

Olszewski, Rosemarie (DEQ)

From: Thelen, Mary Beth (DEQ)
Sent: Sunday, September 13, 2015 10:37 AM
To: Thelen, Mary Beth (DEQ)
Subject: FW: Flint Water Meeting
Attachments: SomnioGlobal_Ozone disinfection technology.pdf

From: Clayton, Stacie (GOV)
Sent: Friday, March 06, 2015 2:05 PM
To: Hollins, Harvey (GOV); 'Gerald Ambrose'; 'Maxine Murray'; Thelen, Mary Beth (DEQ); Wurfel, Brad (DEQ); Devereaux, Tracy Jo (DEQ); Busch, Stephen (DEQ); 'Natasha Henderson'; Shekter Smith, Liane (DEQ)
Subject: Flint Water Meeting

Greetings All,

Attached is a brief overview of the information to be presented on Monday at the 1:00pm meeting with Steve Linder of the Sterling Corporation regarding Flint Water. The meeting will be held at the Sterling Corporation's offices on 106 W. Allegan, Ste. 2 in Lansing. I have sent the appointment and here are the list of attendees:

Harvey Hollins, Director, Governor's Office of Urban and Metropolitan Initiatives
 Gerald Ambrose, Flint Emergency Manager
 Natasha Henderson, Flint, City Manager
 Liane Shekter Smith, Chief, Office of Drinking Water and Municipal Assistance (DEQ)
 Stephen Busch, Office of Drinking Water and Municipal Assistance (DEQ)
 Brad Wurfel, Director of Communications (DEQ)

Please let me know if you have any questions, thank you.

Stacie

Stacie Clayton, Assistant Director

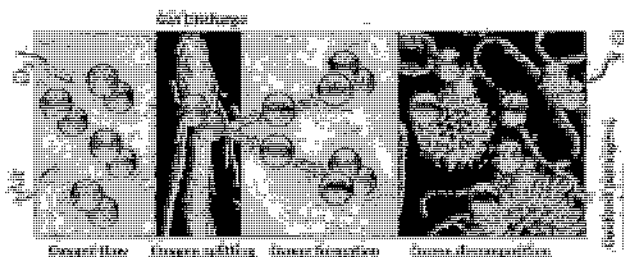
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Chemical Free Water Disinfection by Ozone

Today about 98% of water treatment facilities in the U.S. use some form of chlorine to disinfect drinking water supplies. It is a cost effective method for destroying potentially harmful bacteria and viruses. However, chlorine's ability to interact with organic compounds in water leads to trihalomethanes (THMs) formation. Especially, river or lake water with high level of organic matter require heavy chlorination to combat high level of bacteria, resulting in dangerous levels of THMs and bad smell. THMs, when ingested can encourage the growth of free radicals that can destroy or damage vital cells in the body. Besides cancer, exposure to THMs has been linked to other health issues including asthma, eczema, heart disease and higher miscarriage and birth defect rates. Further, high level of chlorine also poses serious risk to the aging infrastructure.

Chemical free water disinfection technologies such as UV light and ozone have long been recognized to be much safer than chlorination, however, their high cost has prevented wider adoption. The basic mechanism of ozone generation and disinfection is shown in the picture. Ozone has a high oxidation potential (much higher than chlorine) and a superior response time compared to other sanitizing products. Its high oxidizing potential enables ozone to break down organic matters that chlorine cannot. Some pollutants can only be oxidized by ozone. For example, *Cryptosporidium Parvum*, a drinking water pollutant, is resistant to most disinfectants, but is effectively destroyed by ozone. Most importantly, the emission from ozone is pure oxygen and it leaves no residues.



UV light is a competing non-chemical sterilization technique. Intense UV rays break down the sensitive RNA and/or DNA of microorganisms, thus preventing the organism from reproducing. Ozone, on the other hand, oxidizes the microorganisms, thus destroying their cells completely. UV sterilization, being a line of sight process, to be effective, one needs to remove most of the suspended matter prior to the treatment. In contrast, ozone oxidizes the soil or particulate matter, changing or destroying the chemistry of the soiling materials such as organic compounds.

Despite the great benefits of ozone, its widespread adoption is limited due to the high total ownership cost of current commercial ozone generators. Somnio's $\text{Air}_2\text{O}_3^{\text{TM}}$ ozone generator is a paradigm shift in ozone generation technology. The first and only commercial barrier less ozone generator eliminates the requirement of dielectric barriers and highly filtered dried oxygen (pure or enriched) supplies, which restrain current commercial ozone generators. This groundbreaking technology brings a market-competitive, robust, energy efficient, and scalable modular device that offers a financially attractive alternative with the capability of producing varying levels of ozone depending on the application at hand.

Producing ozone cost effectively is only part of the greater story of the far reaching benefits of ozone. Applying ozone effectively for a given application requires careful and intelligent design, sensing and monitoring. In addition to its revolutionary $\text{Air}_2\text{O}_3^{\text{TM}}$ ozone generator, Somnio