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SPEECH BY DR. GERALD HARPER, PRESIDENT OF GEDDES RESOURCES LIMITED AT THE WHITEHORSE GEOSCIENCE FORUM, NOVEMBER 28, 1989

AN OVERVIEW OF DEVELOPMENTS AT THE WINDY CRAGGY PROJECT

Geddes Resources Limited, Windy Craggy Project is located in the northwest corner of British Columbia (slide). For those of you who have attended previous meetings here in Whitehorse, you will be familiar with the project and the developments up to this time last year, when Rob Beckett, our senior geologist presented a paper on the geology of the Windy Craggy prospect.

In 1989 Geddes Resources will have expended more than 13 million dollars on the continued exploration and development of this property. This has to be added to prior expenditures which are in excess of 23 million dollars for a grand total of more than 36 million dollars. This amount is typical of the total capital costs of putting into production some of the recently developed small gold mines in Canada. It is also considerably more than the capital costs of some Nevada heap leach mines. On top of the 36 million dollars already invested we anticipate expenditures in 1990 of probably another 10 million dollars will be required to complete the additional work required to provide adequate data for the completion of a feasibility study. Forty-six million dollars is a lot of money - all risk equity investment. What is the justification for this superlative effort and expenditure? The answer is simply that Windy Craggy is one of the few superlative deposits being explored and developed in Canada today.

Strong words, so I would like to spend the rest of the time available to me explaining to you why I believe they are justified. Although the deposit was discovered in 1958, prior to 1987 the sum total of exploration work consisted of surface and airborne geophysical surveys and a very limited amount of diamond drilling from surface, totalling 23 holes. While this drilling and geophysical signature provided a valid basis for the conclusion that there was a major deposit exposed on the sides of and beneath Windy Craggy Mountain (slide), it did not provide

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any sort of adequate quantitative basis from which to determine the technical or economic existence of a potential mine. In the three years from 1987 until now that has all changed.

The mountain topography (slide) and short summer season made it impractical to try and define the detailed dimensions of this deposit by surface drilling. A bold but expensive concept was developed, to drive a 1.8 km tunnel into the mountain and drill off the deposit from underground, immune from the elements (slide). The specific target for the tunnel was determined to be an area of very high gold values identified by one of the surface holes (#83-14; 61 metres at 9.2 g/t gold or 201 ft. at 0.3 o/t gold). If this represented part of a substantial tonnage of gold ore then a relatively low capital cost "fly in" gold mine might be established to finance the much greater cost of the ultimate mine.

The combination of flow through financing and a junior bull market in 1987 provided the opportunity for Geddes to embark on its ambitious program. After constructing an airstrip, mining equipment was flown in and the tunnel started in May (slide). Ten months later the access tunnel was completed and side tunnels extended to drill stations. The results of the first six drill holes directed up at the gold target were frustrating as they intersected a faulted area which caused serious deviation of the holes away from the target area but into the massive sulphide with remarkable core lengths of consistent copper and cobalt values.

For the next 14 months, until May 1989, drills worked around the clock to trace out the dimensions of the massive sulphide deposit (slide). At that point we had enough understanding of the deposit to identify the broad range of the development options available for the major massive sulphide resource identified by that time. The pace of activity increased, with drilling now focused on detailing the reserves, more tunnelling for metallurgical samples, geotechnical studies, surface trenching, engineering, surveying, air photography, seismology and environmental studies.

We now know that there are at least two major massive sulphide bodies (slide), the North and South, which extend over a horizontal length of at least 1,900 metres (6,250 ft.), reach a maximum width of at least 220 metres (720 ft.) and have a vertical extent of at least 700 metres (2,300 ft.).

Let's translate this into dimensions you should all be familiar with, assuming you watched the Grey Cup game two days ago. The main core of the South Zone has a horizontal extent approximately equal to that of the Toronto Sky Dome (slide). Right beside the Sky Dome is the CN Tower, the tallest man-made structure in the world (slide). The presently known vertical extent of that South Zone core is 500 ft. higher than the CN Tower. So imagine a Sky Dome towering 500 ft. over the CN Tower (slide). The ultimate horizontal and vertical extents are wide open and there are several hints that there will be parallel zones. Indeed, only in the last two weeks, in the course of drilling negative condemnation holes into the eastern wall of the North Zone in order to determine the nature of the anticipated waste rock that must be removed for the open pit, we intersected a new zone. I do not have any assays on it yet but it has presently been picked up in three holes in a horizontal fan and we have just started a vertical fan to trace its extent in that direction. Not content with the possibility of a third zone, in our continued drifting further to the north to provide additional drill stations for definition of the North Zone we encountered 100 metres of stringer mineralization. As mapping on the north side of the mountain picked up massive and stringer sulphide bearing outcrops with copper and zinc values 250 metres vertically above this area; we are speculating that there is yet another zone to the northwest.

Keeping up with reserve calculations under these conditions is impossible (slide). In August 1989 our consultants calculated geologic reserves in the North and South Zones as defined at that time (to only 15 metres north of the North cross cut) of more than 150 million metric tonnes.

This was a substantial increase from the previous calculation in May 1989 but most significantly, it decreased the proportion classified as POSSIBLE category from 66% to 25%. In other words, 75% is now in the PROBABLE category. Our next objective, assuming a 7 million tonne per year mining rate, is to upgrade the first five years reserve to PROVEN category. 35 million tonnes or 25% of the present reserve. As most of this volume will be the near surface material, we built a road to the mountain top this summer (slide). Detailed in-fill drilling from surface is planned for 1990.

An extensive range of engineering studies have been undertaken in the past 12 months which have covered all aspects of development, including mining, milling, location of mine and mill facilities, transportation of ore, low grade and waste, tailings, waste and low grade storage, power generation, access, concentrate transport and shipment, labour availability and transportation. From this we have identified twelve combinations which have been examined in sufficient detail to rank them by quantitative financial analysis and qualitative parameters including technical risk and environmental sensitivity. This has allowed the twelve options to be narrowed to a short list of four, all of which had similar "scores". These four are basically the same except for limited differences in a few of their component modules. For example, diesel versus hydro-electric power would be a trade-off of capital versus operating costs. More engineering and testwork is required to determine finally which of these four is the best.

The overall development anticipates initial operation at a scale of 20,000 tonnes per day or 7 million tonnes of ore per year. At this rate present reserves are sufficient for more than 20 years of operation. Even if production is subsequently expanded, future reserve additions are likely to give an ultimate mine life of more than 30 years (slide). Open pit mining would provide mill feed for at least the first 15 years, at which time a transition to underground mining would be contemplated. Milling would utilize conventional crushing, grinding and flotation techniques to provide maximum recovery of copper (estimated at 88%) in the form of a concentrate grading about 28% Cu with some gold and silver. This would be trucked to the port of Haines, Alaska for shipment to offshore smelters. Subject to further testwork, additions to the mill could be contemplated to increase recoveries of gold and silver and to produce separate marketable products containing cobalt and possibly magnetite and zinc.

For the first five years the average grade of ore mined would be almost 2% copper and the waste stripping ratio less than 1.4:1 (tonnes of waste per tonne of ore). Output would therefore average 450,000 wet tonnes of concentrate per year or 120,000 tonnes of contained copper metal. For comparison, 1988 production of copper by other major Canadian producers was:

Falconbridge	172,000 tonnes
Highland Valley	170,000
Inco	116,000
Westmin	26,000
Gibraltar	19,000

Truck transportation over the 255 km road distance to Haines would require 25 - 30 loads per day, a frequency of slightly more than one load per hour.

(slide) Mining would be a conventional truck and shovel operation with non-acid generating waste rock being trucked out of the pit to dumps; mill feed and low grade, potentially acid-generating rock would be dumped into shoots in the pit floor which would drop the rock down to the level of the present exploration tunnels. Here it would be crushed and fed onto a conveyor system for transport along an enlarged version of the present tunnel to the mine entrance. Low grade material would be stacked in special storage areas designed for reclaim and acid water run-off control. Mill feed would either be trucked to the mill or be ground to a slurry consistency suitable for transport by pipeline 11 kms to the mill located in the upper Tats Creek Valley. Eight kms of this pipeline would be on the Tats Glacier. This portion would require special engineering with a thick gravel pad on the ice surface, insulating the ice, accommodating the minor movement and supporting an access/service road as well as pipelines for slurry and returning water. One of the competitive alternatives to this surface route is a deeper, longer tunnel and conveyor which would have a high capital cost but lower operating risk.

The waste material or tailings from the mill would be discharged into a dammed off area in the Tats Creek valley. Neutralizing limestone will be added and the quality of in and outgoing water will be monitored. The dam would be built high enough for the tailings to be permanently underwater thus eliminating further oxidation and production of acidic water. The constant head of water would also allow the overflow to be fed to a hydro-electricity generating plant which would buffer the operation from fluctuating operating costs that could arise from total dependence on fossil fuels.

Finally, but not least, how compatible with the environment is the proposed Windy Craggy Project? All facilities related to the mine and process plant would be within a relatively small area of Tats Creek Valley out of sight and sound of all main travel corridors. The facilities would be designed, built and operated with state of the art environmental controls.

Our studies have identified the main areas of environmental concern as the road corridor and disposal of potentially acid-generating tailings.

Acid-generating tailings are not unique to this deposit, so we have been able to benefit from others experience. The contemplated system will reduce the chemical reactions generating acid water to a minimum and secondly will neutralize any acidity. The whole mine and mill complex areas will be contained within a single monitored and treatable drainage catchment area. Much of the neutralization will occur naturally as a result of directing the run-off into or over areas of soluble limestones. What can't be handled this way will be dealt with using quarried limestone of which there is an abundance at the site.

The impact of the access road and its resulting frequency of trucking, will be on the wilderness recreation area and the wildlife habitats it passes through. Provided that access to the road is limited to mine-related vehicles, the frequency of use is unlikely to be sufficient to cause disruption to the wildlife habitats. We can also implement measures to protect and assist the wildlife populations.

The impact on the wilderness recreation area gets into the area of subjective judgements. The area to be traversed by the road is not one of great scenic beauty or abundant recreational use. Nevertheless every effort will be made in locating the road route to keep it invisible from the Tatshenshini River other than at the bridge crossing (slide). The section where the road route will be close to the river but mostly out of sight extends for about 25 kms from the confluence of the Tatshenshini and O'Connor Rivers to where the route turns up Tats Creek (slide). Over this length the Tatshenshini River is in a broad valley with a river bed 1/2 a km wide characterized by meandering channels, not fast-flowing rapids. This is not an area used by mountain climbing or hiking groups as it does not contain spectacular alpine terrain. It is frequented by rafters, mostly in commercial tour groups of American origin.

Rather than having only a negative impact, the road could have the potential to provide a positive impact as it would provide an emergency exit route and an alternative for Canadian rafting groups that is not dependent on the United States and could therefore increase the Canadian benefits from rafting. The overall result could therefore be an increase in multiple uses and in particular wilderness recreational activities of the area as a result of development of the Windy Craggy Project.

Our major objective between now and year end is to complete the studies required for the Stage I environmental study of the Windy Craggy project for submission to the Mine Development Steering Committee of the British Columbia Government. They have an established process for reviewing proposed mine developments and their environmental impacts. We intend to continue to work with them through that process to confirm that Windy Craggy can be developed in an environmentally acceptable manner, to provide economic and social benefits and to create new wealth.