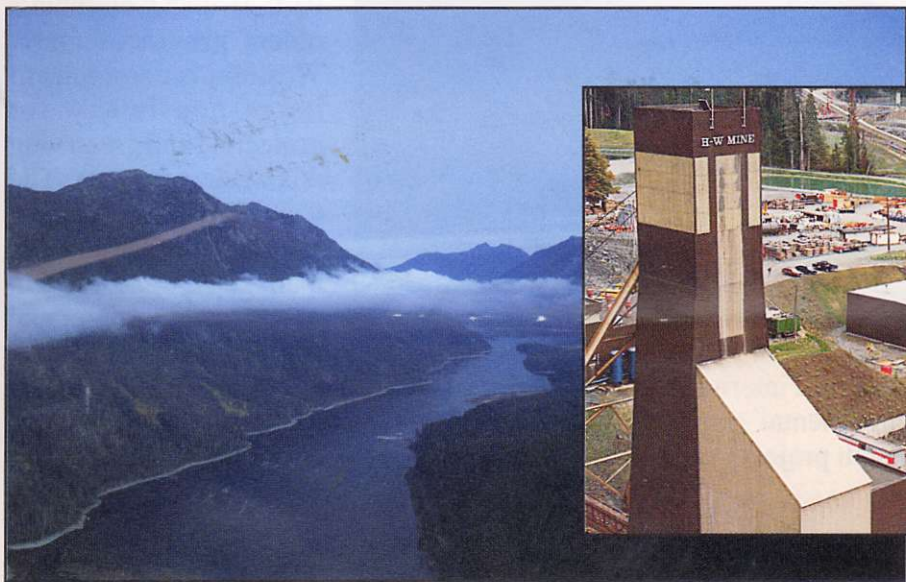


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## MYRA FALLS OPERATIONS

*Campbell River, British Columbia*

# WELCOME

Westmin Resources Limited is proud of its modern mining facilities located near the south end of Buttle Lake on Vancouver Island. A 90 kilometre highway from Campbell River provides access to the scenic minesite.



With operations surrounded by Strathcona Park, British Columbia's oldest provincial park, Westmin is conscious of its responsibility for protecting and preserving this wilderness area. The Company's determined approach to environmental management and its state-of-the-art environmental protection technology

have earned international recognition. Westmin places high priority on the environmental standards of its operations and continues, with various research projects, to improve these standards.

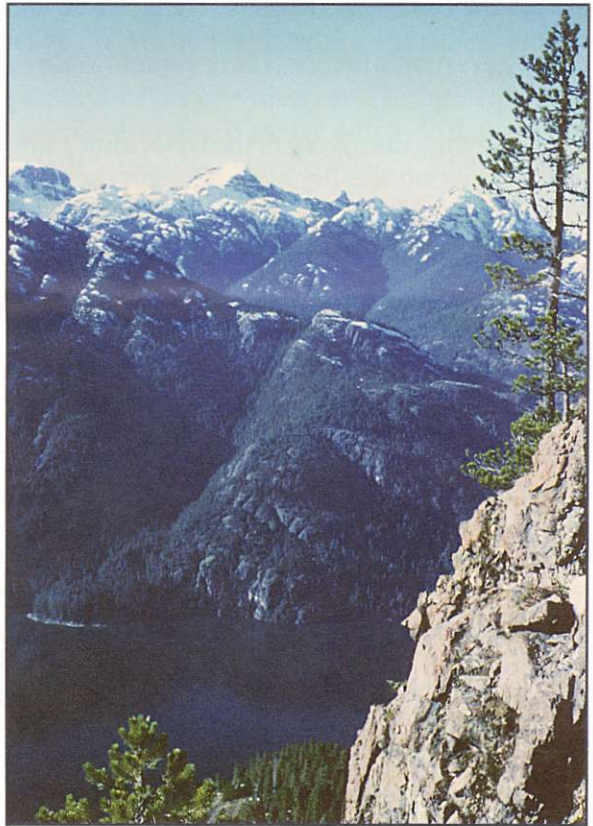
## *the Myra Falls Operations*

Most of the approximately 400 employees at Myra Falls have made their homes in the region. They work as partners with the community and the environment, enjoying and cherishing the area's beauty. During your stay, Westmin asks that you also help to maintain these picturesque surroundings so future visitors may enjoy this natural wilderness park.

Myra Falls Operations consists of one active underground mine, the H-W, and three others which are currently inactive or mined out, a concentrating plant, offices, camp facilities, two hydroelectric generating plants and a tailings disposal area with water treatment ponds and associated facilities.

Copper and zinc concentrates with significant gold and silver values are produced at Myra Falls. After being trucked to Westmin's Discovery Terminal storage and loading facility in Campbell River, concentrates are transferred to ships destined for smelters in Japan, Korea, Canada and elsewhere. There, the concentrates are further processed to yield final metal products.

Copper is primarily used in the manufacture of wire, tubing and sheeting for use in houses and buildings, electrical and electronic products, telecommunication systems and power equipment. Zinc's resistance to atmospheric corrosion makes it an attractive coating for steel and, as such, it is used in the automobile and construction industries. Zinc is also alloyed with copper to make brass and with other metals for use in diecasting precision parts. Zinc powder is an important ingredient in cosmetics, sun protection and tires.



# HISTORY

For thousands of years, prospectors have braved the unknown wilderness in search of fortunes in gold, silver and other minerals. They believed that the Earth's riches in the form of precious and base metal deposits, could be unlocked through their ingenuity and courage.

One such group of prospectors was James Cross and Associates of Victoria, who combed the largely unknown wilderness in the Myra Falls/Buttle Lake region during the early part of this century. In 1918, they staked the claims covering the H-W, Lynx, Price and Myra Mines. Today, these claims make up a sizeable portion of Westmin's Myra Falls property holdings.

Following discovery of the Lynx mine mineralization, the next challenge was evaluating the deposits beneath the earth's surface. The Paramount Mining Co. of Toronto started the first development work in the area during the 1920's but inconclusive findings, along with the remoteness of the area and depressed metal prices, resulted in little work being done in the Myra Valley until 1959 when the Reynolds Syndicate acquired the claims. This group then sold the claims to Westmin's predecessor company, Western Mines Limited, in 1961.

In 1966, the Lynx Mine started as an open pit operation, producing 860 tonnes per day of ore, containing gold, silver, copper, lead and zinc by late 1967. As mining of the Lynx open pit continued, diamond drilling established underground ore reserves. An internal shaft was sunk to a depth of 335 metres with horizontal levels at 46 metre intervals. Seeing favourable exploration results, the company decided to bring this underground operation into production. The Lynx open pit mine was completed in 1975; however, the Lynx underground mine produced until early 1993, at a rate of approximately 8,500 tonnes of ore per month, until operations were suspended for economic reasons.

Until 1966, when Westmin built the present 50 km highway along the east side of Buttle Lake, the only access to the mine site was by boat or barge

on Buttle Lake. All workers, construction equipment, materials and supplies were transported to the site via the lake until the road was built.

The Myra mine orebodies were discovered in late 1969 and underground development quickly accessed these high grade deposits. This mine operated from 1972 to 1986 and produced over 1 million tonnes of ore rich in gold, silver and zinc.

The Price Mine, another of the first three deposits discovered in the area, lies adjacent to the Myra Mine, but on the other flank of Mt. Myra. Unlike the others, this mine's development has been limited and it has not yet been brought into production.

In 1976, an aggressive exploration program began to help counter the inevitable decline in the Lynx and Myra ore reserves. In late 1979, this program was successful in locating the large massive sulphide deposit now known as the H-W deposit. "H-W" stands for Harold Wright, first President of Western Mines and a current director of Westmin Resources Limited.

## *"in search of treasures"*

Following additional drilling, development and feasibility studies at the new H-W Mine, a 716 metre, six-compartment shaft was completed. This is serviced by a 49-metre-high headframe. In 1985, after completion of a 1.4 kilometre conveyor to the new mill, the mill itself and a number of support facilities, initial production averaged 2,700 tonnes per day. Mill production capacity was later increased to 3,650 tonnes per day in 1989. An intensive exploration and stope development program is currently underway to meet and sustain this production target and increase ore reserves.

## GEOLOGY

Mining is a process of discovery and development. A team, comprised of professionals such as geologists, geophysicists, diamond drillers, mine-planning engineers and other technical specialists, locates and maps mineral deposits containing valuable metals such as copper, zinc, gold and silver.



Although it is commonly thought that base and precious metals are found in solid veins of pure metal, they usually occur in chemical compounds known as sulphide minerals, distributed throughout the rock. Even in a massive sulphide deposit, ore may contain less than 50 per cent sulphides and less than 15 per cent pure metals.

For example, in high grade orebodies such as some of those at Myra Falls, one tonne (2,204.6 pounds) of rock may contain approximately two grams of gold, 30 grams of silver, 50 pounds of copper and 100 pounds of zinc. In many lower grade mineral deposits, the metals which occur in sulphide minerals are more sparsely distributed, resembling raisins in a cake. Finding these orebodies is like finding a needle in a haystack, especially when geologists must rely on mere 50 millimetre (two-inch) diameter drill-hole core samples to provide the clues which tell them where ore may be located.

Each year millions of dollars are spent in search for ore reserves for future mining activity. While the sulphide deposits which make up the various orebodies at Myra Falls are being mined, further exploration is necessary to maintain the ore reserve base and prolong the life of the Myra Falls Operations.

An understanding of how orebodies are formed is one of the main tools in the process of discovering new reserves. Specialists must analyze all

available data and decide where exploration drilling should be done. The result of exploration drilling is a drill core which is logged (examined) in its entirety and sampled at intervals to obtain assay tests of specified zones. These geological and assay results are then compiled by geologists and mine-planning engineers to determine if mining is warranted and to establish a mine design.

Orebodies in the H-W, Lynx, Myra and Price mines are located within a 450 metre thick stratigraphic sequence of volcanic rocks of Permian age known as the Sicker Group. This sequence of rocks is approximately 350 - 400 million years old and consists largely of volcanic rocks deposited on the ancient sea floor. Orebodies within the Sicker Group are associated with favourable bands of volcanic rock known as rhyolites.



Three rhyolites are recognized in Westmin's Myra Falls properties. Lynx, Myra and Price orebodies outcropping above the valley floor belong to one of two "upper" rhyolitic horizons. The "lower" rhyolitic horizon hosts the H-W orebody, about 300 metres below the valley floor. At the Lynx Mine, the numerous individual ore lenses typically occur at the top of the rhyolite. H-W Mine ore is at or near the base of the lower rhyolite.

## *finding and unlocking nature's hidden treasures*

The orebodies trend in a northwest/southeast direction over a known length of 6,100 metres in the Lynx/Myra/Price and H-W rhyolitic horizons. The major ore minerals are sphalerite (zinc sulphide), chalcopyrite (copper/iron sulphide) and galena (lead sulphide). These ore minerals occur as either massive fine grained lenses or are disseminated in the rhyolite or sericite schist.

# MINING

People who work underground are given extensive training to handle the sophisticated equipment and unique environment more than 300 metres below the earth's surface. The mines generally operate three shifts a day, five days a week, whereas the mill runs seven days a week.



Personnel and equipment are transported to the heart of the mining operation in elevator-like cars called cages. The cages travel up and down a vertical shaft using a cable system similar to that used in an elevator. The H-W shaft descends 716 metres into the earth.

Underground on each level, a network of drifts or tunnels extends from the shaft to reach actual mining areas referred to as stopes. Mining is a continuous process consisting of drilling, blasting and removing the broken ore. When ore is removed and the valuable minerals are separated from it, about 60 per cent of the ground up waste rock (or tailings) is placed back into the mine as backfill.

The H-W orebody is a thick massive sulphide deposit which allows for a bulk mining system utilizing rubber-tired diesel equipment. Parts of the Lynx Mine have also been modified to allow some use of this type of equipment.





H-W ore is transferred from stopes to orepasses ( which are vertical or sub-vertical tunnels through which broken ore moves by gravity) using load-haul-dump vehicles commonly known as scooptrams. Once in the orepasses, ore drops into waiting train cars on 24 Level and is trammed to the coarse ore bin. Due to wide variations of stope ore grades, the ore is blended through specific tramping patterns to ensure a

more consistent ore grade at the concentrator.

### *the treasures of the underground*

When ore reaches the primary jaw crusher underground, it is broken down into pieces approximately 150 millimetres thick. Ore is then loaded into an 11.5-tonne capacity skip. There are two counter-balanced skips, or giant metal buckets, in which the ore is hoisted up the shaft to a 100-tonne storage bin in the headframe.



From the storage bin, ore travels on a 1.4-kilometre-long conveyor to a 3,600-tonne coarse ore bin at the concentrator.

## H-W



## Underground Maintenance Facility

More than three hundred metres below surface in the H-W Mine is a huge maintenance shop containing five work bays, a drill repair bay, electrical shops, a warehouse with computer facilities and a lunchroom. Over one hundred pieces of equipment operate underground at H-W, including trucks, scoop trams, drill jumbos, longhole drill rigs, a road grader, bulk explosive vehicles, scissor-lift trucks for ground control work, various personnel carriers and mobile service vehicles for tradesmen.

## Ventilation

A large amount of ventilating air is required when mining with diesel powered equipment underground to remove exhaust gases as well as blasting fumes and smoke. At Myra Falls, Westmin has ventilation fans installed which move more tonnes of fresh air through the mine than tonnes of ore removed. H-W ventilation fans installed on the surface, even with buffers and mufflers, were found to produce an annoying whine which could be heard by Strathcona Park hikers miles away. After considerable investigation and expense the Company purchased new energy efficient fans and installed them deep underground to solve this noise problem.



# MILLING

The ore from the mines, already broken into minus-150-millimetre pieces, is taken to the mill or concentrator. The mill is also known as the concentrator because that is exactly what it does: it concentrates the ore minerals and separates them from waste rock.



The milling process begins when ore reaches the secondary crusher. Here the rock is crushed and recycled back to the crusher until it is broken down into small pieces approximately six millimetres thick. After crushing, the ore passes through a rod and ball milling process which grinds it into fine particles. These particles are mixed with water forming a slurry.

This slurry, now ready for separation, is then passed through flotation cells where the chemically treated ore particles are separated from waste particles, floated to the surface with bubbles, and skimmed off as a bubbly froth. Copper mineral particles are recovered first and then the slurry is recirculated and zinc particles are removed. Gold and silver are not separated at Myra Falls but are contained within the base metal concentrates and recovered when concentrates reach the smelters.

## *the treasure surfaces*

Samples are taken regularly to determine the grades (percentage) of copper and zinc contained in the concentrates as well as the amount of other metals such as gold and silver.

Copper and zinc concentrates are then pressure filtered to remove water before being transported by truck to Westmin's storage facility at Discovery Terminal in Campbell River. Every three to four weeks Westmin concentrates are loaded onto barges or ships, destined for smelters in Canada or around the world.



## ENVIRONMENT

Strathcona Provincial Park is B.C.'s oldest provincial park and is the largest one on Vancouver Island, covering 231,000 hectares. Westmin's mineral claims cover about 3,000 hectares; but the area of surface installation and disturbance is about 120 hectares, or about 0.052 per cent of the park area. Despite this small surface disturbance, Westmin takes its responsibility to minimize and mitigate its impacts on the park environment very seriously and continues to research ways to reduce its current impacts and improve its post mining reclamation.

In the early 1980's when Westmin requested approval to expand its operations it had to meet specific guidelines set by the Government of British Columbia as well as address concerns of the local community. Two of these were requirements to cease deposition of tailings onto the bottom of Buttle Lake and to reduce the quantity of metals leaching out of waste rocks and finding their way into Buttle Lake. To do so, surface and ground water treatment systems were installed during July and August of 1982. A new on-land tailings disposal system was devised using a "sub-aerial" technique to produce a seismically stable, dry-land mass. Since installation, this system has performed to expectations and can be fully reclaimed when mining is completed. As part of the facility, tailings drainage and ground water are now collected by a specially designed under-drainage system. These waters are pumped to the Myra ponds, an integrated water management system, for treatment.



Detailed monitoring, undertaken not only by Westmin but also by Federal and Provincial agencies, has proven that the new, combined systems are effective. Currently, Buttle Lake water quality more than meets Federal guidelines for the protection of fresh-water aquatic life and is significantly better than the water quality in 1971, when monitoring commenced.

## *preserving for future generations*

Studies of the area, completed in late June 1983, by Dr. Pederson of the University of British Columbia, and more recently by Rescan Environmental Consultants, show that previously deposited tailings have had no effect on Buttle Lake. They have not leached and are most unlikely to because of the oxygen-deficient nature of the lake bottom. This, and other reports, indicate that the tailings do not contribute to metals in the lake and they are now being covered by a natural, organic-rich layer of lake sediment.



Reclamation, the rehabilitation of disturbed areas, is an integral part of today's mining processes. At Myra Falls much has been done to return areas of the mine site to their original appearance through the use of landscaping and vegetation designed to make the site blend in with the surrounding park land.

# Environment *(continued)*

Obsolete installations have been removed from the site to improve its overall appearance. These include the old mill, the road, bridges and pipeline once used for disposal of tailings to Buttle Lake and many other facilities used before the construction of the H-W mine. Sites used for surface

diamond drilling are reclaimed to the point where no visible evidence of any drilling activity remains. A five year project completed in 1993 involved roadside rehabilitation along the 6 kilometre access road to Jim Mitchell Lake. This road was constructed through some very rugged, mountainous terrain and extensive use of bio-engineering techniques was necessary for slope stabilization prior to seeding and planting. Close to 30,000 native trees and shrubs have been planted in addition to seeding with grasses and legumes. This road now forms the access route to a new trail to the Bedwell Lake area of the park, built partially with Westmin financing.



The overall objective of Westmin's reclamation program is to return as much of the site as possible to its natural, pre-mining, productive state prior to it reverting to Class A Park status after completion of mining. To this end the Company is engaged in ongoing research, and supports research being done by others, to determine the most effective reclamation methods and to minimize any possible long term effects from its waste rock dumps and tailings deposit. Much of this research is being conducted in cooperation with industry and government agencies and has been recognized at several international forums.



## POWER GENERATION

Mining and milling on the scale of the Myra Falls Operations requires considerable electrical power, and therefore Westmin operates two hydro electric plants. The Thelwood Hydro plant fed from the Thelwood and Jim Mitchell Lakes, generates eight megawatts, while a second, smaller hydro plant, fed by Tennent Lake, provides the operation with an additional three megawatts. With supplementary power from diesel electric generators a total of 12 megawatts is used to run the mine, mill and support facilities.



# SOCIO-ECONOMIC IMPACTS

Operations like Myra Falls Operations have an economic impact spreading far beyond the mine entrance. A report recently completed by McKay, Rivard & Co., economic consultants, estimated that for the year 1991 Myra Falls Operations generated \$48.6 million of total income and 1,229 total jobs within the Regional District of Comox Strathcona and more outside.

The \$48.6 million in income was made up of \$27.5 million in wages, pensions and dividends to our employees, retirees and local shareholders (direct income) and \$13.1 million by the income component of the local purchases of our suppliers and employees (induced income). Working this backward it means that every \$1.00 of direct income from the mine generates \$1.77 in total regional income.

Applying provincial and national income multipliers of 2.5 and 3.0 respectively which are appropriate for the mining industry, means there is an additional \$20 million of income generated elsewhere in the province and an additional \$13.7 million nationally for a total of \$82.2 million of income generated in Canada.

The employment impacts work somewhat the same way. There are about 400 employees at Myra Falls (direct employment). Employment of our suppliers and contractors in the region is estimated at 230 (indirect employment) and the spending of our employees and suppliers/contractors results in an additional 540 jobs in the region (induced employment). This comes to a total of 1,180, which means each direct job generates 2.95 total jobs in the region.

Using applied employment multipliers of 3.0 and 3.3 for the province and the country to estimate employment outside the Regional District, it is estimated that the Myra Falls Operations generates an additional 120 jobs in B.C. and a further 135 in the rest of Canada - for a grand total of 1,435 jobs.

Another significant impact of Myra Falls Operations is taxation, which generates a significant portion of the income and employment outside the Regional District. The Company is currently paying over \$4 million in direct, non-profit based, taxes to three levels of government - mainly in the form of sales taxes and property taxes. When we again become profitable we will also be subject to income tax. The taxes breakdown is summarized below:

Local Taxes	\$1.07 million
Provincial Taxes	\$2.96 million
Federal Taxes	\$0.12 million
Total Taxes	\$4.15 million

In addition to these company taxes, there is an even larger level of payroll deductions such as employee income taxes, U.I.C. and C.P.P. for various governments. For 1991 these totalled \$9.7 million.

You can see by these numbers that the positive economic impact of Myra Falls Operations on the Regional District and the B.C. economy is quite significant; other mines in the province have similar impacts. In fact, although the B.C. mining industry employs less than 14,000 workers, which is about 1/2 per cent of our population, we generate 5% of the wealth, and 22% of the Province's exports. We do all this having disturbed less than 1/10 of 1% of the land area of B.C. since mining began about 150 years ago.



**Westmin Resources Limited**

MYRA FALLS OPERATIONS

P.O. Box 8000

Campbell River, British Columbia

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**Fax: (604) 287-7123**

**Regular Tours once each day**

**Monday to Friday at 1:00 p.m.**

**May to August**



Arrangements can be made through the Employee Relations Office for special group tours anytime throughout the year.

