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## **Event Initial Report**

## **Rapport initial d'événement**

### **Ontario Power Generation**

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**Pickering Nuclear Generating Station:  
Unplanned Outage due to algae run**

**Centrale nucléaire de Pickering : Arrêt  
imprévu causé par un afflux d'algues**

Commission Meeting

Réunion de la Commission

**August 22, 2018**

**Le 22 août 2018**

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# EVENT INITIAL REPORT (EIR)

E-DOCS-# 5597506

<b>EIR: Pickering Nuclear Generating Station Unplanned Outage due to algae run</b>	
<b>Prepared by:</b> Directorate of Power Reactor Regulation, Pickering Regulatory Program Division	
<b>Licensee:</b> Ontario Power Generation	<b>Location:</b> Pickering B Units 5, 6, 7 and 8
<b>Date Event was Discovered:</b> July 22, 2018	<b>Have Regulatory Reporting Requirements been met?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>  <b>Proactive Disclosure:</b> Licensee: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> CNSC: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<b>Overview</b>	
<b>Reporting Criteria:</b> REGDOC-3.1.1 - 11(b)  The licensee shall report on:  b. A reactor shutdown or an unplanned change in reactor power	
<b>Description:</b> From July 21 to July 22, 2018, Pickering Nuclear Generating Station was impacted by a large accumulation of algae on the travelling screens (a mesh used to catch and remove debris). The algae was anticipated during this time of year; however, the volume of algae exceeded expectations and led to a rare shutdown of the four Pickering B units (Units 5, 6, 7 and 8). Throughout this event: control of reactor power was maintained; fuel cooling in each core was maintained; and containment was not challenged. Units 5, 7 and 8 have returned to full power operation as of August 2, 2018.  <b>Cause(s):</b> The buildup of algae on the travelling screens caused operators to shut off condenser cooling water (CCW) pumps, which caused a high condenser pressure condition. Unit 5 automatically initiated turbine trip. Unit 6, 7 and Unit 8 were manually initiated turbine trips per operating procedures.	
<b>Impact of the Event</b>	
<b>On People:</b>  How many workers have been (or may be) affected?    0  How many members of the public have been (or may be) affected by the event?    0  How were they affected?  Not Applicable	
<b>On the Environment:</b> There were no environmental impacts from the unplanned outage of Pickering Units 5, 6, 7 and 8.	
<b>Other Implications:</b> Commercial impact on OPG resulting from shutting down Pickering Units 5, 6, 7 and 8.  It is important to note that while the Pickering Units were shutdown, the fuel was safely cooled at all times. Units 5, 7 and 8 Heat Transport Systems (HTS) remained hot and pressurized with their normal full power heatsinks in service (forced circulation and boilers).  Unit 6 initially entered thermosiphoning mode (HTS hot and pressurized but with natural circulation to the boilers) as the Unit had lost its Class IV power source from the grid due to maintenance on a 230kV transmission line at the CherryWood substation, and Unit 5 turbine trip during the algae run. Thermosiphoning mode is a credited short term heat sink in the safety analysis while forced circulation is being re-established. As per design, Class IV power and normal Class III power were restored and Unit 6 then transitioned to a shutdown cooling heat sink configuration, which remains in service to date.  Water from the lake, (Common water system) after passing through the bar and traveling screens in the screenhouse travels by way of large concrete ducts to each of the four Pickering B units where it enters another large concrete duct on each unit. This duct supplies the Condenser Cooling Water (CCW) system and cooling water for equipment (service water). CCW is only required when the units are producing electricity and steam is flowing through the turbines. During severe algae runs CCW pumps and hence the turbines are shut down to reduce the demand for lake water, thus allowing the traveling screens to remove the algae entering the common water supply and to maintain the lake water supply to the service water systems used for equipment cooling and for "shutdown cooling".	
<b>Licensee Actions</b>	
<b>Taken or in Progress:</b> Unit 058 screen house conditions are stable with traveling screen differential pressure at or below 15cm. In addition, the alga was harvested by a boat in the forebay to reduce loads on screen house equipment. Units 5, 7, and 8 have returned to service. Unit 6 was placed into guaranteed shut down state (GSS) using Reactor Shutdown Guarantee 4 (Rod based GSS).	

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**Planned:**

Unit 6 has been placed in a guaranteed shut down state using Reactor Shutdown Guarantee 4(Rod based GSS). The following issue will be resolved prior to unit 6 restart: repair 4kV CLIV tie breaker 6-5320-CB2B (a Unit 6 switchgear circuit breaker).

**CNSC Actions**

**Taken or in Progress:** CNSC staff have met with OPG's Director of Engineering and Director of Maintenance to:

- Gather information and facts about the event
- Determine if the licensee's response to the event was adequate
- Ensure Pickering B reactors are raised to Full Power in a safe manner

CNSC staff has also verified the fish net integrity based on the results of a visual check by OPG personnel.

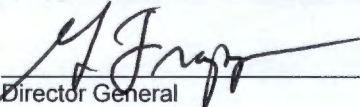
**Planned:** CNSC staff will continue to monitor the progress of the algae removal, and verify OPG staffs restart of Unit 6 in a safe manner.

**Additional reporting to the Commission Members anticipated:**

Yes

No

This issue will be discussed during the next Commission Meeting.

Name and Title	Signature
Gerry Frappier, Director General, Directorate of Power Reactor Regulation	 Director General 2018-08-09 Date

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**Figure 1 (above): Intake Channel - Pickering B**



**Figure 2 (above): Algae Harvester Boat (Orange)**

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**Figure 3: Waste Bins with Algae**



**Figure 4: Screen house Algae collection**