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ONTARIO HYDRO NUCLEAR - CHALLENGES OF THE FUTURE

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With the advent of an increasingly competitive, open access electricity market in Ontario and neighbouring regions, Ontario Hydro Nuclear (OHN) faces a number of short- and longer-term challenges that will ultimately determine the future of the organization and its 9500 employees.

However, OHN has many strengths to build upon in preparing for the competition ahead. These include:

- Extremely competitive production costs. At 1-2 cents a kilowatt hour, OHN's production, fuel and incremental capital costs are among the lowest of any nuclear utility in North America and are very competitive with coal or gas fired generators.
- Strong technical capabilities. Good technical expertise is key to supporting such a large nuclear program over the long term. With the completion of the Darlington Nuclear Station and the dismantling of the engineering and construction organization, OHN's technical resources are now focused entirely on ensuring that these plants run safely and reliably over their 40 year service lives.

OHN has demonstrated in the past that it can resolve major technical challenges -- from retubing Pickering A, to the Darlington fuel failure, to the cleaning and repair of boiler tubes. The challenge now is to avoid through good predictive maintenance the frequent, smaller problems that have plagued OHN's older units in recent years. Critical to this effort is the need to improve our operations, maintenance and administrative processes. And this, in turn, requires that we also improve the engagement of the staff in the business and their alignment towards the business objectives.

- Advantages of multiple units. Studies of top performing nuclear utilities around the world suggest significant advantages from multi-unit operations. These provide opportunities to share resources (and hence reduce costs) and to share learning and operating experience.

OHN needs to better take advantage of the opportunities for improvement by sharing resources and learning among its four plants. This is becoming a major focus of the

organization now that the generating divisions are more firmly established.

- Environmental advantages. The environmental benefits of nuclear power are bound to become more important as concerns about acid gas emissions and the greenhouse effect continue to rise in importance. However, in order to have credibility it is vital that OHN and other nuclear utilities continue to demonstrate good environmental performance.

This includes the management and eventual disposal of nuclear waste, which is one of the most important public concern issues we face in building acceptance of nuclear energy. OHN is actively participating in the current Nuclear Fuel Waste Disposal Concept Hearings. And we are committed to taking cradle to grave responsibility for our waste.

- Strong public support. Recent public opinion research indicates strong acceptance of nuclear power across Ontario. Recent events at the Pickering station, however, have caused concern and suspicion among residents and local officials in some of the surrounding communities. Efforts are underway to strengthen the relationship, and to improve communications.
- Improving station performance. Although there have been some setbacks along the way -- including the recent temporary shutdown of all eight Pickering units -- the performance of OHN's units is gradually improving, led by the Darlington Nuclear Station, which achieved an overall capability factor of almost 90 per cent last year.

Further Improvements Needed

Even with the advantages listed above, OHN faces the difficult challenge of improving overall performance even further in the face of a large current debt burden coupled with the reinvestment demands of aging units at Pickering A and Bruce A. One unit, Bruce 2, has already been shut down and layed up. This is the result of the depressed demand for power in Ontario, coupled with the multi million dollar investment required to retube the unit and replace the boilers.

Other Bruce A units will require major reinvestment as they come up for retubing over the next five to ten years, beginning with Bruce Unit 1 in 2001.

Various options are being studied on how to raise the hundreds of millions of dollars necessary to retube each of the units. Given Ontario Hydro's focus on debt reduction, there is a strong likelihood that the retubing will involve an infusion of private sector capital.

To attract private sector money will require confidence that retubing is a good investment. Ontario Hydro Nuclear has demonstrated that it has the expertise to safely and effectively retube its reactors -- as shown by the steady improvement in retube times recorded at

Pickering A. Moreover, a major initiative is underway to reduce both retube costs and the length of time the units must be taken out of service.

However, to ensure investor confidence, OHN must also improve the reliability of its older reactors at both Pickering A and Bruce A, which have experienced frequent unplanned outages in recent years.

Driving to Nuclear Excellence

Over the past year, OHN has studied the evolving electricity marketplace as well as the experiences of other nuclear utilities around the world. This resulted in the development of a strategic directions document, designed to prepare the organization for long term success. Fundamental to the success of the longer-term strategy is the "drive to Nuclear Excellence today for leadership in tomorrow's markets."

Nuclear Excellence involves the simultaneous achievement of top performance in safety, production reliability and cost. Research has indicated that rather than involving tradeoffs, good safety promotes reliable performance which, in turn, translates into lower production costs -- ie., by doing the job right. There are numerous examples of nuclear utilities in the United States and elsewhere that have demonstrated that significant overall improvements can be made in all three areas at the same time. In fact, it can be shown that good performance in one area is not sustainable unless matched by the other two.

Under Nuclear Excellence, OHN has set itself specific improvement targets for the Year 2000. These include:

- **Average station peer evaluations at "B" or better.** OHN uses peer reviews as a key internal driver of improvement. Our reviews are modelled after those developed by INPO (Institute for Nuclear Power Operations) in the United States. Although we keep our reviews confidential, so as to promote complete honesty, they are recognized internally as a vital measure of performance and an effective way of identifying and resolving future potential problems.

I don't mind telling you that I have been very disappointed by our peer review results in recent years. And I can assure you that management at all the stations now take the reviews very seriously. We are setting up systems to track and eliminate repeat findings, and we are devoting the needed resources and processes to ensure we tackle root causes, not just the symptoms.

- **An OHN average capacity factor of 80 per cent or better.** In the first quarter of 1996, it appeared that we were well on our way to achieving our 80 per cent target. Then we discovered a faulty check valve in Pickering's ECI system and we shutdown five of the units that were at the plant (the other three were already on maintenance outages). I'm not going to speculate on our year-end capacity factor numbers, but I can tell you that we are willing to

take the hit now -- to shutdown Pickering temporarily to correct a whole variety of potential problems -- in order to ensure more reliable performance in the future.

Last year, our capacity factor was 71 per cent. That might seem like a huge distance from the 80 per cent target, but there are numerous examples of other utilities that have made even greater leaps in improvement. And there are numerous utilities that have demonstrated excellent performance year after year -- in many cases, with units that have been in service for 20 or more years.

I am confident that we can achieve the 80 per cent target, though it won't be easy. Our Bruce A and B units are moving to high power operation as they've implemented various fixes to the power pulse concerns that were identified in 1993, forcing a derating of the units. Darlington is running very reliably. And up until the recent check valve shutdown, Pickering B was one of our best performing plants.

The biggest challenge is to improve performance at our older "A" plants. Despite some recurring problems, we are making headway. And we hope to see results in the near future.

- **An OM&A, Fuel & Capital Cost of 1.6 c/kwh.** Our cost competitiveness is inextricably tied to our production performance. The better our units run, the more electricity we can sell, and the lower the per kilowatt costs. Moreover, the more revenue we generate, the more money we can devote to debt retirement. And the more we reduce our debt, the lower our total costs.

We are not far our cost target, and provided we continue to improve performance we are going to be extremely competitive in the marketplace -- open access or not.

A United Effort

Achieving Nuclear Excellence requires the active involvement of all OHN employees, a challenge complicated by all the change and distractions the organization has experienced over the past several years -- and amplified recently by tough and protracted labour negotiations with the Power Workers Union and a great fear of privatization.

Strong leadership, communications and partnership with employee representatives will be vital in achieving nuclear excellence, as will the support of AECL and OHN's other partners in the industry.

At the same time, OHN has also begun strengthening its expertise in marketing and customer relationships -- areas that were previously of little importance to the operation of the business. The continuing evolution of Ontario Hydro's transfer pricing scheme is helping to prepare OHN for the workings of a real electricity exchange and spot market.

Although the future shape of Ontario Hydro is still under question, there are many reasons to

be optimistic about the nuclear side of the business. OHN is competitive now and will become even more so as we reduce our debt and continue the drive to Nuclear Excellence.