



COMMONWEALTH OF MASSACHUSETTS
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July 27, 2010

Mr. David Morris
CDG Environmental, LLC
205 Webster Street
Bethlehem, PA 018015

New Product Review
Product: Saf-T-Chlor
New Technology Approval.
PWSID: 4050000

Transmittal Number: 51009857

Dear Mr. Morris:

The Massachusetts Department of Environmental Protection (MassDEP), Drinking Water Program (DWP), has reviewed the information provided by your company for the approval of the Saf-T-Chlor gas-solid Chlorine Dioxide (ClO_2) generator system to be used in the disinfection or pre-treatment of drinking water. MassDEP/DWP evaluated the information for possible acceptance of your product for use on public water systems in the Commonwealth of Massachusetts in accordance with 310 CMR 22.00.

Pilot Description:

The piloted system is the Saf-T-Chlor, manufactured by CDG Environmental. A full-scale pilot study was conducted at the Canton Water Treatment Plant (WTP), Canton, Massachusetts. The disinfection and/or pre-treatment process was piloted to determine the accuracy of the system to deliver accurate chlorine dioxide doses by the measurement of chlorite ions, a product of reaction. Chlorite ions are produced when chlorine dioxide reacts with reducing agents present in the water, such as manganese (+2) ions.

The Saf-T-Chlor generator system is a solid-gas generator system that uses solid sodium chlorite to yield a pure, gaseous chlorine dioxide product for the disinfection or pre-treatment of drinking water. When the chlorine reacts with the solid sodium chlorite, chlorine dioxide gas is produced. This system is capable of producing up to 8 pounds of chlorine dioxide per day.

The water used in this pilot was raw water from Canton's WTP. The target doses of ClO_2 were 0.5, 1.0 and 1.5 mg/L. When these doses were injected into the raw water, the chlorine dioxide was immediately demanded, particularly, by the manganese ion species in the raw water. This demand for chlorine dioxide by manganese ions or other reductive species made it challenging to measure chlorine dioxide levels directly. Therefore, chlorite ions (by-products) were measured instead. Chlorite ions are produced when Chlorine diode reacts with manganese (+2) ions or other reductive species. Thus, the stability of chlorine dioxide can be measured in terms of chlorite ion levels in the treated water since the results imply first order kinetics.

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD# 1-866-539-7622 or 1-617-574-6868.

MassDEP on the World Wide Web: <http://www.mass.gov/dep>

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Pilot Results:

The results of the pilot study are shown in the Table 1 below:

Table 1- Chlorite Results

Sample ID	Collection Date	Target CLO2 Dose	Chlorite Residual mg/L
1	11/19/09	1.5	1.6
2	11/20/09	1.5	1.5
3	11/20/09	1.0	0.65
4	11/21/09	1.0	1.10
5	11/22/09	0.5	0.71
6	11/23/09	0.5	0.61

The correlation between the Chlorite ion residuals and the applied chlorine dioxide dose, as shown in Table 1, was very strong, demonstrating a unity correlation coefficient, except that sample #3 appears to be an anomalous result. This result was not included in the over-all reaction. This experimental approach was employed due to the high manganese ion concentration in the raw water and its impression on the chlorine dioxide levels. Chlorine dioxide molecule is only transformed to chlorite ion upon reaction with the manganese ion present in the source water. Even though this is an indirect method of measuring chlorine dioxide, the results in Table 1 (above) indicate that the chlorine dioxide production is measurable (indirectly), controlled, and stable.

Approval:

The Saf-T-Chlor solid-gas chlorine dioxide generator was piloted at the Canton Water Treatment Plant, Canton, Massachusetts from 11/19/09 to 11/23/09 on a groundwater source. Based on the results of the pilot conducted, this office **grants approval** to the Saf-T-Chlor solid-gas chlorine dioxide generator with the following conditions:

1. CDG Engineering shall properly label all products and provide written instructions to the public water system on product handling and application.
2. CDG Engineering guarantees that the products, when used in drinking water systems, shall remain chemically stable and shall not alter the quality of stored and/or distributed water.
3. This technology must meet any other applicable state and local requirements.

The MassDEP requires CDG Engineering to work closely with drinking water systems to ensure the products are used safely and in accordance with all manufacturer's and state requirements. CDG

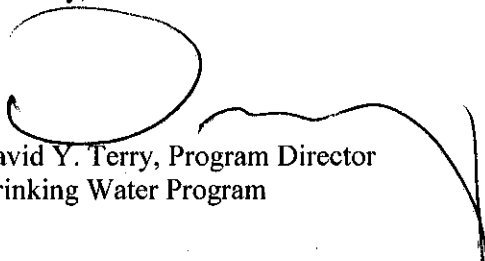
Engineering must inform water suppliers and their representatives of the following:

1. Manufacturer's instructions relative to the methods and conditions for operating the plant must be followed.
2. If necessary, obtain state wastewater permits prior to use.
3. Review the potential health effects associated with using the products.
4. Post manufacturer's instructions regarding product handling and storage.
5. This technology may be subject to the Massachusetts Plumbing Board requirements. The proponent should ensure that this product meets all the Plumbing Board requirements (<http://www.mass.gov/dpl/boards/pl/cmr/3.04>). *In the Commonwealth of Massachusetts, on public or private water supply systems, any pipe beginning on the house side of the metering device or, if none, the main control valve immediately inside the foundation wall to the point of actual connection to heating/cooling equipment, appliance, fixture, etc. shall be installed by a Massachusetts licensed plumber.*

MassDEP may revoke this product approval at anytime if the product fails to perform successfully. MassDEP may also revoke this approval for failure of the manufacturer or retailer to notify the MassDEP of any changes (e.g. manufacturer or retailer change of address or changes in the product or trade name of the product). MassDEP may revoke product approval any time the conditions of approval are not met.

If you have any questions about this matter, please feel free to call Frank R. Niles of my staff at (617) 574-6871 or send an e-mail to: Frank.R.Niles@State.MA.US.

Sincerely,



David Y. Terry, Program Director
Drinking Water Program

cc:

Deirdre Cabral, WERO
Marielle Stone, CERO
Richard Rondeau, SERO
Thomas Mahin, NERO
Kevin Reilly, EPA

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