Marty Puro checks out a rusty piece of mining equipment from another age. See Pages 8 and 9 for more pictures and story.

INCO
Triangle

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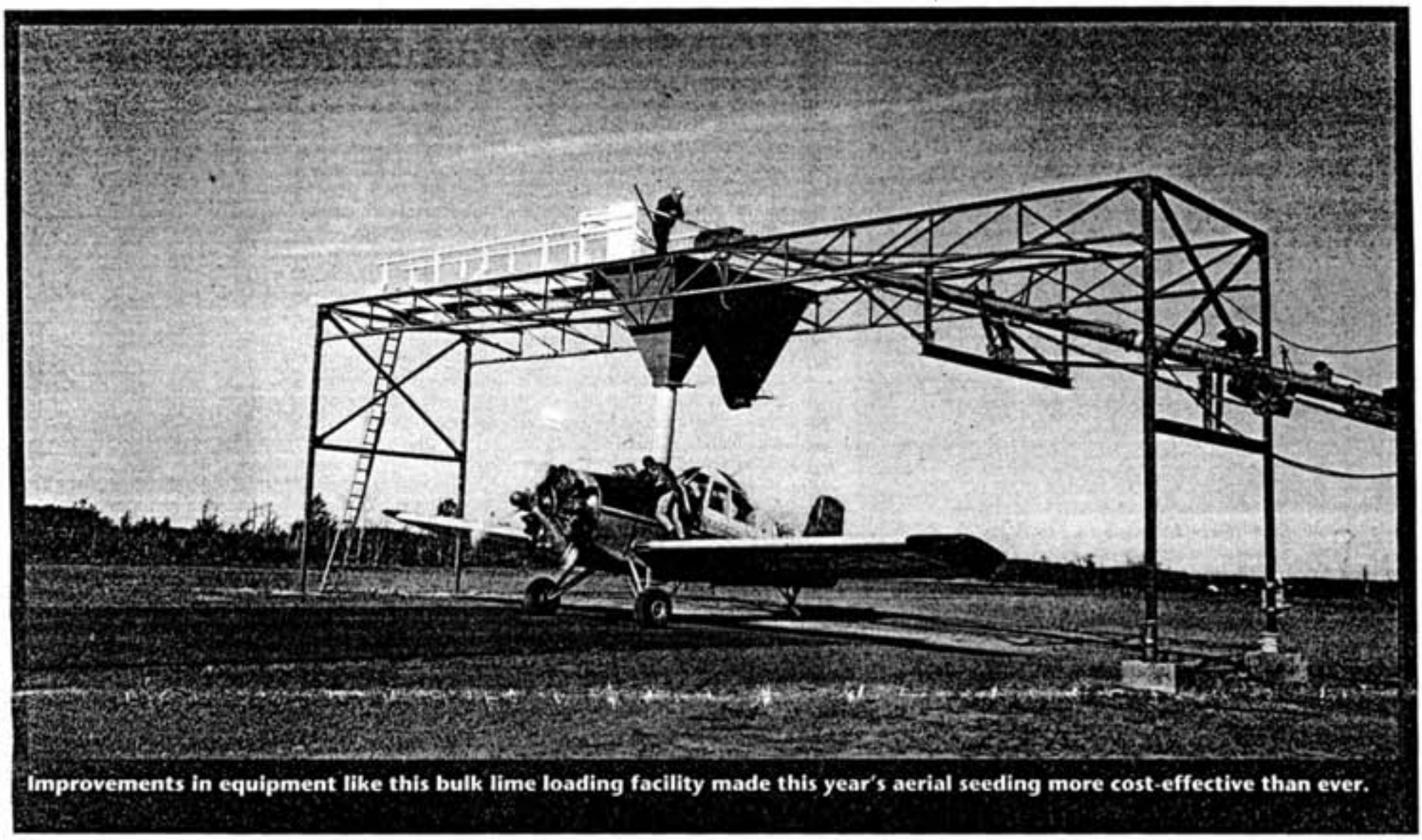

Improvements in equipment like this bulk lime loading facility made this year's aerial seeding more cost-effective than ever.

Aerial seeding effectiveness enhanced

Improvements in methods and equipment have made this year's aerial seeding project more effective than ever.

"Last year the seeding cost approximately $1,200 per acre," said reclamation coordinator Ellen Heale. "This year, the cost has been reduced to about $900 per acre. That represents a significant savings."

One reason for the increased efficiency is a new system for loading materials into the aircraft. In the two previous years, individual bags of seed and fertilizer had to be loaded into the aircraft using a boom truck. The method meant hard work and was time consuming and labor intensive. It meant time on the ground that could be better spent in the air.

This year, bulk lime loading equipment was installed in the form of an overhead hopper suspended by scaffolding. It allowed airplanes to taxi under the hopper, load quickly and take off with much less delay than in previous years.

"It not only increased effectiveness in terms of acreage seeded, but makes the aerial seeding more cost-effective on a per acre basis," said Ellen. "I expect that we will continue to examine methods to make this program as economical and efficient as possible.

"We knew that the technology existed to do this kind of thing," said Ellen, "but the technique of aerial application was experimental. Judging from the results of two years' aerial seeding, the experiment is a tremendous success."

Monitoring of target sites from previous years' seeding reveals substantial growth. Inco reclamation experts quickly discovered that lime, fertilizer and grass seed were taking to the sparse soil. The return of many native plant species is a bonus.

"The project is working out great. It's a cost-effective and productive way of seeding areas that are difficult to reach from the ground."

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"The project is working out great. It's a cost-effective and productive way of seeding areas that are difficult to reach from the ground."

continued on page 2

United Way campaign a success

The harder the task, the sweeter the triumph.

That axiom being true, Inco employees satisfied their collective sweet tooth with a stunning performance in the 1992 Inco Employees' United Way Campaign.

Drawing upon a workforce reduced in size by 1,200 people from last year, Inco employees still pulled together to donate more than $190,000 to the United Way in Sudbury. The total continues to rise as results trickle in.

"This is an achievement we can all be proud of," campaign coordinator Brian King told canvassers during an appreciation lunch at the Copper Cliff Club. "We had fewer people, falling nickel prices, a recession and a three-week Christmas shutdown to contend with, but still managed to increase our participation rate and increase our average donation. That alone makes this campaign a success."

Coupled with $14,000 from pensioners and a corporate gift of $120,000, Inco's total contribution accounts for 30 per cent of the $1.1 million United Way goal in Sudbury.

The company's corporate

continued on page 2

Grier tours environmental projects

An overview of Inco's environmental initiatives was on the agenda during a whirlwind tour recently by Ontario Environment Minister Ruth Grier to the Sudbury operation..

"I think it's always an

continued on page 13

Native species assist man-made regreening efforts

An Agric Air Bull Thrush framed by Frood #3 headframe, makes an air strip approach to pick up a two-ton load of fertilizer and grass seed.

continued from page 1

About 500 acs experimental. Judging from the results of two years' aerial seeding, the experiment is a tremendous success."

Monitoring of target sites from previous years' seeding reveals substantial growth. Inco reclamation experts quickly discovered that lime, ferti Mine. The aerial seeding took place between 8 a.m. and 5 p.m. from Monday to Friday, weather permitting. The 1992 treatment program was completed in mid-October.

The planes took off from the Frood Mine airstrip, west of Highway 69 North, and flew less than 50 feet above the land to be treated at speeds up to 140 miles an hour. They carried two tons of material each and made two applications, the first of agricultural limestone and the second a mixture of fertilizer and grass seed.

Aircraft bombarding Inco property again this year may have been an encouraging sign for environmentalists, but not as encouraging as the way nature is helping the aerial effort.

"A lot of native species are beginning to migrate into these areas already," said Ellen. "The seed is carried to these areas by birds, animals or by the wind. We're seeing new volunteer growth ranging from poplar, willow species and birch to a range of other kinds of grasses, shrubs and trees. In some places in areas treated last November, volunteer birch seedlings have already grown to between four and six inches. We have also seen more evidence of wildlife in the reclaimed areas.

"In tough economic times this initiative truly demonstrates Inco's commitment to progressive decommissioning and reclamation," said Ellen.

Fewer people, tough times yet donations generous

continued from page 1

donation was delivered aboard the pack mule of prospector George Beith during a United Way luncheon prior to the October kick-off of the employees' campaign.

Thanking Brian and co-coordinator Gerry Cullain for their efforts on behalf of the United Way at Inco, Ontario Division president Jim Ashcroft said the 1992 results represent the hard work of canvassers and the generosity of employees.

"It's good that we can all get together in times like these to help the United Way" said Jim, acknowledging the strong support of Locals 6500 and 6600. "So many people in our community depend on these funds."

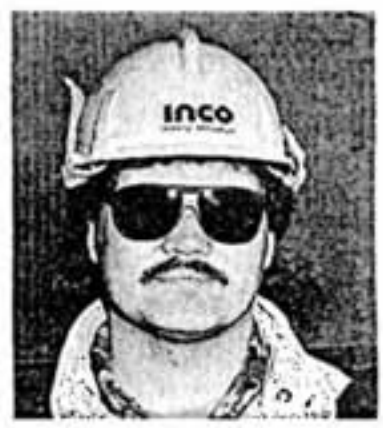
Prospector George Beith and his mule were surprise guests at a United Way luncheon. George delivered Inco's $120,000 corporate donation.

Can we do anything to help in tough economic times?

Larry Pilon, storeman, Warehouse: "As individuals we all have to pull up our socks and help ourselves and cut costs. We have to do our part to cut waste. Although all the TQI teams and different advisory teams are working at it, there's still a lot of waste to be found. I think the message is starting to register with a lot of people."

Richard Brown, machinist, Divisional Shops: "All of us together can make a difference. When we take 10 bolts along to a job and use only eight, don't throw them away. It may be only two bolts, but if 100 people do it that's quite a lot of waste. All these small things pile up. It's a way we can reduce the cost of producing a pound of nickel."

Mark Paajanen, lineman, Power Department: "Every little thing helps. In our department we're doing it, we keep a lot of things we used to throw away before. We're reusing things. I find people doing it much more on their own without being told. I know we used to leave the trucks running a lot more. Now we don't unless it's real cold out."



Marty Makela, lineman, Power Department: "Lots of guys are turning the lights off on their own. I think it's becoming a habit that people are doing at home and now they are bringing it to work. It may be only a little bit, but a lot of people working individually can make up a whole lot of savings."

Claude Paquette, fitter, Locomotive Shop: "The company is going to have to tell the guys to pull up their socks. I think most of the guys will do it on their own, but others won't. That's human nature. I see much less waste on the job today. I'm trying to waste as little as possible. I like my job and want to keep it. I waste less for my own benefit.'

Glen Thurlow, blast boss, Little Stobie: "We're doing all we can do on our own right here. I know I see people all the time turning off lights when they leave the room. People here are very conscious of that. It's no wonder, our jobs are at stake. I've got another six years to put in with this company and I hope I get the chance to achieve it."

Ashley Comeau, hoist-man, Little Stobie: "None of us wants to be out of a job. As individuals, we can do a lot to avoid waste. I know if we needed a couple of quarts of oil for a piece of equipment we used to pick up a five-gallon can and what we didn't need we poured away. You don't see much of that anymore."

Mike Swanson, electrical apprentice, Smelter: "I think all employees should take a lot more care in eliminating waste. There are a number of areas such as energy conservation and material waste where we can realize savings. Everything we do we should be looking at for ways to do things safer and more economical."

MAKING Change

Eight tons of fragile welding work a success

Warming up for a fancy bit of welding work.

That was the round-the-clock task for seven Welding Shop welders in a unique project that could be roughly compared to welding shut the cracks in a chicken egg.

Like mother hens keeping a maternal watch, the welding shop crew had to keep almost eight tons of cast iron waterwheel warm with three propane heaters running around the clock for two weeks.

The huge waterwheel from Inco's High Falls hydro generating facility had to be kept at 300 to 400 degrees Fahrenheit in order to patch cracks and heavy pitting. "You can't just apply a welding torch to something like that," said welding shop supervisor Dennis Hutchison. "If the piece isn't heated up first, the heat from the welding torch is dissipated too quickly by the metal and it would crack. Applying heat to the piece prior to welding allows for proper fusion during and after the welding process."

He said the waterwheel is a decades-old piece of equipment and the cast iron contains a high amount of sulphur and phosphorous. "We've been told by metallurgists that just about everything that's notoriously hard to weld is in there."

Despite the complicated nature of the job and the fact that all the welders had less than six months experience as an Inco welder, the project went without a hitch.

"They had to work in that heat around the clock to get the job done," said Dennis. "It was a complicated, delicate job that had all kinds of built-in complications. And it was done on an irreplaceable piece of equipment. A mishap would have created major problems. The job was done admirably."

Welders involved were Fern Ducharme, Alan Forsythe, Ray Higgs, Ken Hill, Mike Lafleche, Bob Doner and Paul Babe.

Welder Ray Higgs is dwarfed by the cast iron waterwheel he's repairing.

MAKING Change

Creighton Mine's water is up, cost is down

To paraphrase an old adage: what goes down must come up.

This is certainly true of water that enters a mine. The question then is what is the most effective and cost-efficient means of making this happen?

That was the problem that Creighton Mine began working on last February. Alerted to rising costs associated with frequent mine dewatering pump failures, mine superintendent Fred Stanford sponsored the creation of a team to examine the issue.

The team that was assembled is led by mine foreman Jack Davidson and has as its other members, construction leader Jack Ricard, miners Rob McIntyre and Glen Bailey, mine general foreman George Aniol, and mine technologist Al Punkkinen. The team was facilitated by Continuous Improvement members Scotty Stewart and, until his return to the Copper Cliff Copper Refinery, Ugo Dorigo.

Their first task was to identify the purpose of the team. They established a mission statement that dedicated the team to clearly defining the problems in the mine dewatering system and developing recommendations to increase pump life utilizing the Total Quality Improvement Process.

The team gathered data relating to areas of concern such as costs, frequency and suspected causes of pump failures, process flows and standard procedures. With this information in hand they were able to identify various root causes for shortened pump life. The two main problems were found to be the incidence of sandfill reaching the sumps due to the procedures used for the construction of barricades and pouring of sandfill plugs, and the lack of a regular sump maintenance program.

Using cause-and-effect analysis techniques, the team developed recommendations to address the root causes. First, the team recommended that the sandfill procedures had to be strictly adhered to, to prevent the entry of this material into the mine dewatering process. Second, a regular schedule of sump maintenance had to be implemented. And third, it was recommended that the mine investigate alternate methods for the disposal of sump slimes.

"Once we got together the people that knew the pumping system and gathered the appropriate data, the solutions jumped out at us," said Fred.

Now with all this said and done can Creighton Mine see any improvement? You can bet on it. Since the recommendations were implemented in May the number of pump failures historically should have been about eight. How many have been lost between May and the end of October? None! Zero! Not any!

Considering that the average pump repair cost is approximately $20,000 plus removal and installation, Creighton's achievements are significant.

Did the changes work . . . ? We have seen that by using TQI problem solving methods with the Creighton Mine pumps we can make some improvements. But how do we measure this? Is there really improve implemented in May the number of pump failures historically should have been about eight. How many have been lost between May and the end of October? None! Zero! Not any!

Considering that the average pump repair cost is approximately $20,000 plus removalgs are statistically significant. If it is greater than one per cent then it is likely that what you have observed could have happened without changing anything. Since we have historic data on Creighton Mine pumps we can determine a failure rate.

Over a four year period from 1988 to 1991, there were 53 failures. This translates into 1.1 failures per month. Using Poisson's method to compare the number of months that have passed with the number of failures observed in that time period, we calculate the percentage of probability that the improvements were due to random chance. Knowing that we have gone six months without a failure, we have determined that there is a 0.13 per cent probability that this happened by chance. This is well below the one per cent cutoff and thus we can say that this is significant. It is most likely that real change has taken place.

Get the point? Teamwork does pay dividends. Just ask Fred Stanford.

Closing the loop

Continuous Improvement team members spread their wings . . . Crean Hill has a new T.Q.I. coordinator with the return of heavy duty equipment mechanic **Ron Quenville** formerly with the Copper Cliff Nickel Refinery team . . . Levack too has a new T.Q.I. coordinator with the return of division supervisor **Ken Lindsay** formerly with the Mobile Equipment team . . . **Tom Corkal** previously with the Materials Management team has moved to Coleman as a mine general foreman . . . **Leo Bisson** has returned to his job with Janitorial services from the Inco Construction team . . . **Hilly Gilchrist** and **Denis Pidgen** have returned to their jobs with Information Systems and the Local 6500 Contracting Out committee respectively from the Contracting Out team . . . and **Jim Savage** has returned to Environmental Control from the Copper Cliff Copper Refinery team.

To all of you, thank you for your dedication and congratulations on a job well done. Keep spreading the good word about teamwork.

Joining the ranks of Continuous Improvement are: Copper Cliff Nickel Refinery electrician **Gord Camilucci**, Divisional Shops cost analyst **Sandy Roberts**, plant protection officer **Reg Gareau**, Frood-Stobie mine foreman **Scotty Remeikis**, Coleman Mine general foreman **Lawrence Dagenais**, Creighton construction leader **Jerry Guillenette** and Levack Mine general foreman **Terry Van Kempen.**

To our new members, welcome to the team.

If you have any questions, comments or suggestions for this column please call us at the Continuous Improvement office at 682-5231 or fax us at 682-5312.

MAKING Change

Mike McKee and electrical engineer Luigi Del Riccio with air compressors in the background. One of the compressors has been turned off due to improvements in air delivery systems.

Ambitious energy conservation effort turns down the meter, ups productivity

Energy gluttons. They were painfully obvious.

With the Division struggling with tight budgets and financial restraint, it was like money down the Port Colborne Refinery drains.

Michael McKee doesn't mince words. Examining the energy conservation record, he discovered that the refinery had already gone from an energy squanderer to an energy miser. When he took on the chairmanship of the Port Colborne Energy Committee more than a year ago and scanned what had already been done to lower the refinery's energy bill, he was impressed.

"It kind of made me wonder if there was anything left to be done," he said. "But judging from the enthusiasm of our people for the task, I'm confident that we've only just begun to identify the savings potential."

With the recent transformation of the refinery and an Ontario Hydro nomination for a prestigious national energy conservation award, Mike can afford to be straightforward about the contribution of individuals at Port Colborne.

Plant wide, the initial annual energy savings goal was an ambitious five per cent when conservation projects began.

An estimate of the actual annual savings accomplished so far?

About 10 per cent.

"When refinery energy committee members began the ambitious conservation effort more than two years ago, they set out to find where they had to start and where they wanted to go," he said. "In some cases they didn't have too far to look."

"The energy intensive processes were blatantly obvious and solutions were straightforward," said Mike. "Modifications to these processes had been done early on in the program. Now we're at the stage where we have to pick the cherries on the upper branches of the tree . . . conservation items that are hard to find and hard to solve."

To identify the problem areas, employees were solicited as energy investigators. Mike and committee secretary Luigi Del Riccio asked all departments to try and identify three areas where energy could be saved, either by changing operating practices, modifying processes or equipment or even fundamental design changes.

"The response was overwhelming," said Mike. "The ideas and enthusiasm that came forth really impressed me. One member, Yoshi Okita, came up with almost a dozen ideas, four of them red-circled as relatively easy to accomplish."

Many department supervisors tackled the problem by simply examining the areas of highest energy use in their operations and brainstorming for ways to slow down the spinning meter.

Mike and Luigi function as advisers for the committee of energy conservationists. "We offer information on how and where to look. When there's a difficult area to analyze, we're available to help. But basically, we try to provide tools to help members do the investigating within their own departments. One of the things we emphasize is that conservation doesn't mean just hydro. It can be water, steam, natural gas, even gasoline," said Mike.

In many cases, energy conservation efforts have gone hand-in-hand with productivity improvements, safety, a healthier workplace and simplification of operations.

Replacement of obsolete controls on the Foundry Additive Plant furnace and a power supply conversion on its fans has meant annual savings of approximately $100,000.

It's also eliminated environmentally unfriendly PCBs.

The replacement of an air blower with agitators and a delivery pump to supply air to tanks in the Cobalt Hydrate Leaching process has meant increased efficiency and productivity while saving about $40,000 annually.

Also, the current lighting upgrade program throughout the refinery will not only lower energy consumption but in many cases improve visibility and reduce lighting maintenance.

Mike expects the refinery's energy bill to be reduced further. "From the examples of ideas coming in, there's much more to be done. Many are relatively small improvements, but taken together I think the collective effect on our energy bill could be significant."

Many energy conservation projects mean not only reduced operating costs for the refinery, but actual earnings. Many of the projects have earned Ontario Hydro energy conservation grants that could reach $100,000 before the end of the year.

Ontario Hydro is obviously pleased with the refinery's efforts. It was one of only three industries across Canada nominated by Hydro for the Canadian Electrical Association Award.

"The outstanding results achieved by the refinery in addressing a multitude of electrical end-users clearly identifies that Inco is strongly committed to energy management and its financial benefits," states a Hydro submission to the association.

MAKING Change

Perfect timing, communications, teamwork makes unique Creighton project successful

The term "between a rock and a hard place" took on new meaning at Creighton Mine when miners assembled and lowered 20 tons of metal sleeve into an enlarged raisebore hole, all from tight quarters underneath a crusher.

"We've inserted these metal sleeves before, but never from such cramped quarters," said construction planner Ken Jacklin.

"These guys had to set up the rigging to handle 20 tons of steel and to assemble and lower the sleeve into the hole, all from a four-foot by five-foot high pit underneath the crusher. It was like working in a crawl space under a house."

Like a laundry chute in a highrise, the vertical shaft underneath the crusher at 6,600 foot level feeds crushed chunks of ore to a holding bin almost 200 feet below. From here the ore is moved by a conveyer to the skip (a kind of elevator) that takes the ore to the surface.

The project, said Ken, was a study in cooperation and teamwork. "You can't pull off a job like this one without perfect timing, communication and with attention to even the smallest detail. And don't forget, this thing was done by Creighton miners. Working with structural steel isn't something they do every day, never mind the tight quarters they had to work in," he said.

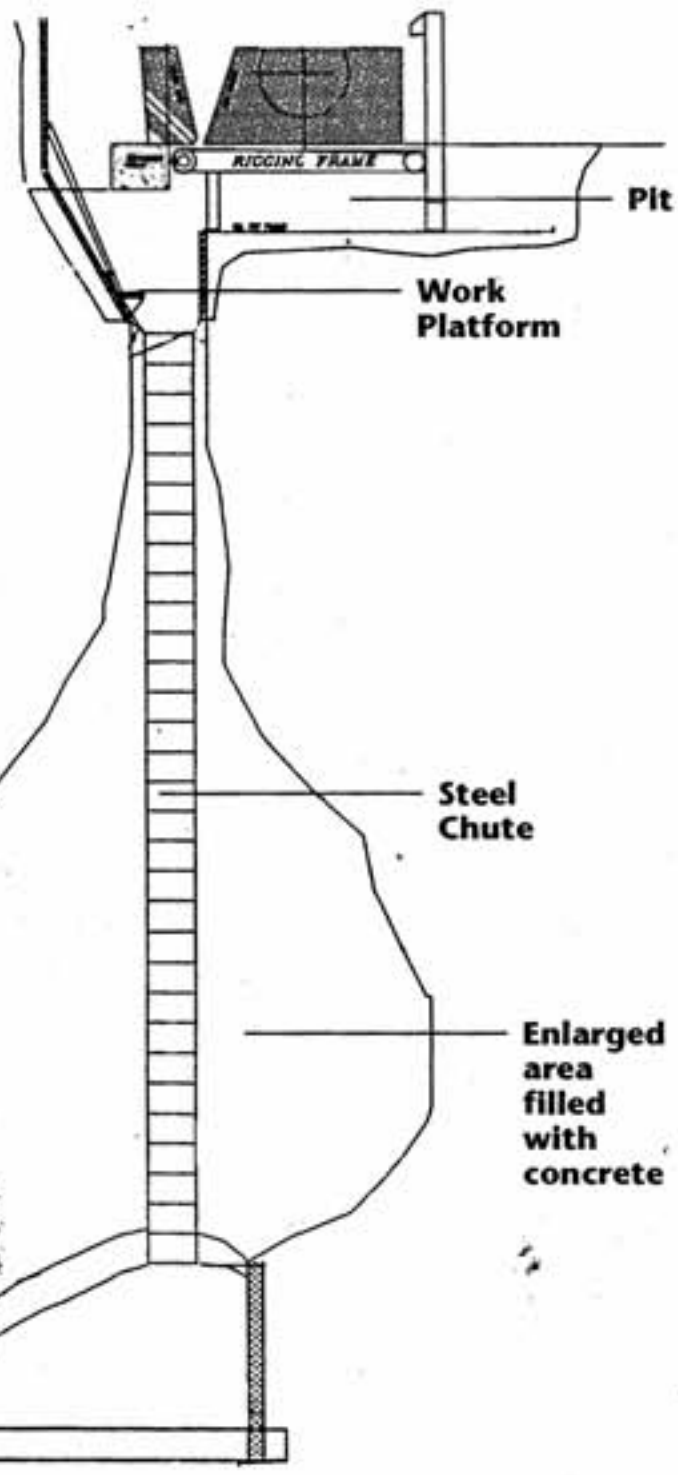
It was all done in record time. Despite getting off to a late start, the combined efforts of Creighton engineers and General Engineering managed to get the details ironed out. By the end of the second week of the project, the chute segments were all in place. "There were a few minor problems along the way, but with the teamwork, cooperation and excellent communications, they were solved along the way," said Ken.

The raisebore hole has been in use since 1971. Over the years, the millions of tons of ore free-falling down the chute had gradually worn away the sides to carve a huge 50-foot long cavern that threatened the ground stability of the crusher above and of a neighboring incline conveyer bringing high-grade ore from the bottom of Creighton Mine.

"If the ground erosion was allowed to continue, it would've created severe problems for our operations," said Ken. "The alternatives were unthinkable. Replacing the entire operation elsewhere would have been enormously expensive."

How to do the job safely was the major concern. Assembling the steel chute by getting people on ladders was considered unsafe. The only practical way was to assemble and lower the steel sleeve.

About 20 people in two shifts worked on the project. Four people from each shift worked for hours in the cramped quarters under the crusher assembling each of the 31 segments of the 62-foot steel sleeve. Each three-foot square segment was first assembled from four pieces of plate steel, then lowered into the hole via elaborate rigging installed under the frame of the crusher. The continually-growing column of sleeve segments had to be lowered with the new segment attached, then secured to attach the next piece. With all segments attached, the rigging had to support 20 tons of steel sleeve.



To assist with the assembling of new segments, one man worked from a small work platform installed in the crusher discharge throat.

Once completed, the assembled shaft hung in the enlarged cavern like a straw in a pop bottle. To stabilize the ground, over 270 cubic meters of concrete were poured to fill the cavern around the chute.

That's the equivalent of approximately 27 tandem truckloads of concrete.

Involved in the project were development miners Pat Demers, Carl Dewar, Rolly Thibault, John Zaran Tonello, Jean Beaudry, Al Clavet, Yves Touchette, Barry Arrowsmith; tram crewmen Len Anderson and Al Daigle; Construction leader Doug Flintoff and construction laborers Ralph Poxleitner, Norm St.George, and Bob Young; Nippers Dave Boudreault, Dean Remillard, William McLeod; blaster boss Marcel Brisson, VRM leader Norm Gignac and diesel loader man Gilles Pilon.

The general foreman was George Aniol. Ray Leahy, Don Tonery and Andy Lane were the foremen on the job. Creighton engineer Ken Jacklin did the engineering for the project.

Excuses! Excuses! Excuses!

We've all got good reasons why something can't get done. Some, obviously, are real. Some may be just phantom and we're all susceptible to them at some time in our working careers.

Somebody brighter than us piled all of the excuses we're ever likely to hear onto one darn good T-shirt that we spotted on a cool summer's day at Canada's Wonderland. Without permission, we would like to print this litany of excuses. How many of them have you heard lately? Today?

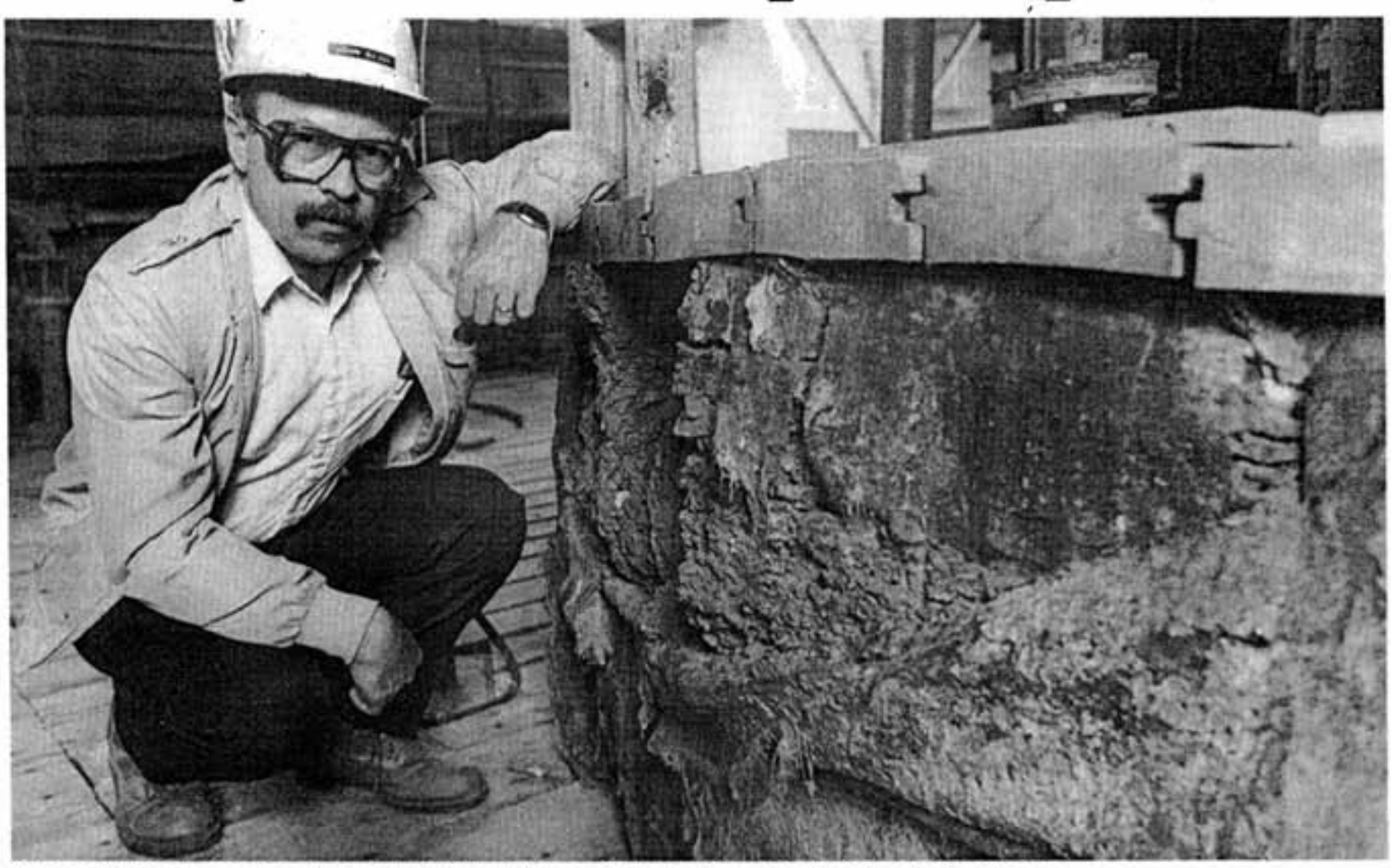
TABLE OF EXCUSES

To save everybody time – give your excuse by number

1. That's the way we've always done it.
2. I didn't know you were in a hurry for it.
3. That's not my department.
4. No one told me to go ahead.
5. I'm waiting for an O.K.
6. That's his job, not mine.
7. Wait till the boss comes back and ask him.
8. I forgot.
9. I didn't think it was very important.
10. I'm so busy I just can't get around to it.
11. I thought I told you.
12. I wasn't hired to do that.

MAKING Change

Refinery's rethink of repair reaps rewards



Process Technology section leader John Sojda with one of the tanks replaced at the cobalt refinery.

Continuous slurry leaching.

Sounds nasty, doesn't it. Something you wouldn't talk about while you eat.

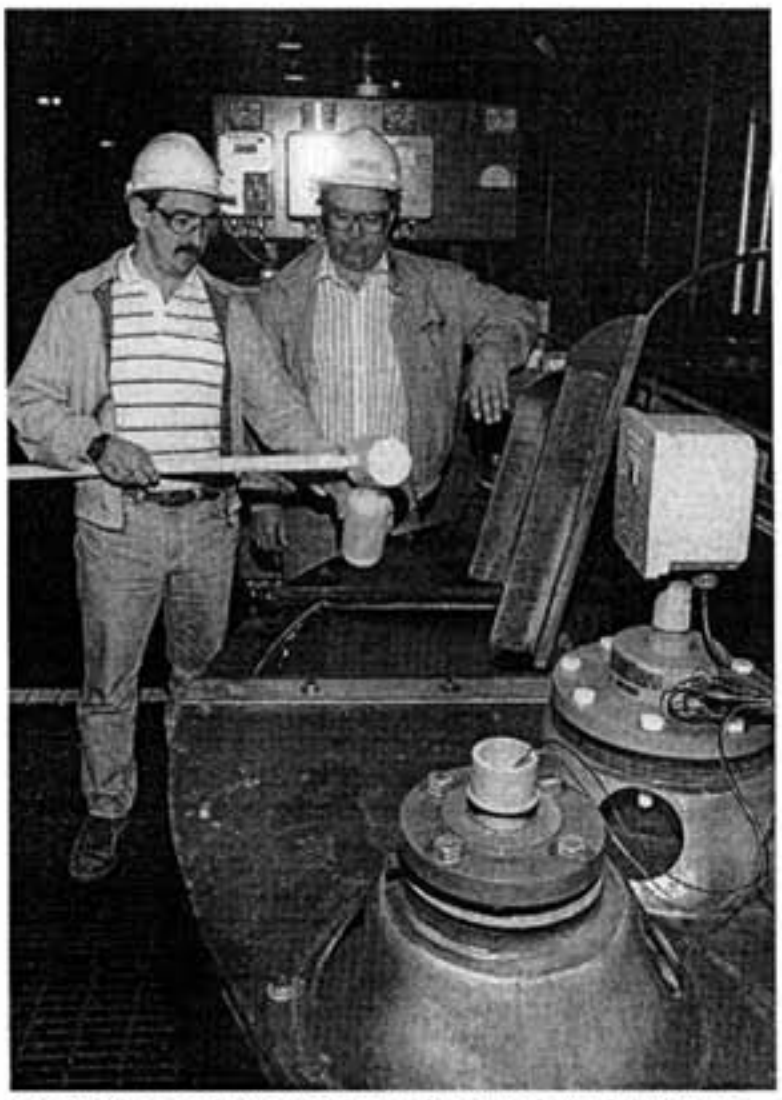
Not so at Port Colborne's cobalt refinery. People here boast about the leaching project. They're downright enthusiastic about it and it's no wonder. Few projects manage to make everybody happy like this one did.

The old leaching system was beginning to show signs of wear and tear. Massive repair or replacement was rapidly approaching. Rather than simply replace the worn-out equipment with brand-new copies of the old, people here pooled ideas about how the process could be improved along with the inevitable overhaul.

The result of two years of brainstorming, planning and implementation is a study in the effectiveness of cooperation, ingenuity, adaptation and teamwork.

Installed in March, the new system came with a price tag no greater than the expected replacement cost of the old equipment.

"In essence, all the improvements were made at no expense," said Cobalt Refinery supervisor Mark Pataran. "We knew we had to replace the existing facilities regardless of any improvements, so we figured we might as well try to improve the system at the same time. "I'm convinced that all this could never have been accomplished without the people we have here in this plant," said Mark. "People like Process Technology supervisor Dan Young, section leader John Sojda, production assistant Dick Lambert and Roger Agnew who headed up the project group.



Production assistant Dick Lambert and Mark Pataran take a sample from one of the new tanks.

"It's hard to pin down who's responsible for the success of this thing since just about everybody got involved in the process at one time or another. From engineering and technical people to the guys on the plant floor, everybody had their hand in the project. We're lucky to have some of the most talented people at Inco working here."

Slurry leaching is a process that removes some of the impurities from cobalt nickel carbonate slurry. The slurry is shipped to Port Colborne by truck from Copper Cliff. An average of three trucks, each delivering 35,000 litres of slurry, arrive here daily.

In the old system, each of two old tanks was used to do the leaching in a batch process. The new system employs three tanks in a series to do it more efficiently and at less cost. Slurry enters the first tank where the pH is lowered. Most of the solids are dissolved here and the liquid overflows to the second tank where cobalt carbonate is added. Here the pH is adjusted again. Final pH adjustment and the removal of iron, the only remaining solid, takes place in the third tank.

Once the slurry leaching is complete, the liquid is processed further and remaining "impurities" such as nickel, copper and zinc are removed, leaving a pure cobalt stream for the production of cobalt rounds. "The three tank series system allows for much better control of the process," said Mark. "Already, we've seen a decrease in operating costs. We estimated annual savings of about $150,000 in the cost of reagents alone, but it looks now like savings will be substantially higher."

Reagents are additives used to retrieve impurities.

Greater capacity, flexibility, less energy consumption and a more consistent end product are some of the other advantages of the revamped process.

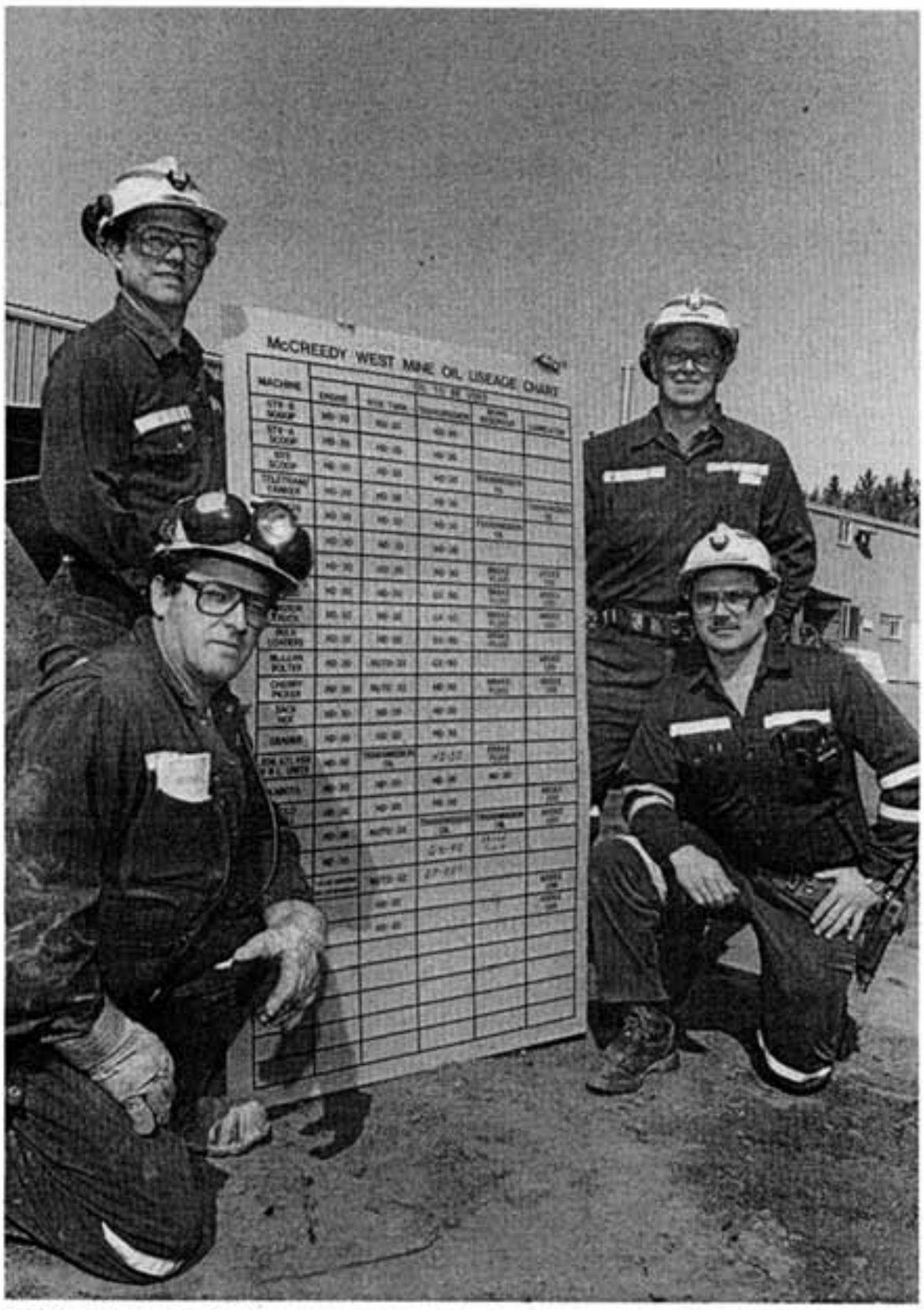
"The customer is going to be happier with the product as a result of the change," said Mark. "Because we are able to fine-tune the process much more accurately than ever, the end product will be much more consistent."

The amount produced, as well as its consistency, can also be adjusted more accurately. Limitations of the old batch method meant restrictions on the quantity of slurry processed daily. The new method, said Mark, allows for a 25 per cent increase in the amount that can be processed. "Unlike before, that amount can be adjusted to meet our needs."

The cobalt refinery's 47 employees are among the happiest with the changes. Once a seven-day operation, the slurry leaching process now operates on weekdays only. Not only does that conserve energy, said Mark, but it means no weekend shifts for employees.

Even Ontario Hydro is happy with the changes. Mark expects a Hydro energy conservation rebate for the reduction in energy consumption over the old system.

MAKING Change



Bob Lacelle, Howard Illsley, Rene Belanger and Dan Michlouski with chart showing proper equipment oils.

McCreedy's squeaky wheels get the grease

It looks like just a minor chore, but heavy duty equipment mechanic Howard Illsley knows it's the kind of nagging, frustrating job that can drive a lesser man into a screaming rage.

He picks up the hammer and walks threateningly toward the ailing bucket on the scrooptram parked in the McCreedy garage. Two pins hold it in place and he winces at the thought of popping them out.

The job usually takes arm-wrenching pounding, poking, tugging, sometimes heating with a torch. It can take teasing, cursing and sometimes a silent prayer or two. Howard's tried just about everything short of a voodoo spell.

Resigned to the task, he gives the pin an initial, half-hearted crack with the hammer.

It shoots out like a cork in a wine bottle.

The second pin?

The same.

For Howard, the proof's in the pin: TQI works.

"Not as much grunt work," said Howard. "A lot less repair, easier repair and better-running equipment. You can really see it on my end."

The mechanic was referring to a unique McCreedy West Total Quality Improvement project that has literally taken the grease to the proverbial squeaky wheel.

Lack of lubrication on mobile equipment was the suspected cause of unnecessary downtime, premature equipment failure and high maintenance costs at McCreedy. An audit was conducted over a two-month period to establish if there was a problem.

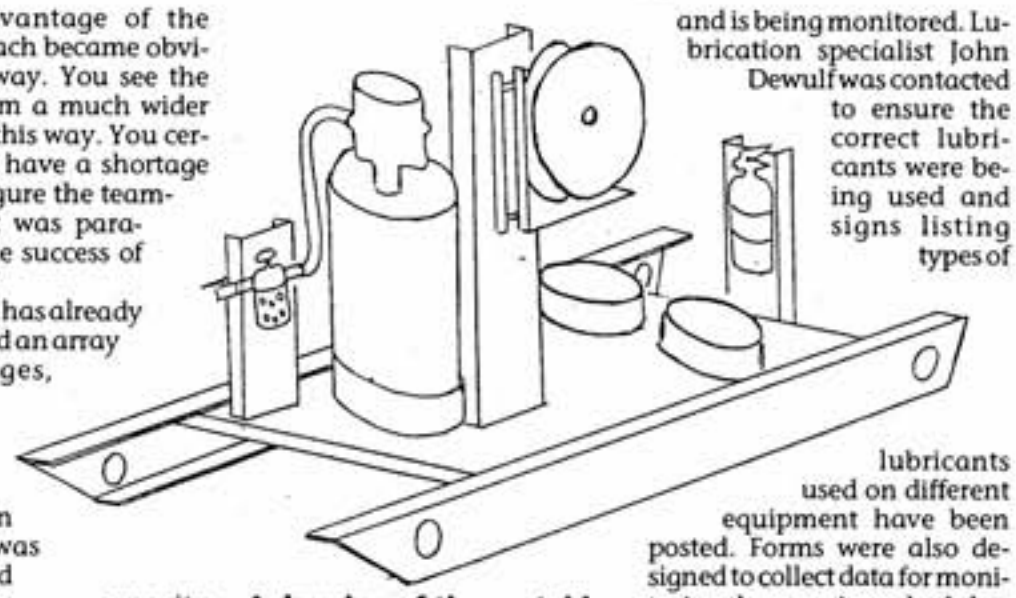
"Sure enough," said industrial evaluator Bob Lacelle, "we verified our suspicions. Sometimes, after you've been operating in the same way for a long time, you tend to accept the way things run as normal. Maintenance people may have suspicions, a feeling that something is not right, but it's unsubstantiated. That's why you have to actively look for the problems in order to find them."

A committee was struck early in 1991 to work on the problem. Consisting of scooptram operator Rene Belanger, production foreman Marcell Mallette, maintenance mechanic Dan Michlouski, Howard and Bob, the committee's first step was to draft a cause and effect diagram and prioritize items requiring corrective action.

"In the initial phase, you pick out things that will have the most immediate effect . . . things that will give you the biggest bang for the buck. The rest can be tackled at a later stage," said Bob.

"The advantage of the team approach became obvious right away. You see the problem from a much wider perspective this way. You certainly don't have a shortage of ideas. I figure the teamwork aspect was paramount to the success of the project."

The team has already implemented an array of changes, many at minimal cost. An internal wash bay on 1,200 level was established and a larger capacity grease gun installed. A washing schedule was drawn up and is being monitored. Lubrication specialist John Dewulf was contacted to ensure the correct lubricants were being used and signs listing types of lubricants used on different equipment have been posted. Forms were also designed to collect data for monitoring the greasing schedules.



A drawing of the portable greasing station fabricated at McCreedy.

Committee members gave demonstrations to all operators on the proper washing and greasing of equipment and a schedule was set up to ensure continued investigation into further improvements.

Perhaps the most unusual additions to the greasing project are a skid-mounted portable greasing station fabricated at the mine and an automatic greasing system installed on one of the scooptrams. The system has been assessed and is working well. The team has recommended that all mine scooptrams be similarly equipped.

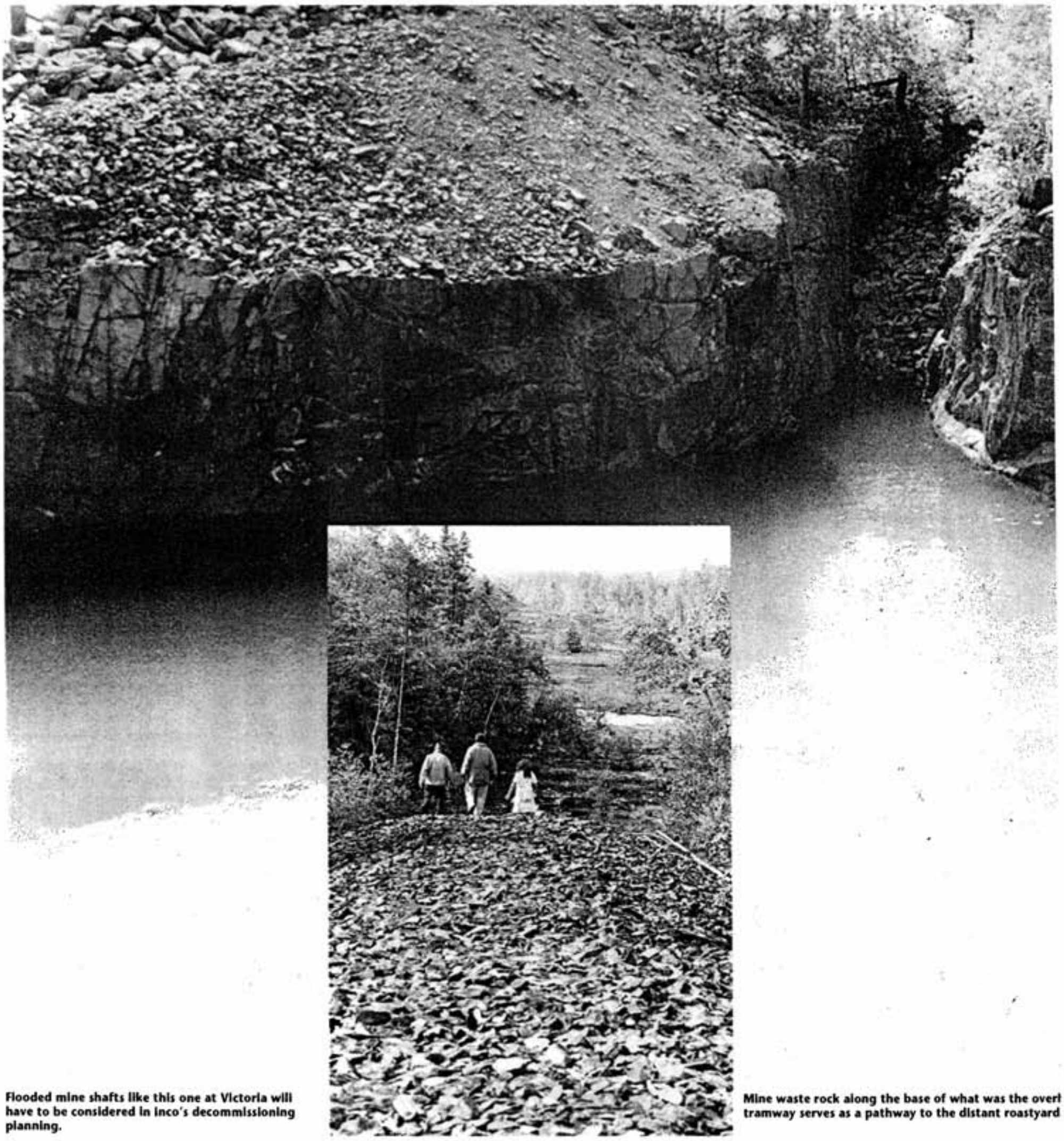
"I don't think this is the kind of project where you see massive results immediately," said Bob. "We've definitely made gains, but they're going to show up over the long run with lower maintenance costs, longer-lasting equipment and less downtime."

Scooptram operator Rene Belanger hooks up the grease gun to the automatic greasing system on his scooptram.

"I operate with the same machine every day," said scooptram operator Rene Belanger. "I try to take care of it. These things make it much easier. I can see the difference already."

"You can pick up information from our operators, our mechanics and others, but it's much more effective to get these people involved directly," said maintenance foreman Dan Michlouski. "It lets people know that we are listening, that we are interested in what they have to say."

According to Bob, the team approach means different disciplines working together cooperatively rather than blaming each other when things go wrong. "It allows everyone an active part in the process, from identifying a problem to recommending and implementing solutions."



Flooded mine shafts like this one at Victoria will have to be considered in Inco's decommissioning planning.

Mine waste rock along the base of what was the overl tramway serves as a pathway to the distant roastyard

Inco's pioneer environmental efforts ease impact of mid-stream rule changes

It's colloquially called a "Grandfather Clause," a legal and legislative device that means you can't be penalized this year for abiding by last year's rules.

But it doesn't apply to some new mining regulations recently enacted.

Society's attitude toward the environment has taken a quantum leap in the last century, from one of total irrelevance to today's view that ecological concerns are of the highest priority.

When mining companies first began their operations, open pits and smokestacks were signs of economic prosperity, jobs and progress. There were few concerns expressed, by either the public or industry, about clear-cutting forests, pollution of rivers and concern for wildlife.

It's abundantly clear that today, most industries agree that past destruction is a tragedy that can't be continued. Massive environmental clean-up projects like Inco's $600 million Sulphur Dioxide Abatement Project and the tailings reclamation program attest to that.

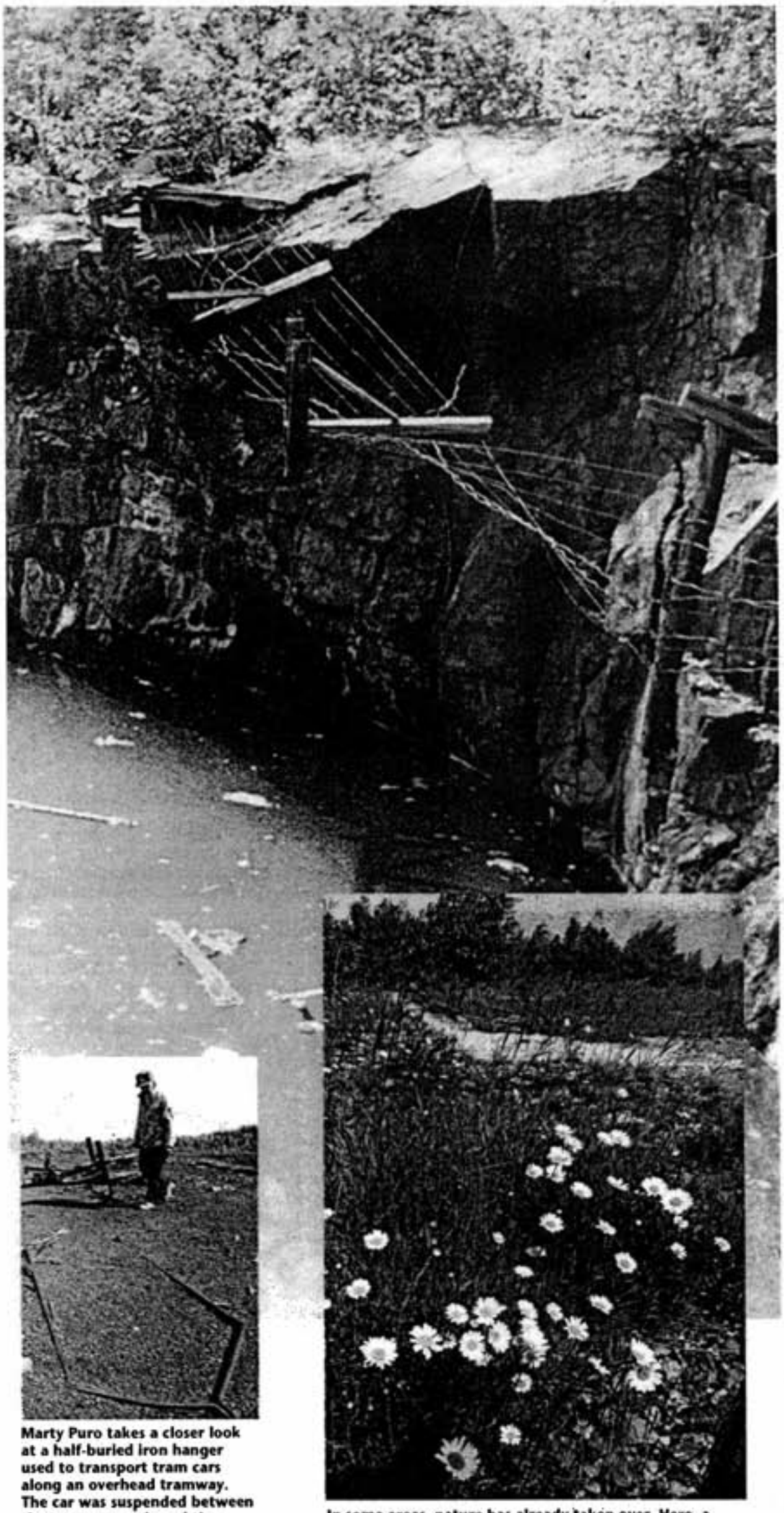
Summer student Lynn Landriault navigates the huge pile of slag at the Victoria site. Lynn headed a crew of students who helped catalogue Inco's abandoned sites this past summer.

Today's "Good Corporate Citizenship" rules have changed and what was considered acceptable 30 years ago is considered anathema today.

Yet Ontario Mining Act legislation passed as recently as last year stipulates that mining sites, many dating back a century and long-since abandoned, must comply with today's standards of rehabilitation.

"It's rather Draconian legislation," says Marty Puro, Inco's superintendent of Decommissioning and Reclamation. "But Inco has accepted this responsibility. The only thing we ask in return is that the regulations be reasonable in terms of what we can afford to do and that we are given a reasonable amount of time to get the job done. We cannot undo overnight the impact of 100 years of mining."

According to Marty, Inco is better off than most. "We've been pioneering land reclamation for decades. Inco put money and effort into environmental work well before the issue caught public atten-



Marty Puro takes a closer look at a half-buried iron hanger used to transport tram cars along an overhead tramway. The car was suspended between the two open ends and the closed end hung on the overhead cable.

In some areas, nature has already taken over. Here, a Victoria Mine service building foundation (in background) is almost hidden by wild flowers.

tion. We've always done a lot of work on our own initiative without legislation and we've always been well ahead of the standards of the day."

Because of Inco's long-standing experience in environmental work that began long before "ecology" was a household word, Inco may have less of a technical gap to fill to meet the new standards than other industries, particularly the smaller operations that literally walked away from mining sites as soon as they were exhausted. But the advantage gained by experience and technology is far outweighed by the sheer size of the task facing Inco that makes reclamation the largest project in the province.

Nevertheless, the new rules mean that Inco's pioneering environmental work of the past will have to be reviewed for compliance to today's standards. Ironically, said Marty, there's a very real possibility that the rules might change again 20 years from now and Inco will have to redo the work being done today.

The new mining legislation has meant an examination by Inco of all its "abandoned" sites, properties that Inco ceased to operate as well as many sites that Inco inherited almost a century ago.

Ranging from exploration pits that might be repaired in an afternoon to a major abandoned mine site like Victoria, which was operated by the Mond Nickel Company from 1899 to 1923 and acquired by Inco in 1931, the inventory will allow Inco to determine the extent of the required rehabilitation work the company is facing and allow for prioritizing the work for future decommissioning activities.

About 90 per cent of the inventory was completed this summer, and mountains of the collected data, including soil and water samples, plant life statistics, drainage and other factors, are being analyzed to determine the extent of the environmental impact and how it will translate into rehabilitation.

While researchers had little problem finding most of the major sites, others are little more than names on old documents and maps.

"We knew roughly where they were but we couldn't find them,"

said Marty. "That's a good sign, actually. Many of the sites were overgrown and blended in with the natural environment. It means that nature has taken over again, rehabilitated the land on its own."

Overall, he said, the results of the survey so far have been mixed. "Nature has bounced back nicely in some areas and on other sites we have to help nature along."

He warned that those sites already visited may have to be examined a second time for additional assessment,

Lynn Landriault examines drill cores left at the Victoria site.

depending on what the site's initial review reveals.

The examination and cataloguing of "abandoned" sites is just half of Inco's decommissioning strategy. The other half is dealing with the eventual closing down of active Inco operations. "Today we take decommissioning costs into account up front, along with all the other economic variables that are taken into account when an operation is assessed for economic viability," said Marty.

While the foresight puts Inco into a much better posture for meeting future closure requirements, it also means that some projects that would have been undertaken years ago might not be economically viable today or might be subject to increased engineering requirements.

Built-in closure expenses could also make the difference between operating and closing down marginal operations.

Demanded under an Ontario Mining Act amendment made just last year, mining companies must have a detailed closure plan including rehabilitation plans and pro-

Marty overlooks the Victoria Mine roastyard. He's standing on the path of the tramway

vision of financial assurance that the plan can be carried out. Marty said discussions with government are now under way to establish submission dates for the closure plans of all Inco's active operations.

He has no way of estimating what the overall financial liability will be. "I only know it won't be an insignificant amount that will have to be added to our operating costs.

"The fact is that we've been doing decommissioning work for many, many years and few people recognize it. There's no better example of our reclamation work than Inco's tailings area where mining waste has been transformed into parkland. We've seeded hundreds of acres over the years." He said another clear indication of the company's commitment to the environment is the recent expansion of the company's stressed land seeding program to include aerial seeding.

Inco's environmental work has captured the attention of the media, other mining companies and industries as well as the public at large. The most curiosity surrounds Inco's underground "nursery" at Creighton Mine where thousands of seedlings are grown for eventual surface planting. The unique project continues to arouse interest from media around the world.

But ingenious tailings reclamation efforts that have transformed mining waste into near-parkland, the result of decades of experimentation and dogged effort by Inco agriculturists, has also become a kind of environmental trademark. Visitors touring Inco often express amazement at the site of trees, grasses and shrubbery as far as the eye can see where black, sterile mining slurry once created a moonscape.

Inco's efforts to protect and improve the environment have earned the company praise from many quarters, including the federal government which in 1991 bestowed upon the company the Canadian Environmental Achievement Award for Corporate Environmental Leadership.

Benefits department moves to Copper Cliff

Tables, chairs, cabinets, desks. Bulging boxes crammed with records. It all filed out of the Scotia Tower Inco offices and onto the 7th floor elevator like booty carried off by a battalion of army ants.

Sitting against the wall on a stack of boxes in a nearly-empty office, a Benefits department staffer calmly answered the health coverage queries of the pensioner on the other end of a telephone which balanced precariously on the window ledge.

It's a good thing she knew her job. Digging up the information in question would have meant chasing a moving van that was somewhere between downtown Sudbury and Copper Cliff.

Despite the inevitable bedlam that accompanies even the most organized of moves, the 10 Inco employees who have staffed the Benefits Department at the Scotia Tower for the past 11 years managed to keep up with telephone queries and drop-in customers while the furniture was disappearing around them.

Despite the many days of packing, unpacking and setting up, the telephones were disconnected for only a day during the physical relocation of the department to its new home at Inco's General Office in nearby Copper Cliff.

"Our people barely missed a beat," said Benefits counsellor Dave Bradley. "We've developed a good relationship with our clients over the years and we tried to make the interruption of our services as brief as possible."

Even during the single day when telephones were disconnected, he said, arrangements were made to tape-record any messages or queries.

The department's relocation is part of a continuing company-wide effort at financial belt-tightening in the face of tough economic times. The offices, originally located in the General Office at the Copper Cliff Smelter Complex, were moved to downtown Sudbury in 1981 as a symbol of Inco's support to the community. "We wanted to give Inco a presence downtown, to ensure the public that the company is here for the duration," said Dave.

Ironcially, the offices' return to Copper Cliff should provide the same assurance to the public. "This kind of cost cutting should send out the signal what we are serious about our intentions to fight back, to stay the course and make ourselves as lean as possible so that we can compete successfully in the global market."

The new quarters, located just inside the main stairs in the former Safety department offices, provide a little less elbow room than the spacious Scotia Tower home. Dave said it'll take a few weeks of operations before any need for additional space could show.

Benefits Clerk Nancy Baldisera sets up in new quarters at the General Office building.

Isabel Scott of Employee Relations makes a last entry into the computer as the furniture disappears around her at the Scotia Tower offices.

Alfred Roy of Office Services, on hand for the move, checks out the lettering over the Scotia Tower office entrance.

Benefits counsellor Dave Bradley takes a minute during packing to look out his former office window for the last time.

Benefits counsellor Richard Myher combines moving day with a little Halloween spirit.

The move to new quarters was carefully planned to continue business as usual. All telephone numbers, working hours and services remain the same.

Depending on where they live, a few Benefits customers may find the new location only a little less centrally located. Copper Cliff is on public transit routes, said Dave, and parking designated for Benefits customers will be made available in the employee parking lot along Serpentine Street across from the General Office. Plans are under way to re-open the pedestrian tunnel under the tracks for easy access.

For most Inco employees requiring Benefits services, the new location will be more convenient.

Most of the department's employees see the move as necessary in view of the tough economic times. "There was some concern at first that the relocation would be a bit more inconvenient for some of our clients," said Dave, "but we plan to make ourselves as accessible and as convenient as possible here. We're trying to eliminate any problems, even if we have to make a house call or two. We like to think we take good care of our customers."

"I've worked here before," said Benefits clerk Nancy Baldisera, "and I don't mind moving back. It's closer to Inco's main services and the rest of the operation. Perhaps it might be a little bit of a problem for a few of our customers, but Benefits has been here before and it worked fine. We'll do our best." "For us, it's better here," said administrator of medical benefits Diane Olivier. "There's a bit of a feeling of isolation when you work downtown."

The department handles such things as health care benefits, benefits programs for active employees, pensioner administration and counselling of employees on government and other services. Hundreds of telephone calls are answered daily by Benefits staff and scores of drop-in customers are handled.

Food for Thought

Snack Healthy

By Nancy Guppy

Snacking between meals, or to replace meals, is part of our work life and busy lifestyle. Snacks can help quench our thirst, satisfy our hunger and give us the energy we need to make it through the work day feeling good.

Healthy snacks are especially important for young children who may get a major part of their day's food intake from snacks.

There are three easy things to remember when selecting a snack:

A: It has to be nutritious;

B: Make sure you vary your choice;

C: Stick to no more than two or three snacks each day.

How to choose healthy snacks

The best snacks are wholesome — that is, low in fat, calories, salt and sugar and high in fibre.

You should change the kinds of snacks you choose often to add variety to your diet and prevent boredom. Snacks need to be convenient and available. Plan snacks like you plan your meals — buy a variety of easy-to-prepare, portable snack foods.

If you can't buy what you like at work, pack a snack when you pack your lunch. If it seems too difficult to remember to pack healthy snacks everyday, you can keep snacks on hand in your desk or locker at work. Assorted fresh fruits like apples and oranges, crackers, pretzels, bags of air popped popcorn, cereals, peanut butter, fruit cups and drinking juice boxes are all examples of foods that will store well. Replenish your stores weekly.

At first some of these foods will seem boring compared to their commercial competitors. Over time you will be able to adjust your taste and desire for healthier snack foods.

All fruits and vegetables make healthy snacks. Some are more portable than others. Whole wheat breads, low fat crackers, high fibre cereals and cookies like fig bars, gingersnaps and oatmeal that are fairly low in fat and sugar also make good snacks.

Low fat cheese chunks, low fat cold meats and hard boiled eggs all make good snacks as well.

Where are chips, chocolate bars and donuts?

These goods are not considered good choices because they are too high in sugar, fat, salt and/or calories to be regular snacks. Pretzels and air popped pop corn without butter are healthy alternatives.

Healthy thirst quenchers

Coffee is a favorite hot drink at work. Health and Welfare Canada advises us we can safely consume up to four cups of regular coffee a day without any ill health affects. Don't rely on coffee or tea to quench your thirst. They have a diuretic affect, taking water and nutrients from the body.

Plain water is the best thirst quencher. Other alternatives include milk, fruit or vegetable juices, mineral water and flavored and herbal teas.

Real or pure fruit juices are more nutritious than fruit punch with real juice added. Read the labels to make sure you know what you are buying.

Surprisingly, chocolate milk can be a good snack. It has all the nutrition of white milk and no more sugar than an equivalent serving of unsweetened orange juice.

Enthusiastic public response to Emergency Week

Local 6600 Safety, Health and Environment representative Judy Gilbert gives a ruler to Grade One student Alicia Simmons.

Berno Wenzl gives rulers to Grade One students at Copper Cliff Public School following a presentation he gave on what to do in case of an emergency.

Steelworkers Local 6500 Safety and Health chairman Don McGraw and Local 6600 Safety and Health representative Judy Gilbert introduce four-year-old Brian Ross to the fire department mascot at the Inco exhibit at the New Sudbury Centre.

Community-wide cooperation and a well-informed public: That's the difference that's made the difference in Inco's emergency preparedness plan.

A special Emergency Awareness Week held last month included a media blitz, school visits, mall displays and other information dispensations designed by Inco to provide the public with as much information as possible.

"What we at Inco have learned is that people want to be given the straight facts so they can respond to any situation in a sensible, fully-informed manner," said Inco's emergency preparedness coordinator Berno Wenzl.

Berno headed up the media blitz, augmenting an intense three-day advertising campaign with three guest appearances on radio and television talk shows. Full-page advertisements were taken out in the major local newspapers as well.

"We figured it would be more effective if we blanketed the media for a short period of time rather than advertising in dribs and drabs over a long period of time," said Berno.

"I think it worked. We got a good deal of positive feedback from our campaign. I think people appreciated the information."

An Inco Emergency Preparedness information booth was set up at the New Sudbury Centre in conjunction with the regional fire departments' Fire Prevention Week. The booth was staffed by volunteers who are involved with emergency planning at their plant, mine or office. "In fact, we had some volunteers from the Copper Cliff Clinic who are not Inco employees," said Judy Gilbert, Local 6600 Safety, Health and Environment representative who coordinated the mall display.

Inco officials were encouraged by the number of people who took an interest in the mall display. "We had a lot of people stop in. There was quite a bit of interest shown," said Berno.

The cooperative project with the fire department was just an outward sign of the success of another major development in Inco's preparedness plan: the coordination of the company's emergency procedures with community agencies such as fire, police, ambulance and hospitals.

"No doubt about it, we're better prepared today than we were just a few months ago, mainly because of the cooperation and communications in the community as a whole. There is an internal and external element in our emergency planning, and both have to function effectively to get the maximum results."

Taking shape is an emergency liaison committee made up of Inco, Falconbridge, fire, police, ambulance, hospitals, unions, utilities municipal officials, school boards and other organizations. A community emergency communications plan, already drawn up, should be in place by the beginning of next year.

Also in the works are plans for a community-wide mock disaster exercise that will test all aspects of the newly-developed plan.

As part of the Emergency Awareness Week activities, Inco volunteers visited area schools and talked to over 2,000 students, teachers and staff about Inco's emergency procedures and how they affect the community.

By all accounts, the Inco message was well-received. Questions fielded by students were so insightful that in at least one case, the queries were written down for further discussion by emergency preparedness planners.

"It was probably one of the most effective parts of the week's activities," said Judy, who along with Berno made presentations to 240 youngsters at Copper Cliff Public School. "The students were very interested in what we had to say. They had some good questions and we had the feeling that they got a lot out of the information session. I think we can be reasonably sure that many of these kids will take the message home to their parents."

Judy and Berno also visited Gatchell School for Students with Special Needs where they outlined emergency preparedness procedures for the school's teachers and staff.

While Berno feels Inco and the community at large are better off with their emergency preparedness than ever before, he warned that no one should rest on their laurels.

"You don't reach perfection with this kind of thing. It's going to have to be an ongoing effort."

Emergency Preparedness Coordinator Berno Wenzl shares information on emergency procedures with teachers at the Gatchell School for Students with Special Needs.

S.H.E. says . . .

Safety, Health and Environment

Are lefties accident-prone?

If you're left-handed or know a lefty, you've probably witnessed the agony and frustration — not to mention the mess, which accompanies the left-handed use of a typically-designed can opener or scissors. Soup all over the kitchen counter or a mangled newspaper clipping.

Ray Boehm, a University of Waterloo Co-op kinesiology student working in the Occupational Health section of Safety, Health and Environment is preparing to survey a portion of Inco's industrial workforce to determine if there is any relationship between handedness (preferred hand) and frequency of injury.

It is understandable that most equipment is designed for right-handers as they compose 90 per cent of the population. The rest of us who fall into the remaining 10 per cent must learn to cope with these designs or, if we're lucky, we find specialty items which cater to our left-handed needs.

Often right-handed designs force the left-hander to assume an unnatural posture in order to perform the simplest of tasks. Writing from left to right, for example, is a feat not easily accomplished by some lefties who put pen to paper with their arms bent in a most peculiar, not to mention painful-looking, way. It is thought that such awkward movement can result in poorer performance and increased chance of injury.

On the other hand (pun intended), some lefties try to use their right hand as a method of coping in a right-handed world and become quite proficient at using either hand. If the task happens to involve a forceful repetitive motion, such as hammering or chopping, the person who distributes the stress between both hands is less likely to develop cumulative trauma disorders than those who are not able to switch hands.

A previous survey using students as the target population indicated that left-handers were more likely to report injuries in all the activity categories tested. These activities were (1) work related (2) in the home (3) sports related (4) using tools or implements (5) while driving a vehicle.

In the Inco study, workers at Divisional Shops will be asked to fill out a "Waterloo Handedness Questionnaire." The survey consists of 32 questions such as "in which hand would you hold a match to strike it?" Supplementary questions inquire if that hand is always used, usually used, or if both hands are used equally often.

A scoring system assesses the subjects' hand preference and strength of handedness. In addition to filling out the handedness questionnaire the workers will be asked to volunteer information on any injuries which they may have had within the last two years related to the five activities mentioned above.

The rate of injury among left and right-handed industrial workers will be compared. In addition, a comparison will be made between the results of the student survey and the industrial survey. A more in-depth assessment will be made of the types of tasks and degrees of handedness related to specific injuries.

By March, the results of the survey should be . . . in hand.

intouch

On the way back to the hall for lunch after a tour of the Port Colborne Refinery are pensioners Eugene Turmel, Carmine Pagliaro, Tony Mastrangelo, Savino Saltarella and Stanley Turbak.

Admiring electronickel squares are pensioners Henry Chumienski, Eric Sewell and Harold Knox.

Pensioners Eugene "Smoogie" Kowalsky, a craneman who retired in 1972, and Violet Crawford, a plant nurse who retired in 1982, renew old acquaintances.

Retirees tour plant for Port Pensioners Day

More than 400 retirees turned out for Port Colborne's Pensioner Day celebration that included tours of the refinery and lunch at the Italian Canadian Club.

"It was a super day," said former superintendent of operations Bill Kantymir, who organized the event before retiring himself earlier this month. "The weather cooperated and everything went smoothly."

As in past years, bus tours of the Port Colborne Refinery proved popular. "We had five buses on hand to shuffle people back and forth between the club and the plant," said Bill. "The pensioners always take a keen interest in how things are changing, the new technology and how things are progressing in areas where they used to work. Many noted the cleanliness of the work areas.

"And they always like to talk about the old days with employees. It's quite obvious that many of these people look forward to the Pensioner Day event. They get a big kick out of it."

More than a dozen pensioners helped stage the event, acting as tour guides, accepting registrations and taking pictures of pensioners with friends they hadn't seen since the year before.

"The Polaroid pictures were a hit again this year," said Bill. "They serve as a souvenir of the event, a keepsake."

Port Colborne even hosted several "guest" pensioners, Inco retirees who weren't from the Port Colborne plant.

"We had two people who worked at Thompson, Manitoba and are now living in this area and several from Sudbury," said Bill.

Environment Minister Ruth Grier shown Inco's environmental projects

continued from page 1

advantage in having the person at the top see first-hand what we are trying to do here," said Environmental Control superintendent Brian Bell. "This way, we get the message directly to the minister, without it being filtered through the bureaucracy."

Case in point, said Brian, was the minister's reaction when told of Inco's difficulty in dealing with her ministry while trying to enter into a partnership on a composting project.

When ministry regulations proved prohibitive, Inco abandoned the project which would have provided a company site for the composting of yard wastes for a local composting committee.

Smelter Complex manager Peter Garritsen explains the workings of the Smelter to Environment Minister Ruth Grier.

"After more than a year of preparation, we received a certificate of approval from the ministry with attached conditions that would have made the project very costly and would have put unnecessary liability on the company. It was a very simple project. We didn't expect that kind of a problem getting it set up."

The minister said she was aware that the rules for composting require changing and improving. She urged Inco not to give up on such projects and said she would look into the matter.

The minister was taken on tours of Clarabelle Mill, the Smelter and the Acid Plant, including a briefing on Inco's $600 million Sulphur Dioxide Abatement Project in the Clarabelle boardroom by Smelter Complex manager Peter Garritsen.

Inco's decommissioning and reclamation efforts were outlined by Decommissioning and Reclamation superintendent Marty Puro and reclamation coordinator Ellen Heale at the Smelter Pavilion.

The briefing concluded with a presentation by Brian, who emphasized the need for closer cooperation between industry and government if solutions are to be found to environmental problems ranging from effluent treatment to PCB destruction.

Matte Processing and Sulphur Products superintendent Aldo Longo and Environment Minister Ruth Grier seem to have their signals crossed during a tour of the acid plant. Looking on is Inco vice-chairman Walter Curlook.

Central Mills manager Mick Throssell explains the Clarabelle control room to Environment Minister Ruth Grier. Seated at the controls is process foreman Luc Bedard.

Ontario Division president Jim Ashcroft introduces Environment Minister Ruth Grier to utilities man Rick Pasanen (centre) during a tour of the Smelter.

HERITAGE THREADS

by Marty McAllister

Prospecting for Power

There's a lot of talk in Sudbury these days about the proposed Sunthetic cogeneration project. Why, there hasn't been this much fuss over electricity since Frank Cochrane outfoxed Major J.R. Gordon for the Sudbury contract back in '03. And there wasn't even any corn involved that time — except maybe after the council meeting.

This isn't the place to argue for or against the new thing, but a little review of relevant local history wouldn't hurt.

The New Magic

We have to start in the 1880s, when many things happened at once.

While the C.P.R. was still heading west and while Samuel Ritchie was preparing to set up Canadian Copper Company operations at Sudbury, a historic collaboration was taking place. The theoretical genius of Nicola Tesla fired the imagination of industrialist George Westinghouse, and the result was technology that made possible the generation and long-distance transmission of alternating-current electricity. (Nick and George weren't the only ones challenging the direct-current ideas of Thomas Edison, but they were big pathfinders on this continent.)

The folks at Canadian Copper caught on quickly. As early as 1890, John D. Evans and his colleagues had begun the search for a promising "water-power", a site at which the power of a waterfall could be converted to electricity. But, for more than a decade, local industry had to depend on steam power — at first to directly drive rotating machinery at the mines and plants, and later to drive generators that powered the new electric motors that were becoming available. Finally, in March of 1906, the Huronian company's hydroelectric plant at High Falls began transmitting 25-cycle power across the 30 mile distance to Copper Cliff.

Other Power Pioneers

But International Nickel and its subsidiary, Huronian Power, weren't the only ones putting this new magic to practical use. The Town of Sudbury had struggled since 1895 with its steam-powered generating plant on David Street. In November, 1905, Frank Cochrane's Wahnapitae Power Company began supplying power to the town and to The Mond Nickel Company from its Coniston generating station on the Wahnapitae River.

Out behind Creighton, on the Vermilion River, Major Gordon's hapless Sudbury Power Company also began generating power in 1905, which it supplied, at various stages in its 12-year existence, to the Gertrude Mine, the British American Nickel Company and the Sudbury Flour Mills. (The wooden dam washed out in 1917 and the plant was stripped, but the fascinating old ruins are still there.)

As new uses for electricity were found and as the area's industry and population grew, so did the demand for power. Huronian added generators at the High Falls #1 Plant in 1908 and 1912, built a new plant next door in 1917, completed the Big Eddy dam in 1920 and brought the Big Eddy generating station on line in 1929. All 25-cycle! (Make a mental note.)

Through its own subsidiary, the Lorne Power Company, Mond built the Wabagishik power plant on the Vermilion River in 1908 and added the Nairn plant on the Spanish in 1916.

Wahnapitae Power increased generation at Coniston in 1909, built the McVittie plant (near Estaire) in 1912 and added the Stinson plant in 1925 — a big encouragement for developers of the Falconbridge Nickel Company.

The Frequency Debate

Both the Lorne and Wahnapitae companies supplied power at 60-cycle (make another mental note), definitely placing their bets on a different number than International Nickel.

And so it went. Until 1930, the Sudbury area was electrically self-reliant at both frequencies. That's a fact. There were no outside power lines leading here. Indeed, even with Sudbury's achievement of city status, it would be another decade before local supplies of 60-cycle power had to be supplemented from elsewhere.

It was rather a different story with 25-cycle. In the late '20s, the new Inco smelter and concentrator at Copper Cliff were nearing completion. The amount of equipment needed for the huge complex was mind-boggling and it was obvious that the demand for 25-cycle power would exceed the supply, even with Big Eddy's 24 megawatts on-stream. There were a couple of options open.

Cogeneration versus Purchased Power

First, as we all know, a smelter creates a lot of waste heat. That was no secret in 1929, either — nor was the idea of perhaps using that heat to generate the extra power we were going to need. What was a secret was that J.L. Agnew commissioned an independent study into what it would cost to add the necessary equipment. The confidential report came back, advising J.L. that the cogeneration idea would add something like 10 per cent to the cost of the new smelter. But it would still be worth it — unless we could buy power elsewhere, for $18 per horsepower or less. As it turned out, we could.

Just about then, the Hydro-Electric Power Commission of Ontario (now Ontario Hydro) was preparing to build a 25-cycle transmission line from its uncompleted plant at Abitibi Canyon to — well, to Copper Cliff, if a deal could be struck. And the price? Surprise, surprise, the offer was $18 per horsepower!

So, the cogeneration plant at the smelter was never built and the purchase of power from H.E.P.C. began in October of 1930.

60 Cycle Wins

Meanwhile, Mond and the City of Sudbury continued on their 60-cycle ways. But, at the same time, the H.E.P.C. was getting ready to buy out the Cochrane and McVittie interests to gain ownership of the Wahnapitae Power Company.

But International Nickel and Mond had merged on January 1, 1929, so the new company used both 25 and 60-cycle power. Most was generated internally and the modest balance was purchased from the H.E.P.C.

In the decades since, two ratios have changed dramatically. 60-cycle now dominates here and throughout North America. The remaining 25-cycle Inco installations and Hydro's line from Abitibi Canyon are in the autumn of their years. Secondly, local generation accounts for a still-important but minority share of the total demand of our industry, the City of Sudbury and surrounding communities.

The Long View

By and large, the people who built those first local power plants were in it for the long haul. Except for the Sudbury Power Company, every one of those old plants is still operating! That's as much as 87 and as little as 63 years. Sure, some generating units have been upgraded, replaced or converted to 60-cycle, but the plants are still there. Wars and nations and generations of workers have come and gone, but the Sudbury area power plants keep on generating.

Our power pioneers were giants: bold, long-term thinkers who didn't let short-term barriers get in the way. But even they never imagined such growth of demand, or the ultimate death of 25-cycle, or the increased dependence on outside power.

So, how does this help our Sunthetic debates?

Just this: the story may encourage us to imagine the picture at least 40 or 50 years down the road. Then decide.

INCOME *ideas*

by Richard Birch

Travelling around the GST

Whether you know it or not, the GST has very likely thrown a wrench into your future travel plans.

The basic rules are relatively straightforward. All travel within Canada is hit by the GST, except for public transportation in urban areas. Travel to destinations outside Canada is not taxable, unless you are flying.

In this case, all air travel to the United States, except to Hawaii, is taxable. However, if you travel directly to the United States by any other method, there is no tax.

GST tactic:

Check out the cost and convenience of rail or bus travel to the United States. It could be cheaper than flying and you won't pay any GST on your ticket.

Air travel to all other international destinations, including those winter hot-spots, does not attract the GST.

GST tactic:

Consider taking your next vacation in the Caribbean or Mexico rather than Florida or California. You'll escape the GST and find the same sunny, warm weather.

If you're travelling to the United States despite the GST, you might consider a one-way flight which is taxable. However, your flight back escapes the tax if booked in the United States.

Compare prices carefully. One-way tickets are often expensive.

If you are travelling in Canada, you may have little choice but to cough up the GST when you buy your ticket. However, those living close to the United States border have another option.

GST tactic:

If, for instance, you are travelling from Toronto to Vancouver, check out the cost of flying from Buffalo to Seattle.

Of course, there is no GST on this U.S. flight. Even after adding in the cost of getting from Toronto to Buffalo and Seattle to Vancouver, you may chalk up a big saving. But don't forget to add inconvenience to your total cost.

Unfortunately, you won't be able to avoid the GST by purchasing a package tour to a United States destination.

When you buy an all-inclusive package, the tour operator will isolate the air fare and add on the GST. The rest of the package, hotel and meals, isn't taxed since these services are consumed outside Canada.

Tour packages to other countries and Hawaii are GST-free.

INTERVIEW

Overwhelming response to Q&A video

A recent Question and Answer informational video produced by Inco and circulated to Inco Limited's worldwide operations has proven to be one of the most successful informational programs anywhere. More than 6,000 Inco employees worldwide sent in questionnaire returns after watching the video.

In the next few issues of the Triangle, we will run some of the more interesting questions along with the answers given by Inco Ltd. Chairman and Chief Executive Officer Michael Sopko. We have removed the names and workplace locations to ensure confidentiality.

QUESTION: I would like to know if the expansion of the Ginsu smelter in China which I read about in the "Extra" has any effect on the sale of nickel for Inco in the Pacific Rim.

ANSWER: The Ginsu smelter in China was supposed to have been completed in 1990. I understand the facilities may be built sometime next year. We expect only a modest impact on our market in the Pacific Rim when this smelter is completed.

China does have a sizeable nickel reserve. Three large deposits were discovered recently. Still, I cannot imagine China becoming a major competitor for many, many years. Today, they are buying more nickel than they can produce. I view China more as a customer than a competitor right now.

Q: I have often wondered why this company does not produce finished products rather than just raw materials.

A: We believe there is benefit in selling 'value-added' nickel products and, in fact, we do so through our alloy and engineered products operations worldwide. There is a concentrated effort under way to develop enhanced primary nickel products with added value. We do not think it would be profitable, however, for Inco to get into the business of creating consumer goods. We would rather sell nickel to those companies that create goods.

I suppose you could say we want to continue to be the best miners in the world.

Q: I would like to know more about Inco in comparison to the world market.

A: Inco is the largest producer of nickel outside of Russia. The nickel industry in the former USSR produces over 600 million pounds of nickel per year while Inco produces in the 400 million pound range. Falconbridge produces about 200 million pounds; Western Mining, about 120 million pounds; and SLN, 115 million. Three Japanese companies combined produce about 150 million pounds.

We increased our market share from 26 per cent in 1982 to 33 per cent in 1991. That equates to one quarter of the world nickel demand if you include the former Soviet Union. We feel that this is a very healthy level; if we had a larger market share, we would be more vulnerable in the event of a downturn in nickel demand in the world.

Q: Is Inco looking at undersea mining? Why does Inco not produce finished consumer products that are made from our products?

A: The topic of deep sea mining is a fascinating one. Various consortia were formed 20 years ago when the growth in nickel demand was six per cent and it was predicted that land-based mines could not produce the required amount of nickel for the late '80s and the '90s.

As it happened, economic and technological changes dictated a substantially lower growth in demand. For example, discontinuing the use of chrome bumpers on cars or more effective nickel scrap recycling. Slower growth coincided with nickel producers becoming ruthlessly efficient, with the result that in the foreseeable future, all nickel will come from land-based operations.

Inco, in tact, in the '70s and early '80s, did participate in an international consortium of companies interested in exploring the possibility of undersea mining.

The technology was developed successfully but the project was shut down. I recall one scientist saying the nodule recovery operation from a ship at sea was the same as standing on top of the Empire State Building and trying to suck a pebble from the sidewalk through a straw.

The technology worked, but it was not feasible economically. Someday the world will be ready for deep sea mining, but I suspect it will be well into the 21st century.

Your second question asks why we do not establish a company to produce consumer goods. It is doubtful that we will ever develop a company to produce nickel-containing consumer products because that would mean ultimately competing with our own customers.

For example, in times of nickel shortage we would likely end up using the nickel that our customers want and that would certainly cause us to lose those customers. We really don't think it makes sense for us to get into the consumer products business when so many of our customers are in that business. Inco does encourage manufacturers to use nickel products through participation in The Nickel Development Institute. Inco is a founding member of The Nickel Development Institute, an international organization based in Toronto.

Is Inco being singled out for extensive and expensive greening work?

The Institute was organized in 1984 to carry out market development activities, market exploration and applications-oriented technical research.

It provides technical service to nickel consumers and others who are concerned with nickel and nickel-containing alloys and their uses. From offices in North America, Europe, Japan, Central and South America, India, Australasia and South Korea, the Institute staff work closely with designers, architects, engineers and others in the selection of materials for manufacturing and construction.

We believe there is benefit in selling 'value-added' nickel products and, in fact, we do so through our alloy and engineered products operations worldwide. As well, we are researching ways to enhance our primary nickel products to add value to them. We do not think it would be profitable, however, for Inco to get into the business of creating consumer goods. We would rather sell nickel to those companies that create goods.

Q: Will Cuba affect our nickel prices?

A: You are joined by many other employees who are curious about where Cuba's nickel industry stands in relation to the rest of the world market.

The Cubans produced 33,000 tonnes of nickel in various products during 1991. Their maximum one-year production in the past five years was 46,000 tonnes. Although they have plans to produce 50,000 tonnes this year, in the past they have experienced difficulties in meeting planned production levels.

To put the above figures in perspective, Russia produces over 600 million pounds of nickel per year while Inco produces in the 400 million pound range.

The Cuban nickel industry competes with us in the production of nickel for stainless steel manufacturing, mainly in the European marketplace. More than 60 per cent of the nickel produced worldwide is destined to be used in the production of stainless steel.

Q: One can observe that on a clear sunny day, little or no smoke issues from the smelter smokestack. However, on cloudy days and during the night or graveyard shift, smoke is observed to be quite volumnous. Is this practice actually reducing emissions or is it just a means of appeasing the environmentalist who can't complain about what they won't easily notice?

A: Your question about smokestack emissions is a good one. At our smelters in Sudbury and Thompson we operate supplementary control systems that, based on prevailing weather conditions, will call for reductions in sulphur dioxide emissions during periods of poor dispersion. We do our best to avoid elevated ground level concentrations that can prove harmful to sensitive vegetation. These conditions exist probably 30 to 60 days of the year during the early spring and sometimes during daylight hours.

Conditions at night are more stable and the sulphur dioxide emissions are dissipated fairly readily, avoiding high concentrations at ground level. The approach you described in your letter is common practice for most smelters and power plants around the world.

Q: Will Inco ever contribute land for further refuse location (dump site) to control the garbage problem of Toronto?

A: I agree that the City of Toronto has a serious garbage disposal problem. The provincial government has already vetoed a proposal that would have allowed Toronto's garbage to be impounded in two very large abandoned iron ore pits near Kirkland Lake.

We don't have any major pit or underground cavities to fill in Sudbury. Our mining methods include the backfilling of mined out cavities with cement and tailings. So, it is unlikely you will find Toronto's garbage at Sudbury's doorstep.

Q: I am concerned about the environmental issues in which Inco is involved. Inco has been successful in reducing emissions and in greening the Sudbury basin over the past years. My concern, however, is that the problem of the environment is not a local problem and I would like to know if Inco is working with other industries, countries and government to discuss and discover ways to continually improve.

A: Thanks for your note. I share your concern about the environment. Outside of North America, in the absence of legislation, we apply Canadian legislative standards to our operations. We conduct regular corporate environmental audits of our plants to ensure standards remain high.

Most interesting, in this age of information, environmental rules have become very portable. In countries like Brazil, for example, the environmental rules are almost identical, word for word, to the rules in North America.

We do participate with a number of Canadian and international organizations that focus on the environment. We have participated with United Nations committees, for example, and we have played an active role in international forums on the environment.

The Canadian mining industry recognizes the need to protect the environment and this is reflected in the Environmental Policy of the Mining Association of Canada and the environmental policies of many mining companies.

Inco's corporate environmental impact policy applies to all of our operations around the world. At present, it is being expanded to include health and safety considerations.

By far, the most valuable role Inco can play is to set an example. You recall the visit to the smelter last October by Prince Charles. That visit resulted in international media coverage that focused on our success in undertaking the biggest environmental project anywhere.

Pioneering work at Inco

9 Years Ago

"Twenty years ago Inco was the pioneer in the use of raise boring machines to make vertical access raises," said the Inco Triangle in November 1983. A raise bore machine is essentially an electrically driven hydraulic press that chips out rock by rotating tungsten carbide bits into it under high pressure.

Previous to this, access raises were carved out of hardrock by drilling, blasting and mucking. But in 1964 Inco brought the first raise bore machine to the Creighton Mine; and while other companies gave up on the technology, Inco bored more than a quarter million feet of raises with raise boring machines in the next 20 years.

In the mid '60s, raises (small inclined shafts used for ventilation ducts or ore chutes) were no more than three feet in diameter, but by 1983 Inco was boring its first 12-foot raise at the underground research facility in the Copper Cliff North Mine.

Planned in a couple of months were 16 foot raises at Copper Cliff South Mine and Little Stobie.

25 Years Ago

In 1967, two new reducer kilns and modern methods of process control made International Nickel Limited's refinery in Clydach, Wales one of the most modern metal refineries in the world.

The new kilns replaced 36 older models in the plant that reduced and volatized crude nickel oxide in the carbonyl nickel refining process, developed by Ludwig Mond and Carl Langer in 1889, and still considered one of the marvels of the scientific world.

Using only moderate temperatures and atmospheric pressure the carbonyl nickel refining process transforms crude nickel into a gas and then back into a solid, producing nickel of the highest quality.

The $10-million modernization program in the refinery also included the unit that produced hydrogen gas from naptha.

40 Years Ago

The largest blast in Inco history up to that time, in November 1967, sent the remains of two pillars crashing down into the huge open stopes above the 600-foot level at the Frood-Stobie number 3 shaft.

Loaded with 64 tons of 75 per cent Forcite powder, it reduced two pillar stumps between the 400-foot level and 600-foot level to 400,000 tons of muck, filling the box-holes at the bottom of the blasthole with enough ore to fill 14 miles of railroad freight cars.

From four drill drifts a total of 165,290 feet of drilling was required to prepare for the blast. Drilling alone required 2,000 man-shifts and 2,000 drill holes, positioned in a pre-determined pattern, the angles and lengths of which were determined by the amount of powder necessary to shatter the rock — approximately one-third of a pound of powder for every ton of ore.

Stick by stick the drill holes were loaded by hand with explosives and when the last cage of men had come up from underground on Saturday, November 1, the electrically wired explosives were detonated from the switchroom on the surface.

So expertly set were the explosives that only a muffled blast was heard — "not even as noticeable as an ordinary Open Pit bench blast," said the Triangle.

(Due to the strike that began in July of 1982, the 10 years ago section of this column has been moved ahead to nine years ago.)

Christmas canned goods drive:
A major project from humble beginnings

It's taken five years, but Edgar Burton has finally managed to 'box in' Inco.

For the first time, the Plate Shop machine operator's Christmas Canned Goods Drive will cover 100 per cent of Inco's Sudbury operations.

Starting with just two collection boxes five years ago, raising a modest $400 in canned goods, the ambitious project has grown annually. This year, 30 boxes placed at all mines, plants and offices will hopefully set new records in food collected from Inco employees for the needy.

"Our goal this year is to collect $20,000 in canned and dry goods for the Salvation Army," said Edgar. "We are counting on everyone to help do what they can to support this effort.

One has only to listen to the news to realize conditions out there have become even more desperate."

He appealed to Inco employees to help make the effort a success again this Christmas.

Edgar got his inspiration for the annual Christmas drive from his children. "In the fall of 1988 I was impressed by the efforts of the students of St. David's School where my three daughters were attending," he said.

"They were gathering canned goods to help the needy at Christmas. I decided that I would try to help in this cause here at Inco.

"I approached the Salvation Army with the idea of holding a canned goods drive here at the Copper Cliff Smelter. They were grateful and assisted me with some ideas to make the drive a success. I approached Smelter management and explained what I was trying to do and I was generously offered manpower and materials to build the first two donation boxes. I placed one box at the #1 Dry at Copper Cliff and one box at the North Mine warm room.

"We had good success at these two locations bringing in about $400 worth of canned and dry goods."

Encouraged by the success of the previous year, the project was expanded in 1989.

"Again the Smelter group generously supplied three more donation boxes for the 1989 Christmas drive. South Mine, the Iron Ore Plant and Creighton areas joined in with the Smelter and North Mine. It was a great success. We collected more than $1,200 in canned goods and dry foods for the needy."

The following year, the unemployment picture was worsening and the number of needy families in Sudbury was increasing rapidly. "I made an appointment to see Smelter management and they were ready for me. This time we decided to double the coverage area. The Smelter generously provided five more donation boxes which were set up at Levack Mine, McCreedy Mine, Coleman Mine, and the last to the Modified Work Centre. Once again, unit and staff employees were provided to monitor the donation boxes.

The overall response was very good. More than $3,500 in food stuffs was collected."

In the summer of 1991 it was decided that the drive should include 75 per cent of Inco's Sudbury operations. The union Safety and Health representatives were asked to help monitor the donation boxes and they agreed. The men and material to build the required 73 boxes were again offered, and the Transportation Department joined in to lend a hand to distribute the 23 boxes to each area. Unit and staff employees volunteered to monitor the donation boxes.

"We were grateful for the extra efforts and generosity of the Inco employees who brought in over $8,500 worth of goods to the Salvation Army."

Edgar credits the success of the annual project to the support it's received from Inco people, including the supervisors and management at Divisional Shops for their generosity in providing many hours on the endeavour every year.

NOTICE

Inco Energy Awareness Mascot Contest entrants

Because of the continuing response to our energy mascot-naming contest announced in the October Triangle, the deadline for submissions has been extended. The winner will be announced in a future Triangle.

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