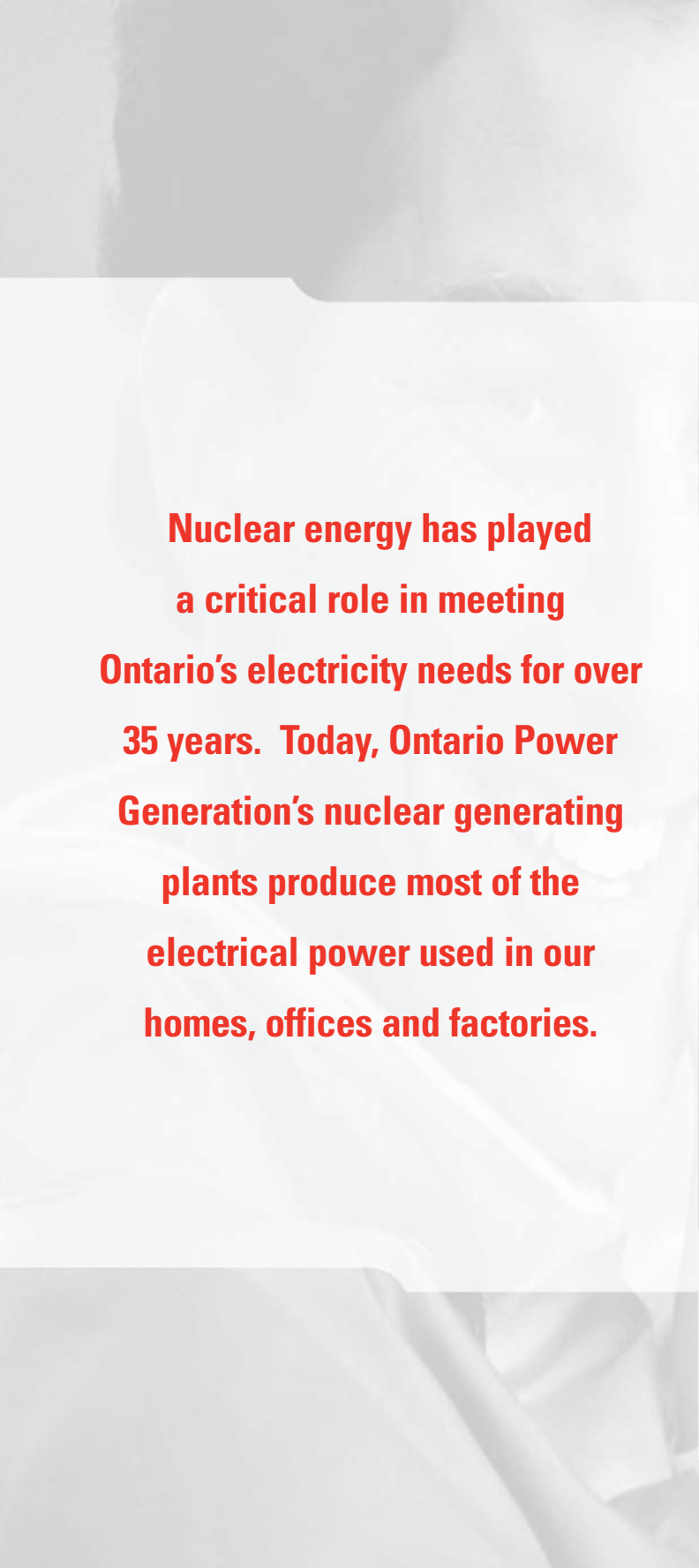
PROTECTING YOU AND YOUR FAMILY

ONTARIO POWER GENERATION

Nuclear Safety and Emergency Planning

ONTARIO POWER GENERATION



Nuclear energy has played a critical role in meeting Ontario's electricity needs for over 35 years. Today, Ontario Power Generation's nuclear generating plants produce most of the electrical power used in our homes, offices and factories.

INTRODUCTION

In Canada, the nuclear industry can proudly say no member of the public has ever received a harmful dose of radiation from a Canadian reactor. While the technology, design and operation of our reactors all have your safety as the primary goal, it is important you know the facts about potential emergencies at our facilities. The chance of a severe nuclear emergency is remote, but it only makes sense to plan and prepare as if it could happen. To help you, we've tried to answer a number of the questions you have asked over the years. However, please call any of the numbers listed on the back page if you want more information about a particular area of emergency planning.

WHO IS IN CHARGE OF EMERGENCIES?

The Province of Ontario has the overall responsibility for managing the off-site response to nuclear emergencies. Ontario Power Generation, Emergency Management Ontario, part of the Ministry of the Solicitor General and Correctional Services, and the regional and local governments work together to protect the public. Each organization has responsibility for a distinct area of the 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. Briefly, the nuclear emergency response is divided into three areas of responsibility.

Ontario Power Generation's first responsibility is to make sure our reactors are operated, maintained and designed in such a way that accidents won't happen. If an accident occurs, our responsibility is to make sure it is controlled and radiation releases are minimized. We are also responsible for the safety of our employees.

Ontario Power Generation also assists the Province and local municipalities with funding and planning support for their emergency programs.

Emergency Management Ontario, an agency of the provincial government, is responsible for the overall Provincial Nuclear Emergency Plan and public safety during nuclear emergencies. If a nuclear emergency were to take place the provincial government takes over the off-site response. It has responsibility for making decisions on the proper level of public action.

Regional and local municipalities all have emergency plans in place. But more importantly, it is their emergency responders, the police, fire and ambulance crews, with support from a host of other groups, who make sure the emergency plans are implemented properly. Plans are important, but it is trained people that make them work!

WHAT IS EMERGENCY PREPAREDNESS?

Emergency Preparedness (EP) means you plan and practise your response to all manner of emergencies. At Ontario Power Generation we have comprehensive plans in place, which are backed up with training and repeated drills. Each employee is well trained in his/her role within the emergency response team.

Our operators have the responsibility for safely controlling the reactors and responding to emergencies should they occur. Our planning and training programs ensure employees are accounted for and are in safe areas. We also set up teams of technical experts who conduct radiation tests outside the facility and provide advice to the reactor operators. Ontario Power Generation also works with other agencies on plans, training and emergency drills so that all parties are familiar with the response procedure.

WHY SHOULD WE WORRY ABOUT PLANNING?

There are many misconceptions about nuclear accidents and how severe they may be. The design of the CANDU reactor means that accidents will be rare and will not likely have any impact on the community. The design of the plant means it will not suddenly "explode." Under rare circumstances,

where an improbable combination of things go wrong, there is a chance of some impact on the community. However, this will likely develop over a number of days, allowing ample time for protective action to be taken.

The Province uses a number of categories as part of their emergency notification. They are: General Emergency, OnSite Emergency, Abnormal Incident, Reportable Event and Liquid Emission. These levels relate to the response needed. These are operational levels and will not be communicated to the public during an emergency. A similar seven stage international scale rates the severity of the accident.

The two most famous nuclear accidents were **Chernobyl** in the former USSR and **Three Mile Island** in the United States.

The accident at **Chernobyl** was caused by a series of human and equipment failures. It is important to remember that this style of reactor was very different from any reactor used in the western world. So different in fact that its design and construction would not be permitted by any nuclear regulator in the western world. While comparisons are not exact, **Chernobyl** would likely have been categorized as a General Emergency in Ontario and was rated a seven on the international scale.

Three Mile Island (TMI) is perhaps the best example of the potential public impact from an accident at a North American reactor. In a word, the public health and safety impact was essentially zero. While the reactor itself suffered serious

damage and was never restarted, all of the safety barriers worked and a negligible amount of radiation escaped.

There is a perception that this was a disaster, but today people work beside the affected unit and regular testing shows the radiation within the facility has not escaped. After the accident U.S. reactor operators and regulators made a number of changes in their operations to reduce the chances of future accidents at other sites. TMI would likely have been categorized as an OnSite Emergency in Ontario and was a five on the international scale.

Ontario Power Generation has had an enviable safety record. The worst event we've experienced occurred in 1994, when a valve failed on the heat transport system of Unit 2 at our Pickering station. A large amount of radioactive heavy water spilled inside the station, but safety systems and containment barriers all worked as designed. Testing showed no elevated radiation levels outside the plant and no employee or member of the public suffered any harm. The accident was rated as the lowest category on the provincial emergency response scale in use at the time, and the affected unit was restarted about a year later. Under the new scale this accident would have been an Abnormal Incident.

After any event at our sites an intensive review identifies the cause. Remedial programs, if needed, are put in place. In the case of the 1994 accident at Pickering, a piping

system was modified. We also make sure the same problem doesn't exist at our other sites.

TELL ME ABOUT YOUR SAFETY SYSTEMS

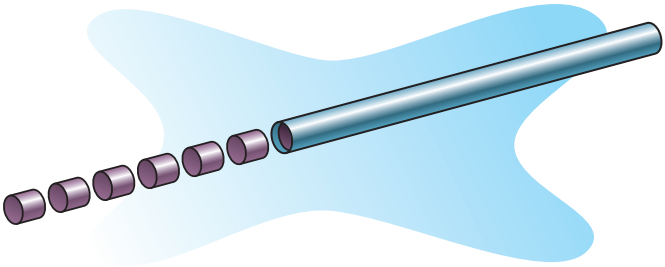
The Canadian approach to reactor safety can be summed up in three words – defense in depth. This means providing multiple technological and operational safety measures that act first to lessen the chance of an accident and then, if an accident does take place, reduce the possibility of harmful effects on employees and the public.

Each operating station is fitted with rapid shutdown systems that can stop the chain reaction within seconds. In addition, the station containment systems are designed to lock harmful radiation within the facility. The CANDU system is unique because it has what is known as a vacuum building. In brief, this structure allows operators to remove contaminated air from the reactor building into the vacuum building. If the situation requires a release of contaminated air from the vacuum building, it will be done in consultation with the Province and the release will take place at the safest time. The released air passes through filters that trap 99.9 per cent of the contaminated particulate.

For more detail or information on safety systems, please call us or visit one of our stations. The phone numbers are listed on the back page of this brochure.

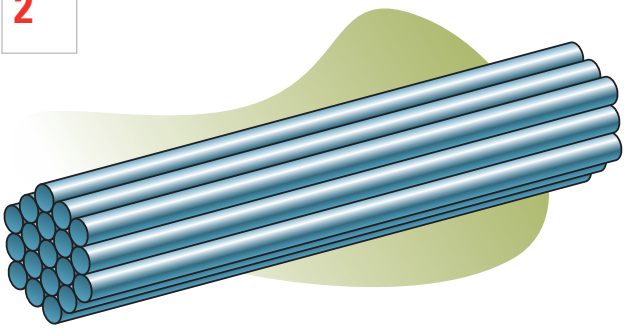
PROTECTIVE BARRIERS

1



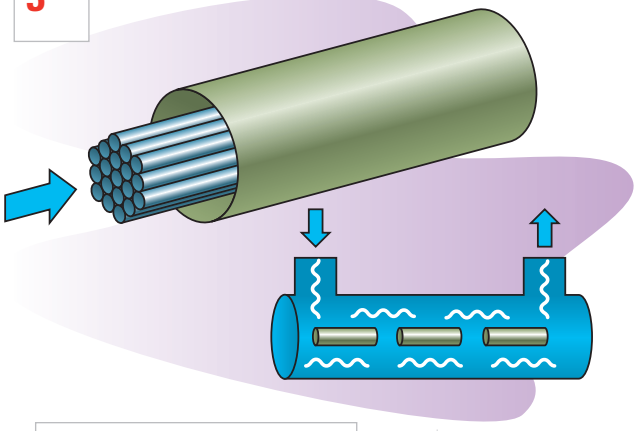
The first of the protective barriers is the fuel itself. More than 99% of the radioactive by-products are locked within the hard, molded ceramic fuel pellets.

2



The second barrier is the surrounding fuel sheath. The fuel pellets are enclosed within these sealed metal tubes or sheaths which are assembled into fuel bundles.

3



The fuel bundles are contained inside the cooling system pressure tubes which make up the third barrier. Water is pumped through these pressure tubes to cool the hot fuel bundles.

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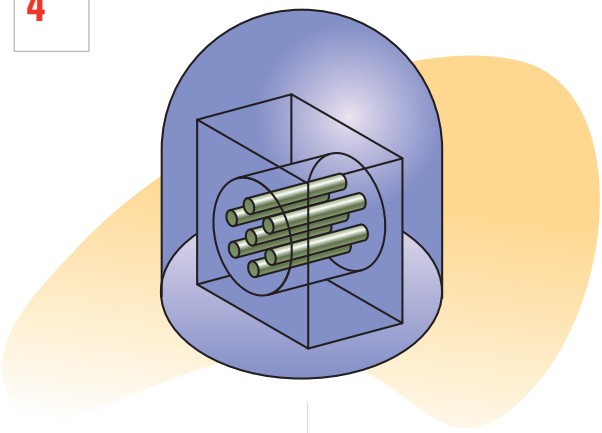

All these barriers are enclosed within the airtight reactor building, which is the fourth barrier. This building has concrete walls at least 4 feet thick.

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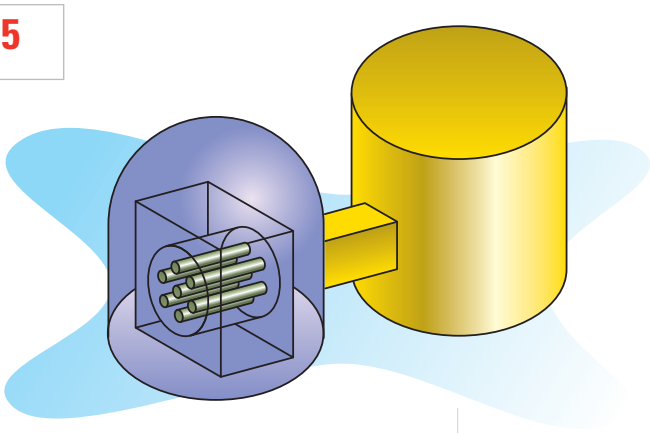
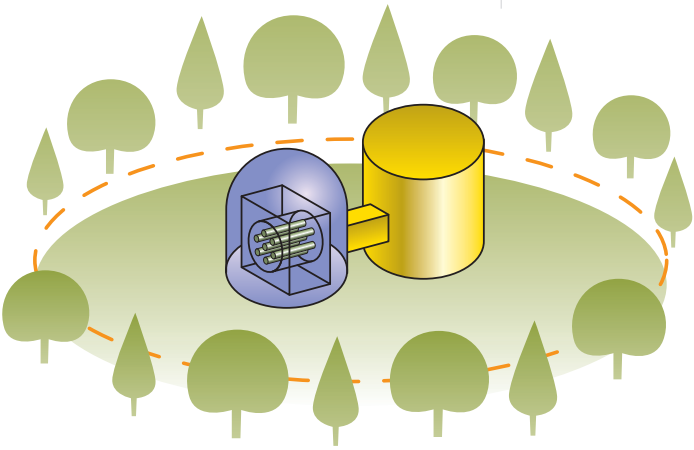


The reactor building is connected to a large vacuum building which will remove any radioactive material released into the reactor building during an accident.

The reactor and vacuum building are surrounded by a one kilometre exclusion zone where there are no permanent residences. This is established to reduce the radiological consequences to the public of any release.



BUT WHAT IF AN ACCIDENT DOES HAPPEN?

If an accident happens, reactor operators would act quickly to stop it from getting worse. They 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 Ontario Power Generation will notify the provincial government and the local municipalities about the accident and the severity. We also activate our on-site emergency response teams to conduct testing and to provide technical backup to the operators.

We act quickly to alert people in parks and other open areas adjacent to our facilities.

Under most scenarios the accident is quickly under control and the station is 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. Usually this is because the vacuum building, which is described on page 6, has become full and a release of air is required. In this case, the Province would activate its emergency response.

They would evaluate the potential for harm to the public and then make decisions on what actions, if any should be taken.

Under most cases, the event would unfold over hours or days. If action is warranted, the Province will alert people within 10 kilometres of the affected station through a series of designated media outlets in your area. It is expected you will have ample time to take proper action. The important thing is to listen to the radio or television and wait for instructions.

SO WHAT CAN I DO TO PROTECT MY FAMILY AND MYSELF?

Advance planning can go a long way during an emergency. Emergency Management Ontario has a detailed brochure for people living near our facilities.

The Emergency Management Ontario brochure gives details on how you will be alerted and what actions you might be asked to take. It also pinpoints your home in one of the emergency planning zones.

It is helpful to have discussions with your family about how they should react during emergencies of all kinds. For a copy of the brochure or more information, call Emergency Management Ontario at (416) 314-3723.

IN BRIEF, IF YOU LIVE WITHIN 10 KILOMETRES OF ONE OF OUR FACILITIES AND YOU ARE AWARE OF AN EMERGENCY, PROVINCIAL AND LOCAL AUTHORITIES EXPECT YOU TO:

- Stay indoors, listen to your designated media and wait for further instructions. If you are at work, do not attempt to return home or pick up your child at school,
- Read your emergency information brochure so you are familiar with the proper response procedures,
- Avoid calling 9-1-1, Ontario Power Generation or other emergency numbers to ask about the situation at our facilities. Such phone calls tie up phone lines that are being used to co-ordinate the emergency response,
- Remember to act in a calm and controlled manner to avoid panic if you are instructed to take action. Often in emergencies the effect of panicking is worse than the emergency itself.

Ontario Power Generation is an Ontario-based electricity generation company whose principal business is the generation and sale of electricity in Ontario. OPG's focus is on the efficient production and sale of electricity from our competitive generation assets, while operating in a safe, open and environmentally responsible manner.

In order to protect our environment, this publication has been printed on recycled paper.

WHERE CAN I GET MORE INFORMATION?

If you need information on Ontario Power Generation's facilities, nuclear safety, radiation or other nuclear issues, please visit our web site (www.opg.com), or call:

PICKERING NUCLEAR
(905) 837-7272

DARLINGTON NUCLEAR
(905) 623-7122
or 1-800-461-0034

For information on the Provincial Nuclear Emergency Plan and what you should do during an emergency, please call:

EMERGENCY MANAGEMENT ONTARIO
(416) 314-3723

For information on Emergency Response in Durham Region, please call:

DURHAM REGION (Emergency Management)
(905) 430-2792

If your community group would like a presentation on Emergency Preparedness, please call any of the above numbers to set this up.

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