OPG NEW NUCLEAR AT DARLINGTON

ENVIRONMENTAL ASSESSMENT

FREQUENTLY ASKED QUESTIONS

APRIL 2009

www.opg.com/newbuild

ONTARIO POWER GENERATION

THE PROJECT

The purpose of the proposed OPG New Nuclear at Darlington Project is to construct and operate a new nuclear power plant at the existing Darlington Nuclear site in the Municipality of Clarington, Ontario.

Since the fall of 2006, Ontario Power Generation (OPG) has sought to engage the public in the OPG New Nuclear at Darlington Project and Environmental Assessment (EA). So far, we've held twenty-nine community information sessions, organized numerous stakeholder briefings and roundtable discussions, met with over 6,000 individuals at local events, and have established a project resource centre for community residents in the Bowmanville Mall.

OPG staff are asked many questions during these discussions. We have created this document to share with you the public's most frequently asked questions and our responses to those questions. An informed community is important to the EA process and OPG will continue to provide public members with opportunities to learn more about this potential Project.

We welcome any questions or comments you may have. For more information, please visit our website at www.opg.com/newbuild, or contact us through our toll-free project information line, 1-866-487-6006, or project e-mail address, NewBuild@opg.com.

The responses contained in this document reflect the present state of knowledge and may be revised at a future time should circumstances change. The assessment process is not a static one and must remain fluid.

ENVIRONMENTAL ASSESSMENT STUDIES

Aboriginal Interests

Q: Are Aboriginal interests being considered in this EA and if so, how?

A: Yes, Aboriginal interests are being considered in the EA. OPG has sought to ensure that Aboriginal views and perspectives are integrated into the EA at the earliest possible stage. OPG has engaged approximately 15 communities that may have a current and/or historic interest in the areas around the Darlington Nuclear site. This involves the following First Nations that are signatories to the Williams Treaty (1923):

- The Alderville Ojibway First Nation;
- The Chippewas of Georgina Island First Nation;
- Curve Lake First Nation;
- Hiawatha First Nation; and
- Mississaugas of Scugog Island First Nation.

In addition, OPG has sought the views and perspectives of other Aboriginal groups that may also have a current or historic interest in this area including:

- Mississaugas of New Credit First Nation;
- Métis Nation of Ontario;
- Kawartha Nishnawbe;
- The Oshawa Métis Council;
- The Ontario Métis Aboriginal Association;
- The Mohawks of the Bay of Quinte First Nation;
- The Huron-Wendat First Nation;
- The Chippewas of Rama First Nation;
- The Six Nations of the Grand River; and
- The Erie Indian Moundbuilders Tribal Nation.

OPG continues throughout the EA process to create opportunities to share information and solicit dialogue on, among other things:

- Whether the Project may have an environmental effect on any lands or resources currently used by Aboriginal Peoples for traditional purposes;
- Whether the Project may have any perceived impacts on Aboriginal and Treaty Rights;
- Whether local and traditional knowledge can assist in describing the existing environment; and
- Proposed VECs that have been identified for the assessment.

A separate Technical Support Document (TSD) on Aboriginal Interests will document this in detail.

Agricultural Interests

Q: How does the EA look at farming activity and agricultural use of lands surrounding the site?

A: The OPG New Nuclear at Darlington EA documents the current agricultural use of lands, including farming activity, in the Local Study Area (LSA). The EA examines the extent to which Project works and activities may affect current farming activity. For example, the lands south of the 401 and north of the CN rail line could be potentially impacted by site preparation activities. The EA includes consideration for mitigation measures should it be determined that the Project would have an effect on surrounding agricultural property.

Q: What's being done to look at agricultural produce outside of the direct fence area in terms of monitoring?

A: OPG currently conducts radiological environmental monitoring programs in the vicinity of Darlington Nuclear. These programs involve the sampling of air, precipitation, lake water, well water, soil, beach sand, lake sediment, local fruits, vegetables, milk, honey, fish and direct radiation exposure. Many of these samples are collected on the properties of local farms including milk, garden produce and silage.

The results of the extensive monitoring programs are reported each year to the Canadian Nuclear Safety Commission as part of a licensing requirement and are made available to the public. These results are also used to estimate the level of radioactivity received by the public (dose levels). Public dose levels from OPG's Darlington Nuclear operations are typically less than 1/1,000 of the regulatory limit.

For this EA, an assessment of potential effects from a new nuclear generating station to agricultural products will be undertaken. Should the Project proceed, the radiological environmental monitoring program would account for the new station.

Aquatic Biota/Surface Water

Q: Does the EA look at the effects on drinking water quality?

A: Yes, the EA looks at the potential effects on drinking water. Lake Ontario serves as a source of drinking water and recreation for communities in the Regional and Local Study Areas. Surface water from water supply plants, lakes and streams, and the proposed discharge structure will be analyzed for contaminants as they represent potential exposure pathways to humans.

As part of OPG's annual Radiological Environmental Monitoring Program (REMP) in support of our ongoing operations, drinking water samples are taken from three Darlington Nuclear-area water supply plants (which are sampled twice daily) and local wells. Monthly well water samples are also collected from farms and residents near the Darlington site. OPG's 2007 Radiological Environmental Monitoring Program (REMP) can be viewed at www.opg.com/news/reports in "Nuclear Reports and Publications".

Q: Does your EA assess lake water quality?

A: Yes. The EA examines lake water quality from many perspectives: Regional, Local and Site Study Area drainage; conventional chemical characteristics; radiological water quality parameters; and sediment quality are all assessed. The study also determines the effects on various water uses including drinking, recreational, industrial and use by fish and other biota.

Q: Does your EA look at the effects on fish from potential lake infilling?

A: Yes. The EA examines potential effects on fish species and their habitat should the Project require lake infilling. Valued Ecosystem Components (VECs) have been selected to assess potential effects on fish and fish habitat. These VECs consist of key fish species that represent the aquatic ecosystem as a whole.

Atmospheric Considerations

Q: How are you assessing air quality to ensure that the Project will not pose air quality issues in the Municipality of Clarington?

A: Air quality assessment is an important part of this EA and is based on a standard approach. The key steps used to assess air quality for this study include:

- The collection and review of data pertaining to baseline air quality, meteorology (i.e. temperature, precipitation and wind) and climate;
- Estimating emissions based on data from OPG reports or standard methodologies;
- Identifying sensitive receptors to include in the effects assessment;
- Documenting weather data from the Darlington Nuclear meteorological station (and other local stations as required);
- Use of atmospheric dispersion models to estimate downwind air concentrations from emissions to air resulting from project works and activities; and
- The comparison of predicted air concentrations to Canadian and Ontario regulatory criteria for air quality. This will help determine how the potential Project may impact air quality.

This will be further described in a separate TSD on the Atmospheric Environment.

Climate Change

Q: How does the EA consider global warming and its potential impact to the Project?

A: Studies by Environment Canada and the Intergovernmental Panel on Climate Change indicate that predicted increases in global mean temperatures could result in the following changes in Ontario over the next 100 years, among others:

- Northward shifts in climatic zones;
- Intensified droughts and flood due to El-Nino events;
- Greater frequency of higher intensity precipitation events; and
- Increases in Great Lake water temperatures.

The EA studied the potential impact that climate change may have on the Project from these types of changes.

The EA also examined the potential effects that the Project may have to climate, including the potential production of greenhouse gas emissions. Greenhouse gas (GHG) emissions are very limited at nuclear sites and do not result from regular station operations but primarily from auxiliary backup systems and from on-site vehicular traffic. During the construction of a new nuclear station, the operation of construction equipment will release small quantities of GHG in excess of existing operations at the site. Therefore, GHG emitted during construction represents a maximum scenario for the Project and was used to assess the potential impact of the Project in this regard.

Human Health

Q: Are there any health effects associated with living near a nuclear plant?

A: There are no health effects associated with living near a nuclear plant. For OPG, nothing is more important than the safety of staff, the public and the environment. It guides our focus for every task we do, each and every day. Continuous monitoring of our station emissions assures OPG and the public that we are operating well below limits specified in the terms and conditions set in our operating licence. In fact, as a company, we voluntarily set more stringent operating targets for ourselves than those which are required by law.

By their very design, nuclear plants minimize emission releases through the use of robust safety equipment and high international standards when it

comes to operating procedures to protect the health of employees and the public. OPG also has multiple safety barriers including an exclusion zone of about 1 km which separates the public from the reactor building.

The data from routine testing and monitoring of plant operations, employee doses, plant emissions and environmental levels of radiation are compiled and provided to the public in annual reports. The preparation and public release of these annual reports is a regulatory requirement of the Canadian Nuclear Safety Commission (CNSC) which must receive and agree to the contents of these reports. Copies of recent reports that have been released to the public may be found on OPG's website, www.opg.com.

Radiation and Health in Durham Region 2007 is a descriptive study that was undertaken by the Durham Region Health Department. The study examines rates of various cancers and congenital anomalies and stillbirths in areas surrounding the Pickering and Darlington Nuclear Generating Stations. The study concluded that rates of cancer, congenital anomalies and stillbirths in Ajax-Pickering and Clarington did not indicate a pattern to suggest that the Pickering and Darlington Nuclear Generating Stations were causing health effects in the population. The study concluded that given the extremely low levels of radiation exposure from the nuclear stations, it would be unlikely that any effects would occur.[1] Additional information will be provided in a Human Health TSD.

Q: Do the different reactor designs being considered have different radiological emissions?

A: Yes, each reactor design has a specified anticipated radiological emission output based on its design and operation, as well as the design of the liquid waste clean up system. The CNSC establishes stringent requirements for public dose arising from plant operations for all nuclear reactors in Canada. The reactor technology to be selected by the Ontario Government will need to meet CNSC requirements in order to be licensed and will be regulated by the CNSC.

Q: Are you conducting epidemiological studies as part of this EA?

A: This EA includes an assessment of potential human health effects according to the World Health Organization's definition of health which is, "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".[2] We look at conventional aspects (i.e. noise, air and water quality), as well as radiological aspects (i.e. ionizing radiation).

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1 Region of Durham 2007. *Radiation and Health in Durham Region 2007.*

2 Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

OPG examines various studies at a local, provincial, national and international level to ensure that health considerations are appropriately assessed and accounted for, including epidemiological studies where published. The approach to assess implications to human health will be summarized in a Human Health TSD.

Q: Will you look at the potential effects of leukemia in children?

A: OPG considered a wide range of studies in its assessment of potential human health effects.

The Durham Regional Health Department recently completed a study titled *Radiation and Health in Durham Region 2007*. The study included a review of the scientific literature on health effects of radiation, information on public radiation dose for people in Durham Region as based on OPG radiological environmental monitoring data, and a comparison of selected health indicators in Durham Region and municipalities within Durham Region. In general terms, the study concluded that "Most Category 2 indicators were significantly low or at provincial levels in Ajax-Pickering and Clarington, including childhood cancer, childhood leukemia, bladder cancer, colorectal cancer, stomach cancer and the congenital anomaly microcephaly".[3]

Malfunctions and Accidents/Emergency Planning and Response

Q: What would happen in an emergency? Does the EA look at evacuation?

A: Yes, the EA includes consideration for evacuation that could occur as a result of credible malfunctions and accident scenarios.

The Province of Ontario has overall responsibility for managing the off-site response to nuclear emergencies. OPG, Emergency Management Ontario and the regional and local governments all work together to protect the public. Each organization has responsibility for a distinct area of the emergency response:

- OPG's first responsibility is to make sure its reactors are operated, maintained and designed in such a way that accidents will not occur. In the highly unlikely event of an accident, our responsibility is to ensure it is controlled and that radioactive emissions are minimized. OPG assists the Province and local municipalities with funding and planning support for their emergency programs.

[3] Region of Durham 2007. *Radiation and Health in Durham Region 2007*, p. 7.

- Emergency Management Ontario, an agency of the Ontario Government, is responsible for the overall Provincial Nuclear Emergency Plan and public safety during nuclear emergencies. If a nuclear emergency were to occur, the Ontario Government would manage the off-site response.

- Regional and local municipalities all have emergency plans in place. More importantly, it is their emergency responders who ensure that emergency plans are properly implemented. This includes police, fire and ambulance crews. Municipal agencies have been an important part of our EA process and have provided input and comment to our process.

For the purposes of the EA, we included the unlikely scenario that an evacuation may be required. In the EA we looked at the potential environmental effects of a malfunction as well as an evacuation scenario, including the potential radiological effects on human health and biota. This will be further addressed in a Malfunctions and Accidents TSD.

Q: What about transportation in a worst case scenario?

A: The EA includes an assessment of the effects of the Project on transportation, and the potential effects of Project-related transportation on the environment.

As part of the EA, we also included the unlikely scenario that an evacuation may be required. A key consideration is the time required to evacuate a designated sector, referred to as "evacuation time estimates". Evacuation time estimates are determined by a number of factors, including the level of road congestion. OPG will include a discussion of evacuation time estimates in the EA for the Project.

The Province of Ontario has the overall responsibility for managing the off-site response to nuclear emergencies. OPG, Emergency Management Ontario, and the regional and local governments work together to protect the public. Each organization has responsibility for a distinct area of the emergency response.

Physical and Cultural Heritage Resources

Q: Are there any burial grounds on the site?

A: As part of the EA work, extensive surveys of any physical and cultural heritage resources are undertaken. This includes archaeological surveys to determine whether any cemeteries or burial grounds exist or potentially exist in areas that may be disturbed. To date, no Aboriginal burial grounds have been found on the DN site; however, two built heritage features remain on the northwest portion of the DN site. These include the Burk family cemetery

which is commemorated by a large monument placed within the cemetery, and a historic cairn commemorating the opening of DNGS in 1989.

Safety and Security

Q: Is it true that the largest security vulnerability at the site would be the used fuel dry storage buildings?

A: Used fuel storage buildings are not considered to be highly vulnerable to security threats. However, as with all nuclear facilties, safety and security is extremely important.

For the Darlington Nuclear Generating Station, once used fuel is removed from the reactor, it is first stored under water in irradiated fuel bays and is subject to continuous surveillance. Following a minimum period of 10 years, the fuel is transferred to dry storage at the Darlington Waste Management Facility and placed in robust, sealed containers made of 0.5 metre thick reinforced concrete and carbon steel inner and outer liners – this provides a very high degree of protection for the fuel. Each used fuel bundle must be accounted for by the station at all times.

The Darlington Waste Management Facility has been designed, contructed and operates to meet all safety and security regulations as set out by the CNSC and has demonstrated to be robust to withstand all credible scenarios. Used fuel is stored within a security protected area and is monitored under programs specified by the CNSC. The International Atomic Energy Agency (IAEA) is responsible for the regular on-site monitoring of all fuel to ensure that it remains in its proper location. The IAEA affixes seals to each type of fuel storage container to ensure that no tampering occurs. OPG's on-site security program also ensures the safety of fuel.

For EA planning purposes, two interim on-site storage options have been considered. This includes the expansion of the existing Darlington waste management storage structures and building an additional used fuel dry storage facility. Regardless of which alternative is chosen, it will satisfy all national and international safety and security regulations.

Q: Do you study things like terrorist attacks?

A: As part of the ongoing licensing of a nuclear power plant, safety and risk assessments are frequently undertaken. With respect to concerns about terrorism, the possibility of a deliberate aircraft crash into a nuclear power plant is the subject of studies that were performed collaboratively among all nuclear licensees in Canada (using similar studies conducted in the USA and Europe as benchmarks).

While the worst-case aircraft crash would be expected to cause significant localized damage in the vicinity of the crash, it would not cause a release of radioactivity to the public. The analysis considered worst-case scenarios and assessed the consequences to the physical plant structures due to both aircraft impact and fires caused by resulting fuel explosions. The case of an aircraft packed with explosives was also assessed. All studies have been submitted to the Canadian Nuclear Safety Commission. Specific conclusions are prescribed information and cannot be released. Accordingly, it is not deemed necessary to address the effects of a highly unlikely catastrophic accident in this EA. This work will be addressed in a Malfunctions and Accidents TSD. In addition, OPG will submit a Site Selection Threat and Risk Assessment as part of federal licensing requirements.

Seismicity

Q: What is the potential for earthquakes? Does the EA include consideration for earthquakes?

A: Yes, the EA examined the potential for earthquakes in the area (referred to as "seismicity") and also the ability for a proposed station to withstand any such hazard.

Research indicates that the Western Lake Ontario Region lies within the tectonically stable interior of the North American continent. This region is characterized by low rates of seismicity. In general, historical earthquakes in stable interior regions, such as the Lake Ontario region, occurred at depths of 5 km to 20 km on faults formed hundreds of millions of years ago during previous active tectonic episodes. These are widespread throughout the crust and typically have little to no surface expression.

Existing research by the Geological Survey of Canada and others have determined that there are no seismic fault lines near the Darlington Nuclear site.

Socio-Economic Considerations

Q: How do you address jobs and the need for skilled workers?

A: As part of the EA, OPG looked at potential effects, including the nature and types of jobs that may be required throughout all phases of the Project. This provided us with the information to determine potential effects on related aspects such as housing, transportation and other infrastructure needs in the community. This will be addressed in detail in a separate TSD on the Socio-Economic Environment.

With respect to the need for skilled workers, there is sufficient lead time due

to the hiring of new staff over the past number of years. OPG is also working with the University of Ontario Institute Of Technology, Durham College and other post-secondary institutions to ensure educational programs are in place. OPG has invested significantly in training through internal programs and through the University Network of Excellence in Nuclear Engineering (which includes other industry partners and several Ontario universities).

Q: What kind of employment will be required for this Project? How and when do I apply?

A: OPG is currently undertaking an environmental assessment for possible new nuclear units at Darlington. As well, OPG is part of a team, led by Infrastructure Ontario (IO), determining a vendor and technology for two new nuclear units at Darlington, to be operated by OPG.

Current estimated timelines predict that the site preparation phase of the Project will start no earlier than 2010. For EA planning purposes, OPG has assumed it will take two years for site preparation. During that phase, we are estimating approximately 400 people would be employed on the Project. This would be followed by four to six years of construction with an estimated 3,500 jobs before the plant goes into service. During the operation phase, approximately 1,400 jobs could be created for operations related to the new units. However, until the vendor is selected through the IO process, OPG is using work force estimates for EA planning purposes and these are not finalized numbers.

Over the next few years, OPG will develop the capacity within its current operations to ensure it has a strong contingent of experienced nuclear operators and experienced nuclear engineers. This will allow us to move over experienced staff to the new station without impacting current operations. To that end, OPG will be hiring new engineers into its organization later this year and will begin hiring new operators starting next year. By hiring new people now, we will have enough depth in our staffing to move over some of our more experienced nuclear operators and nuclear engineers when the time is right.

Beyond the new nuclear activities, OPG is part of an industry experiencing attrition of workers due to retirements over the coming decade. OPG has been partnering with many organizations and institutions, including the University of Ontario Institute of Technology and Durham College, to ensure the company is well-prepared to meet this staffing need. As well, OPG is a founding member of the Durham Strategic Energy Alliance which is committed to developing innovations and training in the energy sector.

Q: What will be the effect on my property value?

A: OPG undertook a property valuation program to assess current residential property values within the Local Study Area (portions of Oshawa and Clarington). This enables OPG to compare and monitor, over time, whether property values change within the Local Study Area and whether the change, if any, can be attributed to the OPG New Nuclear at Darlington Project.

Other studies that have assessed residential property values, including a study for the Pickering B Refurbishment and Continued Operation Environmental Assessment, concluded that there is little potential for adverse effects on property values attributable to a nuclear facility. In the case of the Pickering B EA, local realtors indicated that the nuclear station had not influenced the number of sales as the turnover of properties nearest the station appeared comparable to other communities and neighbourhoods in the City of Pickering.

Q: Does your EA examine the recreational usage of the Darlington Waterfront Trail?

A: Yes, the EA examines recreational use of the Darlington Nuclear site including the waterfront trail, public walking paths, soccer and baseball fields, and related open space. OPG undertook seasonal user surveys to identify and understand the ways in which people use and enjoy the recreational resources on and in the vicinity of the Darlington Nuclear site. The survey also identified specific factors affecting people's use and enjoyment of these recreational resources, any issues or concerns with respect to the Darlington site and those associated with the potential Project. The survey also quantified the number of users by season. This will be reported in the Socio-Economic Environment TSD.

There may be a possible disruption of recreational usage at the Darlington Waterfront Trail during specific phases of the Project such as the Site Preparation and Construction Project Phases. However, appropriate mitigation measures (i.e. measures to eliminate, reduce or control) would be identified and applied in such case to manage the disruption.

Terrestrial Environment

Q: How do you know what wildlife is already on the site? Do you take an inventory?

A: Yes, OPG does take an inventory of the wildlife, as well as other flora and fauna on the site. OPG has an extensive biodiversity program at the Darlington Nuclear site which includes a comprehensive inventory of plants and animals. This program monitors and reports on breeding bird and

amphibian inventories and new species (i.e. plants and animals) observed. Every five years, the Darlington site undergoes an Ecological Land Classification where the land is extensively categorized based on different vegetation and soil types.

For the EA, OPG added to this existing inventory database by conducting an updated and detailed assessment of current species on site. This is called "baseline characterization"; the existing environment is characterized by describing its features and characteristics. The results will be reported in full in the Terrestrial Environment Baseline TSD.

Q: Is OPG staff doing work on Bank Swallows?

A: Yes, as part of the baseline data being collected for the terrestrial environment, OPG prepared an inventory of birds found on the Darlington Nuclear site. Bank Swallows were included in this inventory. They nest in colonies in streamside, river or lake banks across much of North America. A Bank Swallow colony may range from 10 nests to nearly 2,000. OPG has documented the size of Bank Swallow colonies on the existing Darlington site (approximately 1,300 nests) and along the shorelines in Durham Region. OPG also assessed the potential for disruption the Project may cause and has identified mitigation measures. These will be described in full in the Terrestrial Environment TSD.

Transportation

Q: I understand that there will be a GO Transit railway station through Bowmanville – would that help with transportation?

A: GO Transit intends to extend its commuter rail service from Oshawa eastward to Bowmanville, subject to the outcome of their ongoing feasibility study (expected to be completed in early 2009). While this GO rail service extension is intended to service existing and anticipated future population and other growth in the area, it could potentially attract or facilitate more growth, in turn leading to increased demand on community, recreational and other facilities and services. This will be described more fully in the Traffic and Transportation TSD.

For the purposes of this EA, OPG assessed potential roadwork and related infrastructure to better understand site access and parking requirements for future workers. It also included an assessment of site access controls to help explain how the Project may potentially affect on-site road works such as parking and lay down areas. Off-site road works were also assessed to better understand how the Project may affect traffic patterns on public roads at shift changes and during peak construction periods. This will be documented in the Transportation TSD.

ENVIRONMENTAL ASSESSMENT SCOPE

EA Scope - General

Q: Could the EA consider an alternative site or other technologies?

A: In this EA, we looked at alternative site layout options, as well as alternative reactor technologies, used fuel management, low and intermediate waste management facilities and condenser cooling systems. The federal authorities provided additional direction in their Environmental Impact Statement guidelines on alternatives to be considered.

Q: Will the EA assess the need for construction, demolition and abandonment of the reactors and the waste management facilities?

A: The EA considered three phases covering approximately 140 years including: a Site Preparation and Construction Phase; an Operations Phase; and a Decommissioning and Abandonment Phase.

The waste management facilities that are required to be built as part of this Project were also assessed right through to demolition and abandonment.

EA Scope - Transmission

Q: Will the EA include the effects on the transmission corridor?

A: Any potential changes to the bulk (500 kV) transmission corridor are the responsibility of Hydro One and any environmental assessment requirements would be carried out by that organization. However for this EA, OPG considered the cumulative effects of other planned or proposed projects in the area that might overlap in time or space. Potential upgrades to the existing 500 kV transmission line were included in the assessment of cumulative effects.

EA Scope - Temporal Bounds

Q: Why do you use 60 years as the operating life?

A: The nuclear industry has been developing and improving reactor technology for more than five decades. The next generation reactors currently under consideration for this Project have been designed for an operating life of typically 60 years (including refurbishment).

Q: What is the start date for construction and how long will it take? When will the reactors be in-service?

A: Federal regulations require separate licenses for each of the five phases in the life cycle of a nuclear power plant including: site preparation; construction; operation; and decommissioning and abandonment. For EA planning purposes, it is assumed that site preparation and construction activities would not occur any earlier than 2010. It is anticipated that site preparation activities would require approximately two years and would be followed by four to six years of construction (per reactor). The EA assumes that reactor operation would occur no earlier than 2016 and would continue to 2100 (including refurbishment). The Ontario Government has indicated an approximate in-service date of July 2018.

Q: Why does it take so long to complete the approvals for an existing site that already has a nuclear power plant on it?

A: There is a comprehensive federal approvals process that must be followed prior to the construction and operation of a nuclear power plant. While environmental studies were undertaken in the 1970's during the planning of the existing Darlington Nuclear Generating Station, federal EA requirements were not established until 1995 under the *Canadian Environmental Assessment Act.* The CNSC is mandated, under the *Nuclear Safety and Control Act*, to regulate all nuclear facilities and nuclear-related activities in Canada. There are many stages in the life cycle of nuclear facilities; before any person or company can prepare a site for, construct, operate, decommission or abandon a nuclear facility - or possess, use, transport or store nuclear substances - they must obtain a corresponding licence from the CNSC.

There are four major steps in the licensing process which OPG must follow as part of this potential Project: submitting a license application to prepare a site for construction; a federal environmental assessment to ensure that the Project will not cause adverse effects to the environment; a variety of technical assessments by the CNSC to ensure applications comply with regulatory requirements; and CNSC staff recommendations are reviewed or decided upon by the Commission Tribunal or a CNSC designated officer.

EA Scope - Uranium Fuel Cycle

Q: Shouldn't this EA include consideration of the uranium fuel life cycle?

A: The CNSC guide on licensing processes for new nuclear power plants states that before a Site Preparation Licence can be issued, an EA must be completed. The guide indicates that the EA must examine the five phases in

the life cycle of the plant (i.e. siting, construction, operation, decommissioning and abandonment). It does not include the uranium fuel life cycle.

Secondly, the final Guidelines for the New Nuclear at Darlington Environmental Impact Statement (EIS) were issued jn March, 2009, following a public review process. The EIS guidelines describe the scope of the project to be assessed. The guidelines do not include uranium mining or milling.

Thirdly, the licensing process for new uranium mines is governed by the Canadian Nuclear Safety Commission (CNSC). The Uranium Mines and Mills Regulations set out the requirements for the following phases in the life-cycle of a uranium mine or mill:

- a licence to prepare a site and to construct
- a licence to operate
- a licence to decommission
- a licence to abandon

Prior to any such licence being granted, the Canadian Environmental Assessment Act (CEAA) stipulates that an environmental assessment (EA) must be carried out to identify whether a project is likely to cause significant adverse environmental effects, taking into account the appropriate mitigation measures. Only with a positive EA result can the licensing process continue.

ENVIRONMENTAL ASSESSMENT PROCESS AND METHODOLOGY

EA Process, Planning and Decision Making

Q: Has a decision been made to proceed with this Project?

A: Final approval has not been received to construct a new nuclear power plant at the Darlington site. OPG is undertaking a federal environmental assessment to determine the environmental suitability of the site for this potential Project. The EA is one but important piece of work required of the licensing process. A series of decisions will have to be made by OPG, the Province of Ontario, the federal Minister of Environment and the Canadian Nuclear Safety Commission (among others) in order for the Project to proceed.

Q: Why does this potential Project require a federal EA rather than a provincial EA?

A: Nuclear power plants are regulated by the federal government and therefore the federal EA process applies. The Canadian Transportation Agency, Fisheries and Oceans Canada and Transport Canada are also participating as they may have a regulatory role in the approvals process.

Q: Is OPG conducting this EA itself or are independent studies being done?

A: OPG is responsible for the conduct of the environmental assessment and the submission of the Environmental Impact Statement to the joint review panel. In doing its work, OPG relies on a team of over 10 consulting organizations with a team of more than 50 professionals. In addition, we draw on the expertise of numerous OPG employees and we hire specialists in most of the major technical areas, including human health. Our work is subject to peer review and will be reviewed by internal and external experts (some of which are hired by OPG and others to be hired by an independent review panel).

Q: Does the EA look at the fact that the reactor technologies have never really been used before?

A: The reactor technologies being considered for this potential Project are evolutionary (i.e. advanced) versions of existing reactor designs. Regardless of which technology is chosen by the Ontario Government, it must and will satisfy all regulations set out by the federal nuclear regulator – the Canadian Nuclear Safety Commission.

Q: How is the EA decision made?

A: The major outcome of an EA is to determine whether or not a Project is likely to cause significant adverse environmental effects. The significance of potential environmental effects is determined by a combination of scientific data, regulated thresholds, standards, social values and professional judgment.

In order for this Project to proceed for further review by OPG and the Province, the successful completion of a federal EA must be accomplished. The joint review panel will reach a conclusion on the significance of the environmental effects of the Project and will submit its report to the federal Minister of the Environment and the responsible authority (i.e. the Canadian Nuclear Safety Commission). The federal Cabinet will approve the government's response to the panel's conclusions and recommendations.

Q: Some people support nuclear power and others feel that it is too risky – how do you deal with that in the EA?

A: In the conduct of the EA we seek to determine what, if any, potential environmental effects may occur from the construction, operation and decommissioning of a proposed nuclear power plant. That involves a detailed assessment of the nature of the potential risks of nuclear generation and how they may be managed.

Importantly, this EA is being undertaken in a way that encourages input and feedback from members of the public. Once OPG has completed its studies, an independent review panel will examine the work and determine if it is satisfactory.

EA - Significance

Q: How does OPG determine the significance of an environmental impact?

A: Each potential project related work or activity is screened to identify those that might have an effect on the environment. The outcome of the screening will be a large table or matrix which will describe where a project-environment interaction is likely to occur. These interactions are then further assessed to identify those that are likely to result in a measurable change on the environment, and if so, to determine the nature and magnitude of that effect. A measurable change is typically defined as a change in the environment that is real, observable, or detectable compared with existing conditions.

In the final step, each residual adverse environmental effect is assessed to determine if it is significant. Significance criteria typically measure:

- Magnitude or severity of the effect;
- Geographic or spatial extent;
- Duration of the effect;
- Frequency and probability of the effect;
- Reversibility of the effect; and
- Ecological importance and societal value of the affected resource or attribute.

As part of the EA, OPG provides opportunities for the public and key stakeholders to assist in identifying and determining significance criteria.

Q: Is the public involved in the determination of significance?

A: OPG recognizes the public as an important source of local and traditional knowledge for both the Darlington site and the potential environmental effects of this Project. OPG continues to encourage members of the public to provide feedback on aspects of the environment they feel should be included in this environmental assessment. Such feedback helps OPG identify features of the environment to be considered in the effects assessment for the Project.

The methodology of assessing significance and the results of the significance analysis are being discussed with the public at Community Information Sessions.

EA - Process

Q: What is the role and function of a joint review panel?

A: Under the *Canadian Environmental Assessment Act* and the *Nuclear Safety and Control Act*, a joint review panel is established to undertake an environmental assessment and regulatory review of Projects with higher potential for adverse environmental effects. The panel is comprised of subject matter experts selected by the federal Minister of the Environment on the basis of their knowledge and expertise.

Joint review panels have the capacity to encourage open discussion among large numbers of people by allowing individuals to present evidence, concerns and recommendations at public hearings. A panel allows the proponent (OPG) to present its potential project to the public and explain the projected environmental effects. It also provides an opportunity for the public to hear the views of government experts about the project.

Following public hearings, a joint review panel prepares and submits a report that includes, but is not limited to, the rationale, conclusions and recommendations relating to the environmental assessment of a project, including any mitigation measures and follow-up program. Subsequently, the joint review panel makes its decision on whether to grant a licence to Prepare a Site under the *Nuclear Safety and Control Act.*

Q: Will this Project be subject to a review panel? If so, when will this decision be made?

A: In June 2007, the CNSC announced the start of the EA for this Project. In March 2008, the federal Minister of Environment announced that a review panel would be established for this Project. OPG will work to satisfy the requirements as laid out by the federal authorities and the Joint Review Panel.

EA - Valued Ecosystem Components

Q: What is a Valued Ecosystem Component (VEC)?

A: A VEC is a feature of the environment selected to be the focus of an environmental assessment because of its ecological, social and economical value, and its potential vulnerability to effects of a project. VECs can be individual species or important groups of species within a food chain. They can also be resources or features valued for their uniqueness or importance in maintaining the economic base, social structure and/or community stability.

The potential effects of a project are predicted and evaluated for each VEC. This ensures that all likely effects can be measured and compared with existing conditions and environmental standards.

Q: How can the public provide input on the Valued Ecosystem Components?

A: Public input is an important factor when selecting Valued Ecosystem Components (VECs) for assessment. OPG seeks public input on the selected areas of study, as well as the section of VECs. The preliminary list of environmental features was shared at OPG's spring 2008 Community Information Sessions and posted on the Project website for comment and feedback. A draft list of VECs was released for public review and comment during the fourth round of information sessions in fall 2008. Check our Project website at www.opg.com/newbuild for opportunities to provide input on our work as it is undertaken.

PROJECT AND SITE CONSIDERATIONS

Site and Layout Options

Q: Why is Darlington the preferred site for the potential Project?

A: The Province directed OPG to consider new nuclear generation at an existing site. OPG considered its two existing nuclear sites and determined that Darlington was the best site for new nuclear generation for the following reasons:

- There is room to build at the Darlington site;
- The site is located beside a major transmission corridor and load centre;
- OPG has extensive operating experience and knowledge of the site; and
- There is a history of support from local and regional governments.

The Pickering Nuclear Generating Station was the only other possible site and it does not offer the same opportunities as the Darlington Nuclear site.

Q: How many units can you fit on the site?

A: The three reactor types under consideration for this Project include: the ACR-1000 (AECL); the EPR (AREVA); and the AP1000 (Westinghouse). The EA considers all three of these reactor alternatives, and in the context of the number of units required to achieve the 4,800 MW electrical power generation objective (i.e. four ACR-1000s would be required to achieve 4,340 MW; three EPRs would be required to achieve 4,740 MW; four AP1000 reactors would be required to achieve 4,148 MW).

The number of reactor units that can fit on the Darlington Nuclear site is primarily determined by the reactor technology and the condenser cooling system. The natural draft and fan assisted atmospheric towers require more surface land area on the site (and therefore restrict the amount of space for the reactor units).

Q: Will you have enough land to construct everything you need for four new reactors?

A: OPG is conducting studies to determine how much additional nuclear power can be safely constructed and operated at the Darlington site. The purpose of the Project, if approved, is to construct and operate a nuclear power plant that generates up to 4,800 MW of base-load electricity from up to four nuclear reactors. The Darlington site is approximately 480 hectares in size and studies have been undertaken to determine all infrastructure requirements and how they can be accommodated on the site.

Q: Are there any existing constraints (e.g. St. Marys Cement)?

A: There are no specific constraints on site layout from neighbouring properties. Potential effects on the Local Study Area (including neighbouring properties) have been assessed as part of this EA. Mitigation measures have involved discussions and agreements with neighbouring property owners.

Q: Will proximity to St. Marys affect your ability to operate safely?

A: The existence of St. Marys cement, adjacent to the site, does not pose a problem for the existing nuclear power plant and would not interfere with the safety of OPG's operations should a new plant be constructed.

Q: Will this Project require alteration to existing roads? Will the potential impacts be assessed?

A: As part of the EA, OPG considered alternative site layouts. In developing alternative layouts, road infrastructure was assessed. The technical studies conducted for the EA considered changes that the Project may have on traffic patterns on Highway 401 and arterial roads. This will be described in full in the Transportation TSD.

OPG is the founding member of the Darlington Planning and Infrastructure Information Sharing Committee involving local and regional municipalities and the Ministry of Transportation. This Committee continues to meet regularly to discuss major development projects in Durham Region and helped identify and mitigate potential impacts of this potential Project, including those relating to transportation.

Q: Where on the Darlington site will the proposed reactors be built?

A: The proposed Project area designated for new nuclear is approximately 180 hectares (445 acres) in size. There is enough undeveloped space to construct the proposed plant on the eastern portion of the site, south of the CN rail line.

Although model plant layouts have been identified, the actual site layout will be determined by the reactor vendor chosen for this Project. The safe operation of Darlington's existing station and waste management facility would not be affected by site preparation and construction activities. The area for new build would be fenced off and a separate entrance would be constructed. Safe and responsible operation remains our priority at OPG.

CONDENSER COOLING

Relationship to Reactor Design

Q: Are the condenser cooling alternatives specific to particular reactor designs?

A: All nuclear reactors require condenser cooling and all nuclear reactor designs can either use lake water cooling or atmospheric cooling (i.e. cooling towers). Both forms of cooling are considered in this EA.

If cooling towers are to be used, the actual number required would depend on the number of reactor units, the size and capacity of the reactor units, and the type of cooling tower (i.e. natural draft or mechanical draft).

A natural draft cooling tower may be up to 170 metres in height and 100 metres in diameter. A natural draft cooling tower (including support facilities such as equipment sheds, basins, canals or shoreline buffer areas) can require up to 8 hectares of land. A minimum of one natural draft cooling tower is required for one reactor unit and a minimum of two cooling towers for two units. However one reactor unit may also have two towers for operational (backup) purposes.

A mechanical draft cooling tower is typically 20 metres in height and may require up to 20 hectares of land (including support facilities such as equipment sheds, basins, canals or shoreline buffer areas). The configuration of the mechanical draft cooling towers, including how many would be required if built, has not yet been determined.

Cooling Towers

Q: Does the EA assess the potential effects of cooling towers specifically in terms of visual effects, traffic and atmospheric emissions?

A: In the EA we studied the potential environmental effects of cooling towers from a number of perspectives:

- Visual Effects: As part of the land use and visual environment we undertook an assessment of the view shed of the site. This involved an image of what the site would look like with a cooling tower and an assessment of the change in appearance and visibility of the site within the Local Study Area.

- Atmospheric Emissions: One particular area of interest was with respect to the atmospheric emissions from cooling towers. In addition to heat, cooling towers have chemical emissions that would need to be controlled. In winter conditions, atmospheric emissions may also contribute to fogging and icing in the surrounding areas. These types of considerations were assessed and will be discussed in the EIS.

- Water-related Effects: We also examined lake circulation, water temperature, aquatic biota and water withdrawal from the lake.

- Land Excavation: The land excavation required for the footprint of the cooling structures was also considered.

Once Through Lake Water Cooling

Q: How will the EA assess the potential effect that a once through cooling system may have on the lake?

A: In this EA we studied the potential environmental effects a once through cooling system may have on the lake by looking at:

- Lake Circulation: Water velocities and directions near cooling water withdrawals and discharges, and cooling water withdrawal volumes and rates.

- Water Temperature: Thermal plume behaviour, thermal plume locations and sizes, and cooling water discharge temperature.

- The potential for fish impingement and entrainment were also assessed.

OPG has many years of operating experience with once through lake water cooling systems. At the Darlington Nuclear Generating Station, lake water

cooling involves bringing large volumes of lake water into the plant through a lake bottom intake tunnel located 700 meters offshore at a depth of 10 meters. The intake structure is designed to minimize potential adverse effects on fish and other organisms. The lake water is screened to remove debris, algae and other materials before use in cooling systems within the plant. Once used, the warmed water is returned to the lake through a discharge and diffuser pipe that runs approximately 1,560 meters offshore. This minimizes the heat impact on the lake and the potential for the recirculation of heated water.

Q: Does a once through lake water cooling system pose any danger to marine traffic?

A: OPG assessed the potential effects of this type of cooling system including whether it might pose any danger to marine traffic. OPG has been operating once through lake water cooling systems at its existing nuclear power plants and has not identified to date, any danger to marine traffic.

Use of Waste Heat

Q: Why not use the waste heat from the cooling water for other purposes?

A: Typically, condenser cooling systems in nuclear power plants produce a low-temperature waste heat stream, one that is very diffuse and only slightly warmer than the surrounding water temperature. To help put this into context, the temperature of the discharge, in absolutely terms, is no more than 5% warmer than the surrounding water.

There are very few efficient uses for low temperature heat and the economic benefits of waste heat recovery generally do not justify the cost of recovery systems. Having the ability to recover waste heat in an efficient and meaningful way would require a larger temperature difference than is generally produced by a nuclear power plant.

A recent article appearing in a Finnish newspaper reported efforts by the Mayor of Helsinki to investigate the use of a nuclear reactor to serve the district heating needs of Helsinki. The article noted that the ability to utilize reactors in this manner is difficult because steam is not produced at a temperature high enough to allow for a productive contribution to local area heating without compromising the electrical output of the plant.[4]

[4] Helsingin Sanomat, International Edition - Metro. February 2009.

MANAGEMENT OF NUCLEAR WASTE AND USED FUEL

Site Preparation and Construction Waste

Q: How does the EA consider the management of waste produced during site preparation and construction?

A: The EA considers all waste streams produced during the life cycle of a nuclear power plant. This includes site preparation and construction wastes which will be re-used or recycled where feasible. Non-hazardous solid wastes meeting landfill requirements may be disposed of accordingly in a licensed landfill.

Low and Intermediate Level Waste

Q: Will OPG manage low-level radioactive waste on-site, or will it be transported to a new off-site facility?

A: Currently, low-level radioactive waste produced at OPG's nuclear stations is shipped by truck, via CNSC licensed steel containers, to OPG's Western Waste Management Facility (Kincardine, Ontario) for processing and storage. Low-level waste includes items such as used mops, rags and protective clothing. Waste minimization programs are used to reduce the amount of waste sent for interim storage.

The EA considered two alternative means for managing low-level radioactive waste including: transporting the waste off-site to be managed at an appropriately licensed nuclear waste management facility; or managing the waste in a new low and intermediate level radioactive waste management facility on the Darlington site.

Q: What is in place for the long-term management of low and intermediate level radioactive waste?

A: The EA makes provision for the management of low and intermediate level waste from this Project (e.g. rags, used reactor components, etc.). The EA study indicates that the wastes will be managed at an appropriately licensed facility. No decision has been made regarding the final location for the long-term management of low and intermediate level wastes from this potential Project.

OPG is conducting a separate EA on the potential construction and operation of a Deep Geologic Repository (DGR) for the long-term management of low and intermediate level nuclear waste on the OPG lands adjacent to the Western Waste Management Facility (WWMF) in Kincardine, Ontario. For more information about this Project, please visit www.opg.com/dgr. While the

EA does not specifically address wastes from new reactors, the hosting agreement with the Municipality of Kincardine does not exclude these wastes from the Deep Geological Repository Project.

Used Fuel

Q: How do you ensure that used fuel managed on-site is safe?

A: OPG has been safely storing used nuclear fuel at reactor sites for nearly 40 years. Used fuel, after being removed from the reactor by remote control, is moved to water filled bays for a minimum of 10 years, to cool in temperature and to shield workers and the environment from radiation. The fuel is then transferred to CNSC licensed dry storage containers on the reactor site. The dry storage containers are steel-encased concrete and welded shut to protect workers and the public. These containers are kept in a separate facility on the station site which is licensed by the CNSC. The International Atomic Energy Agency affixes seals and monitors the containers throughout the entire storage period.

Q: Do different reactor technologies require different methods for storing used fuel?

A: Used fuel consists of fuel that has been used by a nuclear power plant to generate electricity. Used fuel is managed in a two-stage process, regardless of which reactor technology is employed:

- Wet storage which allows for initial cooling of the used fuel and shielding and followed by; and
- Dry storage for longer term interim storage.

However, these facilities may differ to accommodate the different physical characteristics of different fuel bundles or assemblies. For example, the Advanced CANDU type reactor typically has 6,240 fuel bundles (12 bundles in each of the 520 fuel channels). Each bundle is approximately 0.5 m long.

A typical PWR reactor has 150-260 fuel assemblies that contain 200-300 rods each. The fuel assembly is about 4 to 5 meters long, so the containers would be sized differently to accommodate this. The containers would also be designed to handle the radiological properties of the PWR fuel. Dry storage of PWR fuel is common in many countries around the world including Germany, Switzerland and the United States. These facilities will be addressed in detail in the Nuclear Waste Management TSD.

Q: Is there a plan for the long-term management of used nuclear fuel?

A: The Nuclear Waste Management Organization (NWMO) was established in 2002 and is responsible for the long-term management of used nuclear fuel in Canada. The Government of Canada approved "Adaptive Phased Management" as Canada's approach to the long-term management of used nuclear fuel in 2007. This plan involves establishing a central repository for all used fuel (either above ground or slightly below ground) and eventually moving the used fuel into a deep geological repository where it will be continuously monitored and made retrievable.

The NWMO is currently developing the siting process for the central repository. The siting process will be designed through a number of steps:

- 2002-2005: The NWMO undertook a study to initiate a dialogue and engagement program on Adaptive Phased Management.
- March 2005: The NWMO completed its study and put forward its recommendation to Government.
- June 2007: The Government of Canada selected the NWMO's recommendation for Adaptive Phased Management.
- August 2008: The NWMO released a discussion document.
- September-December 2008: The NWMO invited input to the design of a siting process.
- 2009: Based on input received, the NWMO will publish a "Draft Siting Process Plan". This plan will be subject to review and comment throughout the Spring and revised accordingly.
- Post-2009: The siting process is expected to be launched.

For the OPG New Nuclear at Darlington EA, it is assumed that the used fuel from the new station will be stored in one of two interim on-site storage facilities until it is time to move it to a long-term waste management facility.

Q: What if the long-term plan for used fuel doesn't go ahead? Does the EA account for this possibility?

A: Canada's plan for the long-term management of used nuclear fuel is Adaptive Phased Management. This plan was accepted by the Federal Government in 2007 and the Nuclear Waste Management Organization is actively working to develop a site selection process for a centralized used fuel storage facility for all used fuel in Canada. The plan does not have defined timelines at this point.

At the same time, the EA provides for the interim dry storage of over 50% of the used fuel that would be generated by the new nuclear reactors. This would follow a period of wet storage of approximately 10 years (which allows for initial cooling and shielding). An EA for additional storage space can be

conducted in future years if required. This will be further discussed in the Nuclear Waste Management TSD.

Decommissioning

Q: What happens to all of the waste produced during decommissioning? Isn't most of it toxic?

A: After a nuclear power plant is closed and removed from service, it must be decommissioned. The majority of the material, such as concrete rubble, is non-radioactive, non-hazardous and non-toxic. This material will be re-used or recycled where feasible. All waste material that cannot be re-used or recycled will be managed at an appropriately licensed facility.

Decommissioning also entails the removal and disposal of radioactive components and materials, such as the reactor and associated piping, and the cleanup of radioactive or hazardous contamination that may remain in the buildings and on the site. However, the radioactive portion of the waste is a small percentage of the total amount of decommissioning waste (typically 10 to 20%).

Q: What will the site look like after decommissioning?

A: After the plant is dismantled and all of the materials removed, the operating licence is terminated and the site will be restored to a brownfield state which will be available for other industrial uses. This will be addressed in the Nuclear Waste Management TSD.

LICENSING PROCESS

Q: What is the status of the Site Preparation Licence?

A: OPG submitted a preliminary Site Preparation Licence Application in September 2006 to begin the federal approvals process for this Project. Since then, OPG has been working to identify and complete the full range of additional studies that are required for this application and make sure they are completed on time. OPG will make a supplementary submission in support of this licence application to the Canadian Nuclear Safety Commission in 2009 along with the submission of the EIS. This will be followed by a public hearing.

Q: How do the regulatory requirements for this Project compare with those used in the United States?

A: In Canada, separate licences are required from the Canadian Nuclear Safety Commission to:

- Prepare a site for a new nuclear power plant;
- Construct a new nuclear power plant; and
- Operate the plant once constructed.

Before the licence to prepare a site is granted, the Project has to undergo an environmental assessment as required by the *Canadian Environmental Assessment Act*. Public involvement is built into both the environmental assessment process and the licensing process for both the construction and operating licences.

In the United States, two alternative licensing processes are available under federal regulations. In one instance, an applicant requires a construction permit to build the plant and an operating licence to operate it. Alternatively, an applicant can obtain an Early Site Permit to obtain approval for a particular site and a combined construction permit and operating licence to build and operate the plant. As in Canada, an environmental review must be conducted before a construction permit is issued and there is opportunity for public involvement. However, in the U.S. a public hearing is not mandatory for an operating licence application.

PUBLIC CONSULTATION

Q: What ability does the public have to provide input and influence decisions that are made for this Project?

A: There are many opportunities for public input into the EA process. OPG (the Project proponent) has been providing opportunities for public input since the fall of 2006 and will continue to do so well into 2009. Input could be provided in a variety of ways including OPG's Project website, Project toll free information number and by mail. Input can also be provided in person at Community Information Sessions, OPG's Community Kiosk and at other community based events.

In addition, the Canadian Environmental Assessment Agency provides opportunities for public input into the EA guidelines for this Project, as well as for the panel agreement and terms. The joint review panel will provide opportunities for the public to review the adequacy of the studies and participate in public hearings on the EA. Once the joint review panel issues its report, the public may also provide comments to the federal Minister of the Environment.

Q: How many people attend OPG's Community Information Sessions?

A: On average, approximately 200 people attend each round of Community Information Sessions (there have been four rounds to date). OPG has also

provided information on the Project and the EA Study to over 6,000 residents and the general public through participation at community events. We also have an information resource centre (referred to as the "OPG Community Kiosk") in the Bowmanville Mall. The Community Kiosk provides the community with easy access to information about the Project, a place to ask questions, speak to staff and learn about the Project and EA. There have been over 1,000 visitors to the Community Kiosk since it was opened.

Q: What other communities are involved in this EA Study?

A: Historically, the focus of communications for EAs conducted at the Darlington Nuclear site has been with the Municipality of Clarington as the host community, adjacent communities within 10 kilometres of the Project (i.e. the City of Oshawa) and communities within the Regional Study Area.

The Regional Study Area for the New Nuclear at Darlington EA extends approximately from the Port Hope/Cobourg area in the east, to Toronto in the west (the eastern area, formerly Scarborough), and north to Port Perry in the Township of Scugog.

OPG also recognizes broader communities of interest, generally represented by regional and national groups with an interest in energy and environmental issues. To ensure that this broader community of interest has the opportunity to participate in the planning and conduct of the EA studies, a number of groups and organizations have been identified and included in Project notifications and invitations to participate.

Q: Where can we talk about things like the ethics of nuclear power?

A: The EA for OPG New Nuclear at Darlington includes consideration for human and social components as well as physical environmental components. From this perspective, ethical considerations, such as fairness, equity and intergenerational considerations are particularly important in a Project with a temporal scope of approximately 140 years. OPG welcomes input on these matters and will consider a potential dialogue forum on intergenerational considerations.

Q: What is the purpose of the OPG's Bowmanville Community Kiosk? What can people learn at this facility?

A: OPG's Bowmanville Community Kiosk was established in May 2008 and is located in the Bowmanville Mall. The purpose of the Community Kiosk is to serve as a resource centre for local residents who wish to obtain information on the EA and/or speak directly with an OPG staff member about the Project. Visitors to the Community Kiosk can learn about the variety of environmental considerations included in this EA and are encouraged to provide feedback to

OPG staff (e.g. regarding Valued Ecosystem Components, mitigation measures, cumulative effects, etc.). Information can be accessed at the Community Kiosk in multiple forms including: asking questions or engaging in discussion with an OPG staff member; using the public access computer terminal; viewing videos; obtaining project literature; and viewing the information wall displays.

NUCLEAR TECHNOLOGY

Q: How does a nuclear plant generate electricity?

A: Nuclear reactors do the same job as conventional power plants in the generation of electricity by producing heat to convert water into steam. The steam then spins a turbine and a generator to make electricity. Instead of coal, oil or natural gas, nuclear reactors use uranium for fuel. Uranium atoms make heat by splitting; the technical term is “fissioning”.

When a neutron strikes an atom of uranium, the uranium atom splits into two lighter atoms (which are called fission products) and releases heat at the same time. The fissioning process also releases one to three additional neutrons that can split other uranium atoms. This is the beginning of a "chain reaction" in which more uranium atoms are split, releasing more neutrons and thus, heat. In a nuclear reactor, the chain reaction is tightly controlled to produce only the amount of heat needed to generate a specific amount of electricity.

Q: What process is used to manage the emissions of tritium from a nuclear power plant?

A: Safety is the key consideration at all OPG facilities. We are keenly aware of the need to protect our workers, the environment and the people who live and work near our facilities.

Tritiated heavy water vapour is contained within the reactor building. Vapour recovery dryers remove a majority of tritium in the air within the reactor building. A small quantity of tritium is released to the atmosphere when dried air is vented from the reactor building however, these amounts are kept well within regulatory limits.

During the normal operation of OPG’s CANDU nuclear reactors, a small amount of tritium is emitted from the reactor to the lake and atmosphere as a by-product of the nuclear process. Tritiated heavy water from the reactors is shipped to the Tritium Removal Facility at OPG’s Darlington Nuclear site. The Tritium Removal Facility extracts tritium from heavy water and is safely stored in a concrete vault. Tritium that has been diluted by light water to a point at which it cannot be reused, is processed by the Active Water Management

System and released to the lake providing discharge limits are met.

The rate and quantity of tritium emissions from airborne and waterborne effluents are continuously monitored to ensure that emissions do not exceed the CNSC's approved emission limit referred to as the Derived Release Limit. In addition, the proper control of tritium emissions is independently verified and confirmed by the Radiological Environment Monitoring Program. This program monitors tritium content in various environmental media in the vicinity of the reactor site. Sampling and measurements of tritium concentrations in the lake water, well water and drinking water from nearby water supply plants are routinely taken under this program.

ONTARIO'S ELECTRICITY SYSTEM

Future Supply - Nuclear Base-load

Q: Why is the Province moving ahead with new nuclear plants?

A: Ontario currently has 30,000 MW of electricity generating capacity but many existing power facilities are approaching the end of their operating life (80% will need to be refurbished or replaced over the next 20 years). The Ontario Government and the Ontario Power Authority have developed a plan for Ontario's long-term energy needs. The plan will double conservation and renewables, and maintain nuclear energy capacity for base-load operation up to its current level of 14,000 MW.

Since replacement nuclear facilities have long lead times for approvals and construction, the Ontario Government directed OPG to begin the work needed to enter into an approvals process, including an environmental assessment for new units to be built at an existing site.

Q: How does this Project fit with the Government's plan to meet nuclear base-load capacity?

A: The Ontario Power Authority (OPA) is responsible for conducting independent planning for electricity generation, demand management, conservation and transmission for the Province of Ontario.

In 2007, the OPA produced the Integrated Power System Plan (IPSP) to address Ontario's energy needs for the period 2008-2027. The IPSP recognizes a reduction in the energy contribution from existing base-load resources, largely as a result of declining nuclear capacity (most existing nuclear plants are projected to reach the end of service between 2013 and 2020). These factors will result in significant base-load energy shortfalls starting in 2015 which will increase to nearly 120 TWh by 2027 (120 TWh is 12,000,000 homes or enough electricity to meet over 75% of Ontario's annual

electricity consumption).

The Province has directed the OPA to "plan for nuclear capacity to meet base load electricity requirements but limit the installed in-service capacity of nuclear power over the life of the plan to 14,000 MW".[5] It will be necessary to add more than 10,000 MW of planned nuclear resources over the course of the IPSP to meet base-load requirements.

The OPG New Nuclear at Darlington Project is one of the initiatives underway to assist in meeting base-load requirements. Others include conservation and increased use of renewables.

For more information, or to view a copy of the IPSP document, please visit www.powerauthority.on.ca.

Future Supply - Gaps

Q: What will happen if the OPA's Integrated Power System Plan doesn't go ahead?

A: Under the *Electricity Act* (1998), the Ontario Power Authority (OPA) is responsible for developing an Integrated Power System Plan (IPSP). The OPA's IPSP must be submitted to the Ontario Energy Board for review and approval. Following review, the Board may approve a plan or refer it back with comments to the OPA for further consideration and resubmission to the Board.

On September 17, 2008, the OPA was directed to undertake revisions to the IPSP by the Ontario Government. One consideration to be included in the revision was (among others), the amount and diversity of renewable energy sources in the supply mix. The OPA was also asked to undertake an enhanced process of consultation with First Nations and Métis communities and consider the principle of Aboriginal partnership opportunities in both generation and transmission.

On October 2, 2008, the Ontario Energy Board announced the adjournment of the current IPSP hearing, accepting the OPA's request that it not continue hearing witnesses until re-filing occurs. Timing for the notice of application is at the discretion of the OEB and is expected in the near future.

Q: Why was it decided that Pickering A units 2 and 3 would not be refurbished?

A: OPG assessed the viability of restarting units 2 and 3 a few years ago. At that

[5] Ontario Power Authority. Integrated Power System Plan, Section B11, 5.1

time, it was concluded that while it was technically feasible to return units 2 and 3 to service, there were considerable risks surrounding the projected remaining life, the associated operating costs, and plant performance. Given the large upfront investment required, this represented a significant financial risk that could not be justified on a commercial basis. The reactors are currently being defuelled in preparation for safe storage.

Q: What is happening with the Pickering plant? Will the Pickering B units be refurbished?

A: In June 2006, the Minister of Energy directed OPG to begin assessing the feasibility of refurbishing the Pickering B reactors for life extension. As part of the business case assessment, OPG has been conducting a number of studies, including an Integrated Safety Review (ISR), Plant Condition Assessments and a federal environmental assessment.

Following a public hearing on December 10, 2008, the CNSC concluded that the refurbishment and continued operation of the Pickering B Nuclear station would have no significant residual adverse effects on the environment, taking into account mitigation and follow-up commitments. This decision is a key input into OPG's assessment of the feasibility of refurbishing Pickering B NGS. Once all studies are substantially complete, a recommendation will go to OPG's Board of Directors.

Q: What is the Green Energy Act?

A: On February 23, 2009, the Ontario Government introduced the Green Energy Act in the provincial legislature. The objectives of this proposed Act are to (among others):

- Encourage the growth of clean, renewable sources of energy;
- Increase investment in renewable energy projects;
- Increase conservation; and
- Create the potential for savings and better managed household energy expenditures through a series of conservation measures.[6]

After completing a series of public hearings in communities across the province, the Legislature's Standing Committee on General Government will consider the proposed Green Energy Act in a detailed clause by clause review.

[6] Ontario Ministry of Energy and Infrastructure, "Ontario's Proposed Green Energy Act", http://www.mei.gov.on.ca.wsd6.korax.net/english/energy/gea/

Alternative Energy

Q: Why not pursue other methods of power production (e.g. wind power, solar power, etc.)?

A: OPG will seek to expand, develop and/or improve its hydroelectric generation capacity and will not pursue investment in non-hydroelectric renewable generation projects unless specifically directed to do so by the Ontario Government. OPG received direction from the Province in June 2006 to begin feasibility studies on refurbishing existing nuclear plants and to initiate the federal approvals process for new nuclear generation.

Q: Others have determined that we can meet all of our electricity needs without more nuclear power, why are you proceeding with this?

A: OPG was directed by the Province of Ontario to begin the federal approvals process for new nuclear. This in part, is to address the anticipated base-load future electricity requirements that may arise beginning in 2015.

REACTOR TECHNOLOGIES, VENDOR AND SITE SELECTION

Decision Making Responsibilities

Q: Is there a preferred reactor technology for this Project?

A: The Government of Ontario will make the decision on which reactor technology is selected for this Project. The decision will be based on best technology offered with appropriate consideration for costs, long-term benefits and lowest risks over the lifetime of the new facilities. OPG is providing technical input to the government and does not have a preferred reactor technology for this Project.

Q: Who is responsible for deciding which reactor technology is chosen for this Project?

A: The Ontario Government will make the decision regarding which technology is selected. On March 7, 2008, the Ontario Government announced a two-phase competitive procurement process to choose a preferred nuclear reactor vendor. Infrastructure Ontario is the organization responsible for managing the procurement process. Please visit www.infrastructureontario.ca for more information.

Decision Process - Timelines

Q: How do the timelines for the EA and the reactor technology decision fit together?

A: The Ontario Government's decision regarding technology selection is expected to be made in late spring 2009 prior to the submission of OPG's Environmental Impact Statement to the joint review panel.

Reactor Design Considerations - Distinctions

Q: What criteria are being used to assess the different reactor classes?

A: The Ontario Government has indicated that it will make the final technology selection for Ontario. OPG and Bruce Power conducted a technology assessment to provide the government with a utility perspective of the technology alternatives. Criteria used to assess the different reactor technologies include, among others:

- Lifetime cost of power;
- Best meets schedule for in-service date; and
- Level of investment in Ontario.

Q: What are the differences between the two reactor classes being considered for this Project?

A: The reactor technologies being considered have been grouped into two classes.

These two classes are:

- Pressurized Water Reactors; and
- Pressurized Hybrid Light and Heavy Water Reactors.

The differences in the two reactor classes being assessed are largely in the type of fuel used in the reactor systems. For example, Pressurized Water Reactors typically use low (4-5%) enriched fuel and Pressurized Hybrid Light and Heavy Water Reactors use slightly (2-3%) enriched fuel.

Regardless of this difference, all nuclear power reactors produce heat as a result of a nuclear reaction. This reaction boils water, creates stream and turns a turbine and a generator to create electricity.

Q: Do the new reactor technologies need vacuum buildings?

A: The reactor designs under consideration for this Project do not include a vacuum building for their containment systems. The reactor technologies being considered for this Project utilize independent reactor buildings for each unit as part their containment design.

Q: Do the different reactor technologies produce different amounts of used fuel?

A: Yes, the different reactor technologies being considered produce different amounts of used fuel. The amount of used fuel that a reactor produces is dependent upon the rated power level of the reactor, the enrichment of the fuel (U-235) and the burn-up (which refers to the amount of energy that is extracted from the fuel while in the reactor). The higher the initial enrichment, the higher the potential burn-up. A high burn-up means that more energy is extracted from the fuel and consequently, less fuel is used to produce a megawatt-hour of electricity. Light water reactors will have higher enrichment and thus greater burn-up than CANDU reactors, so the used fuel will take up less storage space. However, the enrichment process adds cost to the front end of the fuel cycle, so overall the total fuel life cycle costs are comparable.

Assuming a 60 year operating life at a 90% average capacity factor, the amount of used fuel per unit and per gigawatt-hour produced is anticipated to be 9.5 kg for the ACR-1000, 2.6 kg for the AP-1000 and 3.4 kg for the US-EPR.

Reactors Design Considerations – CANDU/AECL

Q: Are there Canadian companies that can design and build these reactors?

A: There are a number of companies that design and build nuclear reactors. Atomic Energy of Canada Limited (AECL) is a Canadian-based company that designed the CANDU reactors currently in use at all Canadian nuclear facilities. While no other Canadian companies design reactors, many Canadian firms provide other major systems and components required for a complete nuclear reactor installation. Construction is undertaken by a number of different companies, and there are many Canadian companies capable of construction.

Q: Do we know much about the new AECL reactors, the ACR-1000s?

A: The Advanced CANDU Reactor (ACR-1000) is a new design developed from existing CANDU reactors that have been in safe operation for over 30 years. It has an approximate capacity of 1,200 MW. Two significant evolutions to

the design include:

- The use of slightly enriched uranium fuel (up to 2.5% uranium U-235) in place of natural uranium; and
- The use of natural 'light' water in the heat transport fluid in place of heavy water.

The resultant design is a light-water cooled, heavy-water moderated reactor with higher electrical output, while maintaining a high degree of proven CANDU design features.

Q: Is it more likely that AECL will be selected because they are Canadian owned?

A: The decision will be based on the best technology offered at the best price and which provides the greatest benefits and lowest risk over the lifetime of the new facilities to the ratepayers of Ontario. The technologies and vendors are being evaluated in three key areas:

- Lifetime cost of power;
- Best meets schedule for in-service date; and
- Level of investment in Ontario.

FINANCIAL CONSIDERATIONS

Project and EA Costs

Q: What will the Project cost?

A: At this point OPG does not have a cost estimate for this potential Project. You will see various numbers in the media, generally in the range of $3.5 - $14 billion. However, we need to exercise caution; it is unclear what is included in these numbers. No decision has been made with regard to technology or a vendor, and therefore it is unclear what the costs for the Project will be. OPG will also incur costs associated with the Project oversight team and preparation to operate the plant.

Q: What will the EA cost?

A: The cost of this federal EA is estimated to be approximately $20 - $25 million from start to when a final decision is reached (i.e. over 3 - 4 years). Cost includes such things as OPG staff; technical studies (we have over 10 consulting firms conducting studies in various areas of expertise); and public consultation and communications activities. This excludes any regulatory fees (e.g. Canadian Nuclear Safety Commission fees).

Q: Wasn't an EA conducted for the existing Darlington station? Is it necessary to conduct another?

A: An environmental assessment was conducted in the early 1970's when existing Darlington Nuclear Generating Station was being planned however federal EA requirements did not exist at that time.

There is now a comprehensive federal approvals process in place which is required in order to construct and operate a nuclear reactor in Canada. Before any licence can be issued, a federal EA must be completed to ensure that no significant adverse effects will arise if the plant is constructed and operated.

Decommissioning and Nuclear Liability Costs

Q: How will the costs for the Decommissioning Phase be covered?

A: OPG has an obligation to plan for, and fund, the eventual decommissioning of its nuclear facilities and the long-term management of the nuclear wastes. We believe it is important to ensure that future generations do not have to bear the cost of today's operations.

OPG is party to an agreement with the Ontario Government known as the Ontario Nuclear Funds Agreement (ONFA). Under ONFA, OPG makes quarterly contributions to segregated funds for the management of both its decommissioning and long-term nuclear waste management liabilities. OPG has been putting aside money in a segregated fund to fund the decommissioning of its existing nuclear plants.

As of year-end 2007, OPG has accumulated a total of $9.3 billion in these funds which will continue to grow as annual contributions are made. The liabilities associated with nuclear decommissioning and nuclear waste management as of the end of 2007 were approximately $10.8 billion. Contributions are being made on a quarterly basis to the OPG funds to close the gap. The plan is for the liability to be fully funded at the projected end of life of OPG's stations.

For a new nuclear power plant, OPG would expand existing segregated funds to cover the eventual decommissioning of the new nuclear facilities and the long-term management of the nuclear wastes arising from that plant. Funds associated with decommissioning are strictly controlled and subject to oversight by the Province. The federal *Nuclear Fuel Waste Act* also governs how the nuclear waste funds are established and governed.

Q: How will OPG avoid the cost overruns that occurred during the construction of the first four units in the 1980's and 1990's?

A: OPG and the nuclear industry have learned a lot about good project management and cost and schedule control. If OPG is directed by the Ontario Government to proceed with new nuclear units our commitment is that the best Project management processes will be applied. There will be schedule and cost performance commitments built into the contract with the contractor/builder. Furthermore, the potential contractor/builder will need to provide a fixed price with performance guarantees and a turnkey agreement to limit the risk of cost overruns.

TRANSMISSION INFRASTRUCTURE

Future Development - Transmission Infrastructure

Q: What will determine if additional transmission infrastructure is required?

A: According to the Ontario Power Authority's Integrated Power System Plan, 1,500 MW of additional generation at Darlington would require increased capacity on the 500 kV circuits from Bowmanville to Cherrywood.

Hydro One has indicated that the nature of the enhancements required to accommodate additional capacity will be determined once the number and size of units are known, once dates are more precise, and after consideration is made for other developments in the area.

Transmission EA

Q: What kind of EA would be required for the transmission lines?

A: The EA requirements will depend on the type of enhancements required. Any changes to the bulk transmission corridor and environmental assessment requirements would be carried out by Hydro One.

CURRENT NUCLEAR OPERATIONS

Safety and Security

Q: If there were a nuclear emergency, how would we know what to do?

A: The Province of Ontario has the overall responsibility for managing the off-site response to nuclear emergencies. OPG, Emergency Management Ontario (part of the Ontario Ministry of Community Safety and Correctional Services), and the regional and local governments work together to protect the public.

Each organization has responsibility for a distinct aspect of emergency response. The people, plans and procedures that are put in place for a nuclear emergency response can also be called upon during more common emergencies like ice storms, train derailments or industrial accidents.

If an accident were to occur, reactor operators would act quickly to stop it from getting worse. They would then work on getting the situation under control so there is no impact on the public or employees. As mandated by the Provincial Nuclear Emergency Plan, within 15 minutes OPG would notify the Ontario Government and the local municipalities about the accident and the severity. We would also activate our on-site emergency response teams to conduct testing and to provide technical backup to the operators. We would act quickly to alert people in parks and other open areas adjacent to our facilities.

Under most scenarios the accident would be quickly brought under control and the station would be put in a safe state. At this level, the Province and local municipality monitor the situation. Under rare circumstances (which have never happened in Canada), there may be the potential for some impact on the community. In this case, the Province would activate its emergency response. They would make decisions on what actions, if any should be taken. If action is warranted, the Province would alert people within 10 kilometres of the affected station through a series of designated media outlets. It is expected residents would have ample time to take proper action. The important thing is to listen to the radio or television and wait for instructions.

OPG, regional and local governments work hand-in-hand with the province in planning, practicing, and providing public information on nuclear emergency preparedness. This will be addressed in the Emergency Preparedness TSD and in the EIS.

Q: What are KI pills?

A: During a nuclear emergency, Potassium Iodide (KI) pills can be taken to minimize the absorption of radioactive iodine by the thyroid gland. The thyroid gland absorbs iodine that is taken into the body as a normal part of its function. Following a postulated release of radioactivity, radioactive iodine (a radionuclide) could be absorbed by the thyroid gland. By loading the thyroid with non-radioactive iodine, the gland receives greater protection from any absorption of radioactive iodine that it would otherwise take in.

Provincial officials will authorize the taking of KI pills, but only if necessary. KI pills would be available for the public at reception centers following an evacuation. Schools, daycare centers and hospitals would also have stockpiles of KI pills for their use during an emergency.

Pickering Nuclear Generating Station

Q: Didn't Pickering have to shut down due to problems with the condenser cooling system?

A: In the past few years, there has been a rise in the amount of algae that lives in Lake Ontario. At the Pickering Nuclear Generating Station, the algae becomes entrapped in the once through lake water cooling system, restricting the amount of cooling water that is available to the plant. Consequently, the plant reduces power or, if needed, shuts down while the algae are cleaned out and then resumes normal operations. The plant does have measures in place to minimize the impact of algae.

Darlington Nuclear Generating Station

Q: When is the Darlington A Nuclear Generating Station scheduled to reach its end-of-life?

A: The operating life of a reactor is determined by a number of factors, one of which is the anticipated life of major reactor components, as determined by the extent of degradation to the component. Major reactor components which can limit the operating life of a reactor include feeder tubes, fuel channels and/or steam generators. As such, reference is often made to the economic end of life of a plant, that is, when it is no longer economically prudent to continue to invest money in the plant. Should a decision be made to refurbish the reactors, major components would need to be changed in the Darlington A Nuclear Generating Station over the course of the next 20 years.

OPG has begun studies on the potential refurbishment and continued operation of the existing Darlington A Nuclear Generating Station. This will include an environmental assessment and public consultation. If the Darlington A Nuclear Generating Station were to be refurbished, it would add approximately 25 - 30 years to the operating life of the station. If no refurbishment activities were done, the station could reach the end of its economic life around 2020.