

Evaluation Report for Category B, Subcategory 4.6 Application

Application Number: 2014-3335
Application: Conversion or Extensions to Ltd. or Term-Submission to fulfill conditions of registration on a product with full registration
Product: Wedeco Ozone Generator
Registration Number: 29041
Active ingredients (a.i.): Device
PMRA Document Number : 2546680

Purpose of Application

The purpose of this application was to replace the existing Hankin Ozone Generator at the Lennox Generating Station by the Wedeco Ozone Generator. This product is registered as a restricted product to be used at this location only.

Chemistry, Environmental and Value Assessments

Chemistry, environmental and value assessments were not required for this application.

Health Assessments

Ontario Power Generation Inc. is proposing to replace the Hankin Ozone Generator (Reg. No. 29041) in the ozonated water system of the Lennox Generating Station at Bath, Ontario with the Wedeco Ozone Generator. The ozone generator produces ozone to control zebra mussel fouling in the service water system of the generating station. Published information on the toxicity of ozone was previously reviewed by the PMRA for the registration of the Hankin Ozone Generator. The primary route of exposure for ozone is inhalation and the critical site of toxicological effects is the respiratory system. Therefore, potential occupational and bystander inhalation exposures to ozone and measures to mitigate those exposures and any associated risks of adverse effects on the respiratory system were reviewed by the PMRA for the Wedeco Ozone Generator.

The location and layout of the equipment for producing and injecting ozone into the service water system is the same as for the Hankin Ozone Generator, and the ozone concentrations to be generated by the Wedeco Ozone Generator are the same. Although the ozone monitors will be changed to Wedeco models, the remaining components of the ozone injection system are the same as for the Hankin Ozone Generator.

Occupational exposures to airborne ozone at the Lennox Generating Station could occur as a result of accidental leakages or emissions during the operation of the ozonated water system. Potential occupational exposures to elevated levels of airborne ozone will be

mitigated by an ozone destruct unit that prevents off-gassing from ozonated service water into the air of the station, and a series of ozone in air analyzers that can automatically trigger amber warning lights, audible alarms, emergency ventilation in the ozone generator equipment room, and if necessary, a shut-down of the ozone generator. Most of the analyzers have alarm settings that are based on Ontario Ministry of Labour (OML) occupational exposure limits (OEL) for ozone including a high alarm calibrated to an OEL time weighted average of 0.1 ppm and a very high alarm calibrated to an OEL short term exposure limit of 0.3 ppm. The analyzer for the outlet stack of the ozone destruct unit is calibrated to an Ontario Ministry of the Environment (OME) certificate of approval under the (Ontario) *Environmental Protection Act* specific to the Lennox Generating Station (No. 5525-4NBH7G) that specifies a maximum ozone outlet concentration of 0.1 ppm. High alarm and very high alarm settings for this latter analyzer are 0.08 ppm and 0.1 ppm.

The ozone generator equipment room at the Lennox Generating Station also houses equipment to generate and store oxygen used by the ozone generator. To monitor the oxygen levels in the room, there is an oxygen in air analyzer calibrated to the OML confined spaces guideline for oxygen (i.e., 18.5–23%). If the oxygen level in the room is outside of the range of the guideline, the analyzer sends a signal to automatically shut down the ozone generation equipment, turn on the amber warning light in the room, activate an audible alarm, and turn on the emergency ventilation in the room. This system is expected to mitigate any occupational health and fire risks from insufficient or excessive atmospheric oxygen levels in the room.

Other aspects of the ozonated water system that are expected to limit occupational exposures to excessive airborne concentrations of ozone or oxygen include the ozone gas piping and all piping carrying service water or ozonated water which comply with piping codes, guidelines, and standards that prescribe minimum requirements for design, fabrication, inspection and testing, and promote the safe storage and transport of gases such as ozone. Also, the label for the ozone generator has warning and precautionary statements on the hazards of ozone, and the Wedeco Ozone Generator operation and maintenance manual and label for the ozone generator include directions for the availability and use of appropriate respirators when verifying airborne ozone levels under high or very high alarm conditions. Additional information relevant to limiting occupational exposures is provided in the ozone generator operation and maintenance manual, and in the Lennox Generating Station operating instructions, sampling procedure, and policies and procedures documents. This information includes descriptions of ozone and oxygen hazards and precautions, information on the oxygen and ozone detection alarm systems and procedures for responding to alarms, system start-up and shut-down procedures, directions for operating the ozone destruct unit, processes to follow for noncompliance with certificates of approval including corrective actions and reporting requirements, routine maintenance procedures, and records generation.

The primary source of potential bystander exposures to ozone in air is expected to be the outlet stack of the ozone destruct unit. Because this stack is located 4.8 m above the ground and 30.5 m from the nearest receptor, there should be sufficient time for mixing, dilution, and decomposition of any residual ozone emissions in ambient air before any bystanders could be exposed. Also, as noted previously, the ozone in air analyzer for the outlet stack is calibrated to a generating station specific OME certificate of approval for ozone emissions, and is capable of automatically activating warning lights, audible alarms, and shutting down the ozone generator, if necessary.

Consequently, it is expected that the potential for bystander exposure to levels of ozone in air originating from the outlet stack of the ozone destruct unit that could adversely affect human health is very low.

The ozonated water system at the Lennox Generating Station is operated to achieve a residual of 0.1–0.2 mg/L ozone in water throughout the service water system. According to an amended certificate of approval from the OME under the *Ontario Water Resources Act* (No. 2624-6MASFH) best efforts must be used in the design, construction, and operation of the system to not exceed effluent objective ozone concentrations of 0.15 mg/L in the service water system at the pump discharge and 0.002 mg/L in the condenser cooling water discharge channel prior to any effluents entering Lake Ontario. There is also an effluent limit of 0.01 mg/L ozone for the cooling water discharge channel into Lake Ontario. For comparison, currently there are no Canadian drinking water, recreational water or (environmental) water quality guidelines for ozone, but concentrations of 2–5 mg/L are commonly used to oxidize organic chemicals in drinking water treatment. Ozone levels at different locations in the ozonated water system at the Lennox Generating Station are monitored by weekly grab samples and continuous (ozone in water analyzers). Any exceedances of the effluent limit must be reported to the OME as soon as possible, and an annual report must be prepared that includes monitoring data and a description of any failures to meet the requirements of the certificate of approval along with remedial action proposed or taken. Given the requirements of the OME certificate of approval, the sampling and monitoring processes in place to ensure compliance, and the relatively high reactivity and short half-life of ozone in water, the potential for occupational or bystander exposures to levels of ozone in water associated with adverse health effects is very low.

Incident Reports

Since April 26, 2007, registrants have been required by law to report pesticide incidents to the PMRA that are related to their products. In addition, the general public, medical community, government and non-governmental organizations are able to report pesticide incidents directly to the PMRA. As of July 6 2015, no human or domestic animal incident reports involving Ozone and Devices specifically for Ozone devices had been submitted to the PMRA.

Conclusion

The Pest Management Regulatory Agency has completed an assessment of the information provided, and has found the information sufficient to support the registration of the new Wedeco Ozone Generator.

References

A. List of Studies/Information Submitted by Registrant

1.0 Human and Animal Health

PMRA Document Number	Reference
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1381698	2000, Design Description - Ozonated Water System (OWS), DACO: 5.2
1381700	2000, Operation of the Ozonated Water System, DACO: 5.2
1381701	2000, Continuous Ozonation of Service Water at Lennox G.S. – Overview of System Location and Operation, DACO: 5.2
2449616	2013, Ozone Generator specifications and Operations & Maintenance Manual, DACO: M2.9.1
2449617	2014, Use Description Scenario (Application and Post Application), DACO: 5.2

B. Additional Information Considered

i) Published Information

1.0 Human and Animal Health

PMRA Document Number	Reference
2531118	Ontario Ministry of the Environment, 2006, Amended Certificate of Approval, Amended Certificate of Approval Industrial Sewage Works Number 2624-6MASFH, Issue Date: March 7, 2006, Ontario Power Generation Inc. PO Box 1000 Bath Ontario K0H 1G0, DACO: 5.14
2531119	Ontario Ministry of the Environment, 2000, Certificate of Approval Air, Certificate of Approval Air Number 5525-4NBH7G, Ontario Power Generation Inc. Lennox Generating Station Highway # 33 PO Box 1000 Bath Ontario K0H 1G0, August 18, 2000, DACO: 5.14
2531120	Ontario Ministry of Labour, 2013, Ozone [10028-15-6], Current Occupational Exposure Limits (OELs) for Ontario Workplaces Required under Regulation 833, January 2013, DACO: 5.14
2531122	Ontario Ministry of Labour, 2011, Confined Spaces Guideline, Health And Safety Guidelines, Revised July 2011, ISBN 978-1-4435-6943-2, DACO: 5.14
2534895	Centers for Disease Control and Prevention (CDC), 2015, Ozone, NIOSH Pocket Guide to Chemical Hazards, http://www.cdc.gov/niosh/npg/npgd0476.html , accessed on May 21, 2015, DACO: 4.8

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