

ORTECH Information Paper

The Ontario Power Authority recently introduced a new program called Demand Response 3 (DR3) that would see up to 2,000 MW of power provided by backup power generators located throughout the province, particularly during the 1,600 hours a year when the province needs them most (i.e., periods of heavy demand when electricity is imported at a premium from the U.S. or other provinces).

Currently there are eight companies, called "aggregators," that have applied to participate in the DR3 program. An aggregator signs up owners of backup generators, then strikes a contract with the power authority guaranteeing that a certain amount of backup power generation can be switched on. The power authority is willing to pay an attractive price for that predictability.

However, the Ontario Ministry of Environment (MOE) recently proposed new emission limits for internal combustion engines used for non-emergency power generation (EBR Registry #010-2463 <http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTAyNjYy&statusId=MTUzNDYx&language=en>). The proposed emission limits apparently apply to both existing and new engines running on diesel, bio-diesel, natural gas or bi-fuel (natural gas/diesel). These proposed emission limits are source emission, or stack limits, that apply to emissions from individual generator sets and are separate from Point of Impingement (POI) limits as defined in O. Reg. 419/05 and found in the MOE's Ambient Air Quality Criteria (AAQC) guideline.

As indicated in the table below, the following contaminants have been targeted: NO_x (expressed as NO₂), particulate matter (PM), non-methane hydrocarbons (NMHC), carbon monoxide (CO) and sulphur dioxide (SO₂).

Contaminant	Proposed Emission Limit 2007-2010		Proposed Emission Limit 2011+	
	(kg/MWh)	(g/bhph)	(kg/MWh)	(g/bhph)
NO _x (as NO ₂)	1.0	0.75	0.4	0.3
PM	0.2	0.15	0.02	0.015
NMHC	1.3	0.97	0.19	0.14
CO	3.5	2.6	3.5	2.6
SO ₂	15 ppmv fuel sulphur content*	15 ppmv fuel sulphur content*	15 ppmv fuel sulphur content*	15 ppmv fuel sulphur content*

* ultra-low sulphur diesel (ULSD) - where other fuels are used, equivalent maximum allowable sulphur emission levels will be required.

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The proposed limits would apply during steady state operation, and not during start-up or shut-down periods. The proposed limits would apply to all generator sets used for non-emergency electricity generation including:

- Generator set owners/operators wishing to participate either directly or through an “aggregator” in the Ontario Power Authority's DR3 program or other similar programs;
- Individual facilities using on-site generator sets to undertake “peak shaving” or “peak clipping” electricity generation (peak shaving/clipping is defined as the use of on-site generation on a periodic basis during periods of high electricity system demand to either reduce electricity costs to the end user or to generate electricity to sell back to the grid); and
- Customer based generation, or distributed generation where facilities choose to install a generator set on-site to meet all or a portion of their electricity consumption needs, rather than take electricity from the grid.

These limits would not apply to off-grid communities/facilities that rely on diesel generation for the primary source of electricity supply.

Although it may be possible to retrofit existing generators with emission control technologies such as catalytic reduction devices to achieve the proposed emission limits, it is not clear what level of detail the MOE will require in verifying emissions (e.g., manufacturer's emission guarantees or validated stack testing).

The MOE is also considering whether or not to continue with the restricted operation of non-emergency generators on smog days (i.e., on days when such units would be expected to be needed most), which it enforces through conditions in Air Certificates of Approval.

The Independent Electricity System Operator (IESO) balances the supply of and demand for electricity in Ontario and then directs its flow across the province's transmission lines. When the IESO foresees the possibility of an emergency event, the Emergency Load Reduction Program (ELRP) process is initiated on the day-ahead or day-at-hand. This process begins with a notification to participants, followed by a voluntary submission of offers by participants, and if needed, activation of those offers by the IESO. Participants must be able to generate or turndown at least 1 MW of capacity to participate. This program has been in operation since June 2006.

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The requirements for the generator sets under the ELRP will be different than the requirements proposed for generator sets operated for non-emergency use. The environmental requirements for the ELRP include:

- Compliance with the MOE air standards specified in O. Reg. 419/05;
- NO_x emission limit of 3.0 kg/MWh (2.2 g/bhph);
- PM emission limit of 0.2 kg/MWh (0.15 g/bhph); and
- Use of Ultra Low Sulphur Diesel (15 ppmv) or equivalent.

Consultation on the proposal ended March 1, 2008. ORTECH has already submitted comments and questions on this proposal.

Out of interest, ORTECH has undertaken some preliminary calculations based on published U.S. EPA AP-42 Section 3 emission factors for natural gas-fired, diesel-fired and gasoline-fired engines. Based on a typical natural gas-fired or diesel-fired generator unit with a heat rate of about 7,200 BTU/bhph (or about 9,800 BTU/kWh) without the application of emission control technologies, one or more of the proposed emission limits for non-emergency power generation would be exceeded. ORTECH has also undertaken a few preliminary calculations based on diesel generator manufacturer's emission data and stack testing results for new engines (again without the implementation of emission control technologies), which also showed exceedances at the proposed emission limits.

Should you have any questions or would like to learn more about how these proposed emission limits might impact your facility, please do not hesitate to contact us at 1-877-774-6560 to speak with any of our consultants or email us at info@ortech.ca.