the 7,400-foot level where he does his drilling.

That promise shows itself firstly in the form of black water.

Diamond drills use water to force drill cuttings out the top of the drill hole.

When the drill is in high grade ore the flushings turn the water black and there's been quite a bit of black water at Creighton lately, James said.

Geologist Mike Dudar discusses drilling progress wireach 7,530 feet below surface.



Diamond driller James Niemi knows Creighton Deep future ahead of it because of sample boxes like this drill core samples shine like nickel – and with good r found 300 feet of massive ore at a depth of around 7

gh grades' from mine employees



"This is 7,450. We're at the deepest point here," said Creighton Mine jumbo drill operator Bob Lafortune. That's no exaggeration. In fact, this point is the deepest active mining area of the entire bulk mining world. It also boasts some of the Division's richest ore, with an average coppernickel combined grade of six per cent.



Geologist Mike Dudar holds up a particularly valuable drill core sample. "This is what pays our wages."



Surveyor Ken Tellier uses a Laser Total Station 7,450 feet below surface at Creighton Deep to make sure the mining is "on line" and "on

grade." The surveying station tells him





nbo driller Bob Lafortune. Bob is working in a ramp that will soon



long he "We feet."

If you think reaching 7,530 feet below surface will be an achievement in mining, the people of Creighton Deep will seem very ambitious. "I'm coring down to 8,800 feet," said diamond driller James Niemi.

"The softer it is the better the grade. Around here you can break it easily in your hand," commented scooptram operator Hugh Duncan (inset), as he snapped a piece of shiny ore between his thumb and forefinger.

Inco expertise played key role as SNO



John Lappa of the Sudbury Star chats with Neil Tanner of Oxford University beneath the recently finished acrylic vessel. The vessel, which will hold 1,000 tonnes of heavy water, is the largest of its kind in the world.

Surrounded by scientists and caught up in a media throng, the most proud individual on the last 'public' visit to the Sudbury Neutrino Observatory site was an Inco miner.

Danny Lavigne, general foreman of operations at Creighton Mine, was involved with the underground project from "day one." But he hadn't

b e e n back to the site since a m e d i a t o u r when the l a s t shovel of rock was removed. In his time on t h e



project, Danny **Danny Lavigne** Inco's geomechanics people."

More than seven years after construction began in 1990, the observatory hopes to soon begin answering some of the most puzzling and potentially most important questions in the fields of physics and astrophysics.

The acrylic sphere, filled with heavy water, is surrounded by a metal geodesic sphere with 10,000 light sensors capable of sensing a candle burning on the moon or the flash of fireflies 6.5 kilometres away.

The geodesic sphere and the remainder of the cavern outside the acrylic sphere will be immersed in ultra-pure normal water.

Neutrinos are the most abundant particle in the universe with the ability to penetrate virtually everything. The heavy water, which weighs about 10 per cent more than regular water, has an added neutron, which significantly enhances the chances of a neutrino 'collision'. A collision causes a flash of light which is detected by the light sensors. The light sensors are wired to observatory computers enabling scientists to monitor the size, direction and types of neutrinos.

"Along with electrons and quarks, neutrinos are the particles we don't know how to subdivide," said McDonald. "The scientific work being done here is regarded as providing answers to some of the most important questions about our universe both on a microscopic level and on its largest scale. The international scientific community regards this experiment as having the potential to do that better than any other experiment in the world."

Some of the questions SNO scientists hope to answer include what is happening in the core of the sun, do neutrinos have mass and what is their rate of motion?

The implications are enormous.

If neutrinos have mass, for example, it is possible that in several billion years the universe will stop expanding and start contracting — the Big Crunch as opposed to the Big Bang.

The filling of the acrylic



Norm Bodson, right, construction superintendent with the Sudbury Neutrino Observatory project, discusses construction of the acrylic vessel while Neil Tanner of Oxford University gazes upward at the recentlycompleted structure.



The 10,000 light sensors that hang on the geodesic sphere surrounding the acrylic vessel are sensitive enough to detect a candle burning on the moon.

They said it!

"By going underground we shield out the cosmic rays which otherwise would make our detector glow like the Northern Lights."

Art McDonald, director of SNO

"One gram of mine dust in the vessel after we're finished is too much."

Davis Earle, associate director of SNO

"We worked on this project for seven years. This is probably the best acrylic, the best transmitting acrylic, that's ever been produced. They asked us 'How good can you make it?' and then cut that tolerance in half and then in half again."

oversawa

team that started with a solid mass of rock and left behind a perfectly carved out cavern 10 storeys high by 70 feet wide. What he saw this time was the final stages of a fully functioning laboratory dedicated to solving the mysteries of the universe.

The final tour of the Sudbury Neutrino Observatory (SNO) was officially held to mark completion of the 12meter diameter acrylic sphere. The largest of its kind in the world, the sphere will hold 1,000 tonnes of heavy water, SNO's unique neutrino sensor material, when the observatory begins operations later this year.

"I think today's visit was the highlight of my SNO experience," said Danny on the "It was difficult in the beginning because there were so many people involved and everyone was trying to tell you how to do your job. We proved that we were Inco miners and we were the best in the world. We did the excavation under our terms and it came in on time and with no injuries."

mine's 6,800-foot level. "The

whole drift, the whole exca-

vation is just finished unbe-

lievably. It's like being in a

surface apartment building.

some of the miners who did

the excavation back in — they

wouldn't believe what I saw

had never been involved with

an excavation of this size at

this depth and he admits the

hurdles of building an ob-

servatory in the heart of an

active mining area were sig-

"Nobody thought it could be done," he said. "We (Creighton) had to make our

tonnages and still cater to the

SNO people. But with the

partnering that went on it

worked out 100 per cent and

that same partnership con-

today."

nificant.

"I just wish I could take

Mining for 32 years, Danny

SNO project director Art McDonald expressed deep appreciation for Inco's cooperation and contributions, saying "an excavation of this size at this depth presented an interesting combination of science and engineering."

The cavern is "designed to withstand more than the largest possible seismic event ever recorded at Creighton Mine and at the closest distance it could possibly occur," said McDonald. "That's a tribute to vessel and the surrounding cavern with water is scheduled to begin next month and the detector will be turned on as the filling begins.

Over time, the SNO scientists will adjust the experiment to broaden their knowledge of neutrino behavior.

"We will be adding other components to the heavy water such as detectors made, ironically, of ultra-pure nickel — some of which was probably produced in this very mine," said McDonald. "We'll also be adding magnesium chloride, both of which will enable us to do different measurements.

"We would hope to be able to continue this observatory for a very long period and study other things from our universe and the long-term properties of our sun." John Lee, director of technology, Polycast Ltd.

"When we have completed the installation of the water, the mid-point of the heavy water at the centre of our detector will be the lowest radioactivity point that has ever been created."

Art McDonald, director of SNO

"You couldn't go outside the boundaries. You had a boundary to stay within with your drilling and your blasting and that's exactly what you got paid for. If you" went outside those boundaries the whole program fell apart."

Danny Lavigne, general foreman, Creighton Mine

"It's really exciting to see something like this happening in our area. We'll be known not only as a mining centre but as a scientific centre as well, which is something we can all be proud of."

Peter Wong, Chair of the Regional Municipality of Sudbury

project readies to begin operating



Walter Sarazin, ultra-pure water systems supervisor, runs a procedure mode for water movement on the computer. The computer controls all modes for light and heavy water, says Sarazin.





Darren Grant, a graduate student from Carleton University working on the SNO project, checks the electrostatic counters used to measure radium in the water. One atom per ton of water is the purity goal.

MCTV reporter Bryan Oliver hangs his hard hat back in place on the rack following an underground tour of the neutrino observatory. Hair nets, clean coveralis and a shower are part of the ritual at the ultra-clean SNO site.



SNO project workers were busy in recent

What's in a name?

Davis Earle, associate director of the Sudbury Neutrino Observatory, says the catchy acronym associated with the project - SNO - has significant relevance outside the scientific arena.

- SNO Job What scientists had to do to get funding for the project.
- SNO Flurries Heated meetings of the project consortium.
- SNO Drift The underground drift leading to the observatory site.
- SNO Bunnies Female employees of the observatory.

. SNO Fence - What the team will require when the project is over to help dispose of the assets.

- The name Sudbury Neutrino Observatory or SNO, however, was not chosen in haste. A great deal of time and energy went into selecting just the right moniker.
 - Passed over during the selection process were: HOBBIT — Heavy Water Observatory Buried Beneath Inco Turf.
 - DUL Deep Underground Laboratory.

ionins completing the complex bonding and polishing process for the acrylic vessel. Some 130 curved panels of "the best acrylic ever produced" were required to form the spherical vessel.

Chuck Hearns of Queen's University checks the vast array of cables leading to the photomultiplier tubes.



IDEAL — International Deep Astrophysical Experimental Laboratory.



Art McDonald, SNO project director, is interviewed at the observatory site by reporters from **Global News, CBC** and the Globe and Mail. The media tour attracted a large contingent of visitors.

Trespassing snowmobilers pose safety risk

nowmobilers have generally been responsible in keeping to the designated trail through the Copper Cliff Tailings Area this winter.

But there are those who flout safety.

As snow conditions improve for regional sledders, George Whitman, who's responsible for the tailings area, is reminding people of the importance of staying on the Sudbury Trail Plan (STP).

"We want to promote the Sudbury Trail Plan. We allow the STP to use part of our property in the tailings area to connect to trails outside of Inco property," George said.

If snowmobilers stick to the STP trail they'll be safe. It's well marked."

Snowmobilers trespassing on Inco property off the STP system in the tailings area pose dangers to themselves and to employees, who could easily be caught off guard by a fastmoving snowmobile.

Because the Copper Cliff Tailings Area is an active industrial site, there are large vehicles and people working in the area 24 hours a day, George

said.

In addition, the condition of the landscape changes as a result of adding mine tailings.

"It's an active area. Things change. An area someone may have trespassed into the day before could have a new hazard on it the next day. And there are open holes on the site," he explained.

'It's also possible to come around a corner and be faced with a bulldozer."

Any sledder trespassing at night would double the risk factor of running into holes or heavy equipment.

Two recent near accidents on Inco property outside the tailings area underline the importance of warning people that they are putting themselves and others at risk by trespassing on private property.

Earlier this month in the Clarabelle Mill upper yard a snowmobiler and his machine became stuck while driving on Inco railroad tracks in the evening.

"Fortunately, our crews were able to see this individual, help him get his machine free and guide him off the property,"

said Pat Thompson, superintendent of Transportation. "But it was an accident waiting to happen."

In an earlier incident, an Inco train crew in the Levack area was startled by the sudden appearance of three snowmobile headlights crossing the tracks ahead of them.

Anyone found off the STP trails on Inco property could face trespassing charges.

Both these instances could have had serious consequences," said Pat.

Having issued the warning about trespassing, George is quick to credit the majority of snowmobilers in the region for their overall respect of safety and property.

"The public generally have been very good."

Ontario Federation of Snowmobile Clubs (OFSC) representative Jim Robinson also encourages respect of private property and safety rules.

"Without private land owners allowing us access, there wouldn't be a trail system. Inco has been extremely cooperative in allowing the snowmobile clubs to use the property for crossina.

Staying on the STP trail on Incoproperty is the safest place to be when riding, said Jim, an OFSC special constable and provincial coordinator.

In fact, when riding anywhere in the region the STP is the safest place to be, he said.

"The vast majority of snowmobilers are responsible and stay on the trail. They obey the rules. However, there's a small but very visible minority who don't respect the rights of others."

lim said those snowmobilers must be reminded more about the importance of safety rules.

George also pointed out another safety hazard this winter.

With a milder start to winter than usual this year, creeks pose a greater hazard both on and off company property.

"Creeks in Copper Cliff are more open than in the past. We're concerned by this because we've noticed some tiny boot prints around the edge of creeks."

George is advising children and adults to stay off creeks in the Copper Cliff area.

"People, especially kids, could end up in the water."

RULES TO RIDE BY

Active snowmobiler and Inco employee Jim Robinson, who is also a representative of the Ontario Federation of Snowmobile Clubs, has three basic rules about snowmobiling that he wishes everyone would follow when riding. They are:

- Don't drink and ride.
- Stay on your own side of the trail.
- Don't annoy the non-snowmobiling public.

(This last rule is a catch-all, Jim said, including many safety and common sense tips such as: no sledding on residential streets late at night; don't trespass; stick to designated trails; and many more.)

Victor rock finds home in pit



Environmental analyst Darl Bolton said waste rock will always have a place to go in the Sudbury region. MacLennan Pit, near the Victor Advanced Exploration Project, still has a lot of space left to fill, for example.

nco's waste rock is not going to waste.

Rock extracted as part of the mining of ore is a valuable part of Inco's varied land reclamation and regreening efforts.

With 96 years in the mining business, Inco has no shortage of open pits available to fill. Waste rock from work at the Victor Advanced Exploration Project, near the Sudbury Airport, is the latest to be recycled into a closed surface mine. During the last two years 275,000 tons of rock extracted from Victor has been placed into nearby MacLennan Pit, which operated from 1965 to 1973.

is full it will be ready for a clay cap and regreening. And Inco people will begin filling another pit.

After any pit is filled, it can be clay capped, limed and seeded. Once grass and other vegetation have taken root, seedlings are planted and nature takes its course. That's been the case for many former mine sites and industrial areas Inco has regreened.

In 1997, Inco planted 184,000 trees in the region.

One of the most visible of the regreened areas, at least to drivers, would be the roadside berm off Highway 17 entering the community of Cop-

per Cliff. Using waste rock to fill voids or pits remaining from

A RECLAMATION REPORT

Inco's Decommissioning and Reclamation Department has many projects on the go similar to the MacLennan BL

Other mining sites recently decommissioned or in progress include:

Victoria Mine

The east stope is filled with waste rock. The west stope's crown, or top of the stope, has been blasted down and is currently being back filled with waste rock. A clay cap will be applied this spring before seeding takes place. Located about 35 kilometres west of Copper Cliff, Victoria Mine was discovered in 1886 and was mined for nickel and copper until 1923. From 1973 to 1978, development work and mining was carried out. An environmental assessment was carried out in 1996 to determine the acid generation of the waste rock and potential contamination to water and soil.

Victoria Roasting Yard

Reclamation work including seeding was completed in 1996. Jack pine and red pine trees are to be planted this year. Located two kilometres south of Victoria Mine, the turn-of-the century roasting yard was clay capped in 1996.

Evans Mine

Reclamation work here began in 1996 and is now complete. Two kilometres south of Conner Cliff, Evans Mine once contained 3 per cent nickel and 2.66 per cent copper. Evans Mine has been inactive since 1899.



"MacLennan still has a substantial capacity left," said Bill Dawson, Victor project manager.

"In addition we have capacity at the old Victor Mine site, where we've constructed a dump for the trucks."

During the shaft sinking at the Victor exploration site all of the waste rock generated was crushed, mixed with cement and used for concrete in the lining of the shaft.

"So what we did is we recy-

Filling in closed surface mines is not only the start of a regreening process for the sites, it is also an effective means of improving public safety. Fencing and signs around pits not yet filled are measures used to keep people from trespassing into areas where cliffs or sudden drops exist.

cled all of our waste rock," Bill said.

Environmental analyst Darl Bolton said waste rock will always have a place to go in the Sudbury region.

"We have more open pits than we do waste rock, which is a very good position to be in."

Filling a pit is the start of a process to return a formerly active mining area back to its natural state.

When the MacLennan Pit

opera tions is the best way to return the land to

closed

mining

a natural state, Darl said. "But even if a pit isn't

com-

pletely filled, the sides of a pit can be blasted in so the cliffs are eliminated. Then what we have is a valley and the legal liability is taken care of."

That's what was done in the case of the old Santala quartz quarry in Walden about two years ago.

The site now has a marsh, which formed naturally to create a home for frogs and ducks.

MacLennan is on the way to a similar rehabilitation.

Mond Quartzite Quarry

"It's totally naturally regenerated," said Inco environmental analyst Darl Bolton. "You could walk across that site in the bush and not realize you're standing beside it." The Mond quarry also boasts many 30-foot spruce trees. Located one kilometre north of the Victoria slag pile, near the town of Worthington, the quarry has not operated since 1915. The larger of two pits there is home to a family of beavers.

Dill Quarry

Reclamation work at Dill Quarry was completed in 1996 and an old fence was removed to reduce liability. Environmentally, the site is doing very well. Fish and minnows live in the pond that used to be part of the pit. Dill Quarry, which closed around the turn of the century, used to supply quartz to Inco's long closed Coniston Smelter. Nature has long since taken care of reseeding at Dill, which is located 1.5 kilometres southeast of the city.

Vermilion Mine.

Cleaned up in 1997. The 150-foot pit has been backfilled with waste rock from the site. The pit was mined for nickel, gold and sperrylite (a platinum group metal) from 1905 to 1916.

EDUCATION & INCO

Students savor 'on-the-job' learning



Instrument man Don Strain has been at Inco 10 years longer than Lively District Secondary School student Tom Labelle has been alive. Don showed the Grade 12 student around the Copper Refinery to see such technology as the Distributed Control System. The teenager was one of nine students in Lively's Technological Education Solutions for Tomorrow (TEST) program on placement at Inco plants.

ively high school students recently put their technological education to the TEST at Inco and found there's no substitute for learning from experienced and motivated employees.

Nine of Lively District Secondary School's Technological Education Solutions for Tomorrow (TEST) program students just completed 10week placements at Inco operations in the Sudbury region.

James Richer, 17, a Grade 12 student, said he enjoyed the hands-on learning Inco people in Mines Research gave him.

"I chose to get into robotics and design. I was doing a lot of programming of a robot at school. Here I've been doing a lot of work with an engineer, **Paul Devlugt**, in mechanical design for a tele-remote project he's working on. It's very interesting."

James said he was most impressed by the level of detail that goes into such projects.

"It's the little things I like. You have to think about all the hydraulic systems you need to design to work with the main project. You have to double check everything and make sure it's up to specs."

James is considering studying at McMaster or Waterloo universities to pursue some of the work he's seen first-hand at Inco's Mines Research.

"I'm out there actually learning," summed up **Ryan Villeneuve**, 18, of his placement at the Copper Cliff Mill. He appreciated the variety of plants he got to work at in the Ontario Division. "I'm not just in one place. I've been at Hill Station, the Copper Cliff Waste Water Treatment Plant and the Vermilion River Treatment plant."

As a group, the students said they took special notice of the wealth of experience at Inco operations.

Instrument man Don Strain has been with Inco 10 years longer with Inco than 17-year-old Lively student Tom Labelle has been alive, for example.

Don showed the Grade 12 student around the Copper Refinery to see modern technology in use, such as the Distributed Control System.

"I'm looking to become an instrumentation technologist," Tom said, adding that he'd love to work for Inco. "Don gave me good hands-on training."

Kevin Debruyn, also 17, learned the importance of experience in the job of heavyduty equipment mechanic.

"It's mind-boggling. Some guys have been here for 38 years. It's no wonder they are good at their jobs," Kevin said.

Don Pagnutti, 57, himself a 38-year Inco employee, was one of the people in Divisional Shops showing Kevin what a heavy-duty equipment mechanic needs to know to be good at the trade.

"The number one thing is safety. That's what we tried to show him – using the right equipment and the right tools for the job," Don said.

"We showed him how to work together with people as a team," added **Leo Lazowik**, 54, a heavy-duty equipment mechanic with 34 years service.

"Kevin did well. But he needs more meat on him," Leo said with a smile.

Kevin said the employees at Divisional Shops did more than just treat him as a student.

They made him a temporary member of the working team. "The guys didn't make me just watch. I helped all of the time. I did a lot of impact work taking off nuts and bolts. And they showed me all their procedures that they've learned over the years."

In making Kevin part of the team, the Divisional Shops mechanics also threw a few harmless practical jokes his way.

"I got sent to get the 'skyhook' once. I didn't find it. There's no such thing as a skyhook. They also asked me to get a pail of steam. But I didn't fall for that one. It's been a lot of fun. I've enjoyed it."

There was only one drawback to his placement, he said.

"I'll miss Inco when I go back to school. But I won't miss the early mornings here at 7 a.m. I will miss all of the people."

Ted Beynon, Lively TEST's program leader, said the students get the real life experience they crave and need to prepare them for the hightech workplace.

"Inco gives them real life work situations. And the students like the way they're treated."



TEST student Kevin Debruyn, 17, gets his hands on a scooptram axle under the guidance of veteran heavyequipment mechanics Leo Lazowik, 34 years service, and Don Pagnutti (standing), 38 years service.



"He was very nice to us. He wanted to help everybody," said **Marielle Simard**, of Riviere Beaudette, Que., in a telephone interview and money to help those stricken by the storm.

Although he has family in the areas near the blackout, they were not in need of assistflashlights supplied by Inco. "It's surprising how valuable just a flashlight is. But at night, everything was black." He also made much use of his chainsaw cutting down large trees broken by thousands of pounds of ice clinging to every branch.



Pump station operator Mario Lague drove to eastern Ontario and Quebec to help victims of the ice storm left without heat and power for weeks.

ario helped us a lot. Hebroughtus matches, candles and food," said a victim of the recent ice storm which buffeted parts of eastern Ontario and Quebec.

That assessment made it worth **Mario Lague**'s time and effort to drive his pick-up truck, loaded with two generators and flashlights to communities in both provinces hit hard by an ice storm which left millions without heat and electricity.

Mario, a pump station operator in the tailings area with 29 years at Inco, left Sudbury Jan. 15 and returned Jan. 21, after helping those who were without electricity, heat and light. ----P----- ALLOL VIC VI

Retirees Mrs. Simard and her husband Gerard Simard credit Mario for helping them get through a tough part of the power blackout. The Simards, who have a wood stove which helped them stay warm in their home, were without electricity from Jan 5 to 23.

"He cut branches off our trees for us. We couldn't get out of our driveway without him."

The storm of the century, as the media have dubbed it, killed at least 21 people and left millions in the dark and without heat for two weeks. Hundreds of thousands of people were without power and heat for more than a week longer.

"I wanted to stay longer, but the worst was over," Mario said shortly after his return home and just before his first shift back at work.

Mario spent his own time

ance.

Nonetheless, Mario felt he had to go.

"When I saw the pictures on TV, I couldn't sit idle."

So he hurried off to his home town of Saint-Jean Haut Richelieu, Que., and to Riviere Beaudette, Que., near the Ontario border.

"Saint-Jean was one of the worst hit. You couldn't find a generator. They were like gold. People were stealing them left and right."

The two generators he brought down were supplied by his neighbor, businessman **Stan Thompson** and his brother **Keith Thompson**.

"They offered to let me bring many more down. But that's all I could fit in my truck."

While Mario was there he made use of the equipment he took with him, including many "I also heated up a few hot water heaters so people could take their baths. People were really thankful."

Mario returned to Sudbury with a lighter load having sold the two generators for \$1,500 each – "less than half of what they are worth."

Mario said although the trip cost him about \$600, he'd gladly help out again in a similar situation.

"It was pretty well a war crisis. People were walking around in the dark. It really strikes you. It makes you think it could be preter bare."

- it could happen here."

If such a disaster struck the Sudbury area it would be good to have people such as Mario around to lend a helping hand.



with Ron Rafuse

1997 is history now and there is nothing that can be done about the good and bad things that occurred both on and off the JOD.

The start of a new year brings renewed resolutions for many of us or a commitment to accomplish some new endeavor or defeat some old habit. Some accomplishments can be realized by using knowledge gained over years of experience or a strong will and renewed commitment.

At Inco, plans have been made to build on safety experience and past learning to make 1998 our safest year in history. This is not just a wish or a whim. It is built on hard work, commitment and training. Involvement of everyone is the key to being successful.

As we move toward our first safety principle - All injuries can be prevented - and following the Getting to Zero workshop themes, it means that Training employees to work safely and Employee involvement is essential, principles six and two, are the keys to safety success.

The goal for the Ontario Division for 1998 is a disabling injury frequency of 1.7.

Last year, we achieved 3.6.

In each of the past three years a 25 per cent improvement has been made. It is built on the commitment of leadership and using the knowledge that we have gained as employees over the past years.

It is more than a wish to become accident-free. We have the tools, training and knowledge to have an accident-free workplace.

But it takes the commitment of each person in the company to make it happen.

We know that about 90 per cent of accidents and incidents are the result of actions in the workplace. And the actions of people can only be controlled by trained people committed to doing work safely.

What does a disabling injury frequency of 1.7 mean?

A person is considered to have a disabling injury when a doctor states that he or she can't perform regular duties on the next scheduled shift as a result of an injury. Specifically, this is called modified work.

A lost-time accident occurs when, following an injury, a person is not able to report for work at all on the next scheduled shift.

Both categories are considered disabling injuries.

Inco uses an international rating system to determine fre-quency rates. It is based on 100 employees working an average of 2,000 hours a year for a total of 200,000 hours.

When an injury occurs the accident is multiplied by 200,000 and divided by the actual hours worked to that point. If, for example, a plant has 100 employees who work for one year and have one accident they will have a frequency of 1.0.

Another of the tools that we have to start the new year is a jointly-developed 1998 safety, health and environment program to help guide our area joint health and safety committees to provide leadership in the workplace. It is endorsed by the president of the Division and the four union presidents.

The tools, training and systems are in place to make 1998 a safe year and it can be more than a wish or hope with everyone deciding to apply the things they have learned to their everyday work.

Each person needs to ask themselves: "Why would I not work safely?

My company expects me to work safely. My family and loved ones need me. My union expects me to work safely. Time, money and effort has been devoted to training me to recognize hazards and know the standards.

All each of us needs to do is to just do it.

Think about the only way to work. Safety is one day at a time.

Ron Rafuse is superintendent of safety in the Ontario Division.



What does energy efficiency have to do with production? This is a question that is often asked and the answer, in many cases, may not be all that apparent.

There are several components to energy use that affect production. Energy consumption represents a direct cost in the production of nickel from mining and milling to smelting and refining.

Inefficient use of energy increases unit production costs because increased consump tion and cost is required to produce the same amount of nickel. Leaving equipment run needlessly or using equipment in a manner that is less than optimal drives up consumption and cost. Another important factor is indirect costs, which can in many cases replace production with downtime, excessive maintenance and increased capital costs for replacement of equipment. A low utilization rate is characterized by lower production resulting in higher unit costs. There are fewer units produced to distribute total costs.

Wise energy use lowers production costs

If the lights are only required for half days rather than full days then the lamps need only be changed every five to six years rather than every three years. The savings include the cost of the lamps, the work to purchase, deliver and install the lamps, and the work to transfer and dispose of the old lamps.

> The energy consumed is also half per year – the energy used provides for lighting only when it is needed and not wasted when lighting is not required.

The same holds true when other resources are

Each piece of machinery and equipment has a usable life before it must be replaced or maintained. Not utilizing machinery properly or running it needlessly quickly uses up this life. For instance, leaving conveyors, pumps or fans running needlessly only adds costs and shortens the productive life of the equipment.

Lamps are a good example. High-efficiency lamps have a life of 25,000 hours or approximately three years.

wasted. Take pumping water, as an example.

Every litre of water is pumped from the natural environment, filtered, treated, pumped to the plants, pumped throughout the plant process, pumped out of the plant to the water treatment plant, filtered, treated and pumped back to the natural environment. Imagine the energy savings and reduced labor, maintenance and capital costs if we reduced water waste and equipment use.

What does energy efficiency have to do with production?

Not using energy when it is not required reduces production costs. Not leaving equipment and machinery idle needlessly reduces maintenance and replacement costs - again reducing production costs but also providing for higher utilization and the potential for increased production.

Energy efficiency encourages production efficiency. Make energy work harder for you.

Remember to: Turn it off, turn it down and use high-efficiency equipment. Energy efficiency provides for production efficiency. Efficient production results in lower costs and increased competitiveness in the tight worldwide nickel markets.

Use fat-free diet to reach health goals

By Melanie Stos

Well it's that time of year again, the time when we all make our New Year's resolutions and vow to stick to them.

FOR YOUR HEALTH

From the Occupational Medicine Dept.

One of the more popular resolutions is "I'm going to start watching what I eat and lose some weight."

We have all heard that an important aspect to losing weight and eating healthy is reducing our dietary fat intake.

Here are a few easy tips to use around the kitchen in order to cut your dietary fat intake:

 Choose lean cuts of meat and trim visible fats and skin from cooked meats.

 Use cooking methods that will drain the fat away from the meat. Barbecuing is a good example.

 Processed meats and cheeses are high in fat and salt. Therefore, try to reduce the amount of processed meats and cheeses in your diet. Examples are bologna, wieners, cheese whiz, and cheese slices.

 Refrigerate soups and stews and then skim off the fat before eating.

• Use legumes in place of meat more often. They are an excellent source of protein and fibre, with very low fat and cholesterol content.

 Instead of sautéing vegetables like onions, try cooking them in broth or juice.

Use non-stick pots when cooking foods that require some

fat. Thus you can significantly reduce the amount of fat you need to prepare your food.

· Choose two per cent milk instead of cream or milk whitener in your coffee. An even better alternative is one per cent or skim milk.

 Choose plain skim milk yogurt instead of other yogurts. You can add your own fruit if desired.

 Mixing plain yogurt with sour cream or mayonnaise in salad dressings, sandwich fillings, potato salads and coleslaw makes a healthy alternative.

 Make your own chip dip with plain yogurt and add the flavorings of your choice. Try the baked chips with your homemade dip or opt for the healthier choice of raw veggies.

 Read labels carefully so you can choose the lower fat foods. Look for the abbreviations B.F. (butter

fat), M.F. (milk fat), and M.G. (matiere grasse, French for milk fat). You should look for two per cent B.F. or M.F., or less when selecting dairy products.

By watching what you eat, reading your labels and reducing your fat intake you will be on the way to a healthier lifestyle. Have a happy and healthy 1998!



Name	Date of Birth	Date of Death	Years of Service	Name	Date of Birth	Date of Death	Years of Service
Jan Bairon	01-17-09	12-02-97	24.5	Neil MacDonald	09.07.20	- film	
Jaroslav Bartak	06-24-20	12-11-97	33	Ramo Molucio	08-07-39	12-23-97	26-34-44-44-44-44-44-44-44-44-44-44-44-44-
William Belowo	s 02-03-22	12-09-97	29	Bruno Maivaso	09-30-25	12-15-97	28
Kenneth Brear	08-16-29	12-04-97	30.5	rienry Martin	03-01-97	12-28-97	24.5
William Bryant	03-09-25	12-17-97	34.1	Archie McLeod	09-08-09	12-28-97	38.5
Martin Callagha	n 04-12-07	12-09-97	38 1	Leonard Metcalfe	05-12-19	12-18-97	24.5
Lionel Cartier	04-26-13	12.09.97	25 5	William Nelson	03-11-20	12-04-97	18.2
Ernest Chartran	d 03-31-41	12.11.07	22.2	Mark Newton	04-19-54	12-18-97	23
Frederick Colema	an 09-11-26	12-11-97	32.7	Daniel O'Connell	09-14-13	12-21-97	24
Norman Davis	02.27.24	12-1/-9/	20	Mike Orsag	09-15-02	12-02-97	26.1
lean-Yues Dam	02-2/-24	12-14-97	36	Steve Quendeck	10-09-05	12-04-97	20
Narrises Diery	07-14-44	12-14-97	27.5	Leon Rioux	06-24-24	12.31.07	an carter for the
Narcisse Dignard	d 02-06-27	12-26-97	19.5	Mike Rutkowski	06-24-25	12.11.07	
Loman Farnan	01-21-38	12-27-97	35.5	Lucien Simon	05 21 21	12-11-97	and the second s
Dmytro Fedorosci	huk 02-20-20	12-07-97	27	Iaon Thibecult	03-31-31	12-22-97	30.5
Stephen Gazdic	05-01-32	12-06-97	38	The The	02-03-31	12-15-97	32
Joseph Kania	02-22-07	12-14-97	29.7	coert Thomas	10-01-25	12-02-97	38
Robert Kelly	02-06-18	12-25-97	43.6	Robert Todd	12-05-14	12-05-97	37
Ernst Klem	10-10-20	12-21-97	26	John Tokarz	03-08-14	12-02-97	20.5
George Kreczko	01-30-12	17.75.07	20	Jonas Vabuolas	06-24-16	12-17-97	.22
Victor Laporte	11-16-14	11-16-14 12-23-97	21.7	Michael Verbiwski	10-14-97	12-23-97	37
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Employees 'carve' artistic reputations



South Mine electrician Don Alemany pays strict attention to detail as he paints the finishing touches on one of his woodcarving creations. In his first year of carving, Don captured first place in the Song Bird category and second overall in the novice division at the Northern Ontario Ducks Unlimited competition.

wo inco electricians' love for nature and attention to detail have helped them carve their way to international recognition.

The woodcarvings of Gilles Prud'homme and Don Alemany, South Mine electricians, have been recognized both nationally and internationally as the best in novice and intermediate categories. Both agree their love of the art and extensive research methods give them the edge at competitions.

Research takes on an entirely new dimension for these woodcarvers. The perception of artists being struck by some divine inspiration is not always accurate. In fact, for Gilles and Don, inspiration is hard work. Many hours are spent researching the anatomy of subjects, their habitat, character, color using photographs, videos and the ultimate research medium - bird watching. Both admit swapping their mine safety glasses for a set of binoculars to obtain accurate research on the bird in its natural environment. This attention to detail has been an excellent strategy for both artists. Gilles' carvings placed first in the novice division in the World Miniatures, competing against 750 pieces with a 3.5-inch pair of miniature ducks. Gilles followed in his father's footsteps who won in the same category at the worlds in 1996. At the Canadian championships, Gilles

placed first in the intermediate division, and in the Northern Ontario Ducks Unlimited competition, placed first in the open category and captured the People's Choice Award, an honor extended to the artist from the general public.

Don's accomplishments parallel those of his co-worker and fellow woodcarver. After only six months practicing the art, Don's second carving earned him first place in the song bird category and second place overall at the Northern Ontario Ducks Unlimited competition, and first in the song bird division at the Canadian championships. Such an accomplishment is rare for a beginning carver.

Both attribute their success to painstaking attention to detail and research. "You have to accumulate a lot of reference material," noted Gilles, in his fifth year of carving. "You need to study the bird's habits because the judges are very particular. We do go bird watching, this is the best method." Don has similar techniques which initially involve molding the prospective subject with clay, transferring the model to a drawing plan, then to the actual piece of wood. "Inspiration comes from many things, not just one specific thing," explained Don.

hours of the morning. "Well sometimes I just wake up early and it beats watching the clock," said Don in defense of his actions.

"Face it," Gilles says with a laugh, "You're obsessed. You really are."

This declaration of obsession originates from a man who transformed his garage into a woodcarving shop. Gilles, who charges his fellow carver Don with obsession, now parks his vehicle outside throughout the snowy winter to accommodate his 'hobby.' Inside the workshop are the fruits of his painstaking labor. Some pieces will take the course of the entire winter to complete and this attention to detail is revealed in the finished product and the more than 40 ribbons that grace the wall of the workshop.

Gilles began carving in the summer of 1992, following in his father's footsteps. "I used to watch my dad carve; he's been carving since I can remember. He carves animals and I carve mostly birds." The gift of artistry extends to other members of his family, including three siblings who share in this passion, and two painters. "There are a lot of artists in my family and they are all amazing." Woodcarving for Gilles is a winter art, and it is during this season his creative energy unleashes. Averaging roughly eight hours a week, Gilles begins a process that would try the patience of Job. "When you are working on a piece you have to really concentrate on what you are doing. If you make a mistake, you have to

throw the wood in the garbage and start all over again."

Paradoxically, Gilles finds this creative yet precise process relaxing. He not only concentrates to avoid throwing out his piece and beginning again, but the competitive nature of carving factors into creations; "Every piece is for myself, then I enter (the competitions). Winning pushes you to try harder."

The competitors are judged on four elements: anatomy, originality, artistically, and the ability to capture the essence of the bird. "When the judges critique a piece, you can really learn a lot, but it can be hard too," Gilles admits.

But the benefits of competing far outweigh its negative aspects, Gilles notes. In addition to a learning process, competition allows the artists to display their work for the public and receive the public's reaction. "It's rewarding when people look at your work and say it's nice."

When Don began carving two years ago, inspired by Gilles' wooden creations, entering competitions was not considered. On Gilles' insistence, Don entered his first competition and won, "I've never seen that before (a beginner carver winning first place). It's very rare," said Gilles.

Don appears modest when discussing his rare achievement and notes he spends a lot of time in his workshop and in woodcarving courses. He admits in addition to hard work, he does have an edge over some other carvers attributed to his natural talent. "The artistic side of me was always there but just never came to light until I began carving."

Don also credits his family for supporting his obsession that occupies much of his time during the winter. "I spend a lot of my time in my shop, and if I'm not in my shop I'm on courses. It's very time-consuming."

Despite the incredible amount of time dedicated to his art, Don is repaid with a satisfaction that cannot be measured. "I love it when a piece is finished. The whole time you are doing it, it's gratifying. Taking a block of wood and creating something, painting the feathers, sanding it down, it's all gratifying."



Gilles Prud'homme's attention to detail earned him an international ribbon at the world championships. Gilles is an electrician at South Mine.

"You see, we are bird lovers, and you have to really like what you are going to make," added Gilles.

Don enjoys his art to what Gilles defines as an extreme. Many days Don can be found tinkering in his wood carving workshop in the wee MAIL POSTE Conside Peri Corporation / Societé conselience day postes Periode peri Bik Nbre 2065 Sudbury, Ontario

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