Remediation Earth™

Bio-Hazardous Waste Treatment with ZERO Emissions

OZONATOR NG-1000

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CANADA VERIFIED VÉRIFIÉ

Performance Claim Verified
by the Canadian ETV Program

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MEDICAL WASTE
FIRST DO NO HARM

In the United States over 465,000 tons of biohazardous waste is generated each year by approximatley 377,000 health care facilities. Traditionally, the solution to the problem of bio-hazardous waste has been incineration. However, incineration does not make the medical waste disappear; the gas by-products and resulting toxic ash endanger our health and the health of future generations.

A medical waste incinerator releases into the air a wide variety of pollutants including dioxins and furans, metals (such as lead, mercury, and cadmium), particulate matter, acid gases (hydrogen chloride and sulfur dioxide), carbon monoxide, and nitrogen oxides. These emissions have serious adverse consequences on worker safety, public health and the environment. Dioxins, for example, have been linked to cancer, immune system disorders, diabetes, birth defects, and other health effects.

Because of their pollutants, medical waste incinerators must be retired or retrofitted, resulting in millions of dollars in capital expenditures, and then high annual costs for monitoring, stack testing, operator training, etc.

Today there is a unique, environmentally friendly alternative to the incineration of biomedical waste; it's a device called the "***OZONATOR***" created by Ozonator Industries.

According to the organization Health Care Without Harm, 69% of the dioxins in the earth's atmosphere can be attributed to the incineration of medical waste.

The patented ***OZONATOR*** technology holds promise for medical facilities and communities around the globe. No longer do they need to be concerned that the handling of their bio-hazardous waste is harming their workers, their communities and their environments. No longer do they need to be concerned with the risk of rising costs demanded by the bio-hazardous waste service providers. The ***OZONATOR*** is an immediate, on-site, cost effective and environmentally way of dealing with your bio-hazardous waste. Additionally, through our leasing partners, facilities can set up a program that allows them to not only experience immediate cost savings, but also ensures them of **long-term cost certainty** with regard to the costs of treating their bio-hazardous waste stream.

In January of 2008, Ozonator Industries announced the sale of its first ***OZONATOR*** to the United States. This first ***OZONATOR*** unit was installed at Union Hospital in Terre Haute Indiana. Union Hospital now serves as a model of how a facility can take control and ownership of the issues associated with its bio-hazardous waste management and can turn what was an environmental concern into an opportunity for bottom-line cost-savings. Since installing their OZONATOR, Union Hospital has experienced significant economic savings with regard to the costs associated with the handling of their bio-hazardous waste stream.

Due in a large part to their implementation of an OZONATOR , Union Hospital was the recipient of a Practice GreenHealth Environmental Excellence Award presented to them at CleanMed 2009. These awards celebrate the achievements and commitment of healthcare's environmental champions.

Union Hospital – Terre Haute, Indiana

COMPANY BACKGROUND

Based in Regina, Saskatchewan Canada, Ozonator Industries is a privately owned company that specializes in the research, design and development of ozone-based technologies for both sterilization and sanitation. The patented ***OZONATOR*** technology is just the first of many technologies that Ozonator Industries will be commercializing over the next few years, all of which will prove to be both revolutionary in design and global in need.

Our ***OZONATOR*** is manufactured in Regina, Saskatchewan, Canada by **Brandt Industries**. Brandt Industries is ISO Certified (ISO 9001-2000) and has won numerous awards, including being named as one of Canada's 50 Best Managed Private Companies. They have also won numerous ABEX Awards, and in 2009, Gavin Semple, the President of Brandt Industries was inducted into the Canadian Manufacturers Hall of Fame.

Remediation Earth, Inc. (REI), based in Westlake Village, CA, is a technology innovator and project developer in the waste remediation industry. As a technology partner with Ozonator Industries, REI sells, leases and maintains the ***OZONATOR*** systems as stand-alone units to generators and processors of medical, pharmaceutical and international wastes, including waste from military bases, etc. REI also incorporates this patented ozonation technology with its own thermal conversion technologies to effectively remediate hazardous medical waste used as a feedstock within its waste-to-energy facilities.

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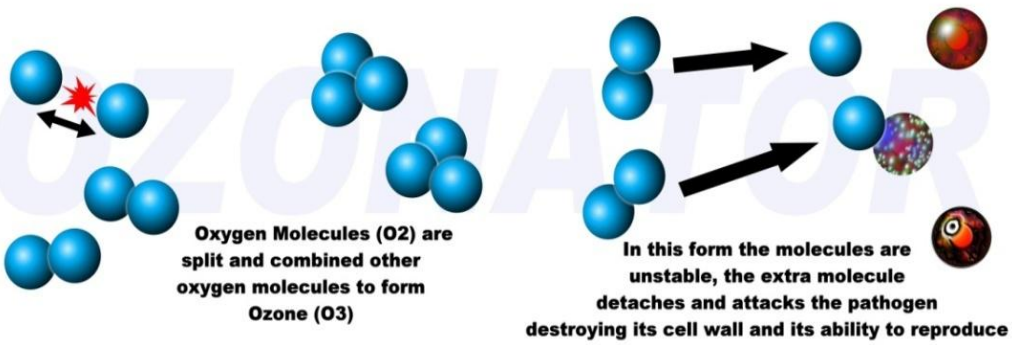
WHAT IS OZONE?

Ozone is a marvel of Nature. In the upper atmosphere ozone protects our planet from harmful ultraviolet radiation. Closer to Earth, ozone purifies and sanitizes the air we breathe, the water we drink, and food we eat. Long used in medical therapies, ozone has shown remarkable antibacterial, anti-viral, and anti-fungal properties.

> *Ozone is of particular value as a disinfectant, as it is able to promote the oxidation of carbon-carbon double bonds (C=C). This type of bond is found in many biological molecules, and in other types of organic compounds, most notably pharmaceuticals. As a result, ozone is effective to kill essentially all pathogens including bacteria, fungi, viruses, as well as prions. Ozone is also effective to promote the degradation of a large number of drug compounds.*
>
> *Dr. Colin D. Rasmussen, Ph.D., LL.B.*

Ozone is a form of oxygen, consisting of three oxygen molecules (O_3). Unlike diatomic oxygen (O_2); the breathable oxygen present in the atmosphere), ozone is very unstable, and decays to O_2 within about 30 minutes under normal atmospheric conditions. Ozone is a powerful oxidizing agent. It is able to oxidize a number of molecules including metals (with the exception of gold, platinum, and iridium).

In Nature, ozone is formed by the sun's ultraviolet rays, and the high-energy electrical discharges that happen during lightning storms.



MODE OF ACTION

Ozone, an allotropic form of oxygen, is a molecule comprised of three oxygen atoms, whose chemical symbol is 0_3 (Figure 1). In normal conditions of use, ozone is in a gaseous state and soluble in water. It is a powerful oxidizer (the reduction potential for the half-cell reaction 0^3 + 2H + 2e- —> 0^2 + H_2O is 2.07 V), and is chemically unstable in gas and liquid mixtures. It is one of the most powerful oxidants. Fluorine (F2/F-, 2.87 V), fluorine monoxide (F20/F-, 2.15 V), and atomic oxygen (O/H_20, 2.42 V) are examples of chemical molecules that have a reduction potential higher than ozone. However, they are either extremely toxic or almost impossible to use or generate. Oxydo-reduction potential of hypochlorite (HCIO/C1) is 1.49, and the potential of peroxide (H_202/H20) is 1.78.

In its pure state, ozone is a pale blue gas. Otherwise, it is a colorless gas at room temperature and can be easily detected because of its pungent smell when present at levels of 0.003 ppm to 0.01 ppm, well below the acceptable level of 0.1 ppm. Ozone is 1.66 times heavier than air; it will tend to stay near the ground. The UV spectrum shows a single broad absorption at 254 nm, and it is frequently used as a mean to measure the production of ozone in generators.

Directly, the ozone molecule is highly selective. Indirectly, due to the action of secondary species reacting like free radicals and formed by the decomposition of ozone on contact with water, these free radicals are not selective. The term "free radical" is used to explain a physical reality of the sequence of reactions. During certain chemical reactions involving the breaking of bonds, there is a transitory formation of short-lived highly unstable neutral entities that carry an unpaired electron called a "free radical."

In the presence of water vapor, the oxygen atom produced by the decomposition of ozone will react with a molecule of water to form hydroxyl radicals as in the following equation:

$$O + H_2O \rightarrow 2HO$$

Typical Dosage and Reaction Times

- Aspergillus Niger (black Mount): Destroyed by 1.5 to 2 mg/1.
- Bacillus Bacteria: Destroyed by 0.2 mg/1 within 30 seconds
- Bacillus Anthracis: Causes anthrax in sheep, cattle and pigs. A human pathogen. Ozone susceptible.
- Clostridium Bacteria: Ozone-Susceptible.
- Clostridium Botulinum Spores: Its toxin paralyzes the central nervous system, being a poison multiplying in food and meals. 0.4 to 0.5 mg/1.
- Diphtheria Pathogen: Destroyed by 1.5 to 2 mg/1.
- Eberth Bacillus (Typhus abdominalis): Destroyed by 1.5 to 2 mg/1.
- Echo Virus 29: This virus most sensitive to ozone. After a contact time of 1 Minute at 1 mg/1 of ozone, 99.999% killed.
- Escheriachia Coli Bacteria (from feces): Destroyed by 0.2 mg/1 within 30 seconds.
- Encephalomyocarditis Virus: Destroyed to zero level in less than 30 seconds with 0.1 to 0.8 mg/1.
- Enterovirus Virus: Destroyed to zero level in less than 30 seconds with 0.1 to 0.8 mg/1.
- GDVII Virus: Destroyed to zero level in less than 30 seconds with 0.1 to 0.8 mg/1.
- Herpes Virus: Destroyed to zero level in less than 30 seconds with 0.1 to 0.8 mg/1.
- Influenza Virus: 0.4 to 0.5 mg/1.
- Klebs-Loffler Virus: Destroyed by 1.5 to 2 mg/1.
- Poliomyelitis Virus: Kill of 99.999% with 0.3 to 0.4 mg/1 in 3 to 4 minutes.
- Proteus Bacteria: Very Susceptible.
- Pseudomonal Bacteria: Very Susceptible.
- Rhabdovirus Virus: Destroyed to zero level in less than 30 seconds.
- Salmonella Bacteria: Very Susceptible.
- Staphylococci: Destroyed by 1.5 to 2 mg/1.
- Stomatitis Virus: Destroyed to zero level in less than 30 seconds with 0.1 to 0.8 mg/1.
- Streptococcus Bacteria: Destroyed by 0.2 mg/1 within 30 seconds

KINETICS OF THE STERILIZATION MECHANISM

In the early 1900s, Dr. Harriet Chick described a method for estimating the destruction of microorganisms by chemical disinfectants. She postulated that the microbial mortality would follow first-order kinetics. If the reaction conforms to Chick's law, the data give a straight line on a semi-logarithmic graph. This law works for all liquid disinfectant and for many sterilization processes. Chick's law has evolved into what is now referred to as D-value.

The ***OZONATOR*** process follows this law. The mortality of microorganisms is linear on a semi-logarithmic graph. However, the critical parameter for ozone is not time, as in steam or ethylene oxide sterilization processes; it is the ozone concentration (dose) admitted into the chamber. This process can be compared to the radiation process, where a minimal dose is needed to achieve the sterility assurance level.

OZONE PRODUCTION

Due to its thermodynamic properties, ozone is a metastable product: it decomposes slowly (in minutes) at ambient temperatures and rapidly (in seconds) at higher temperatures. Ozone is produced naturally from oxygen in the upper atmosphere by the absorption of ultraviolet radiation from the sun. Passing air or pure oxygen across an electrical field can artificially generate ozone as it occurs in nature when lightning discharges pass through the air

Ozone is metastable, and is therefore produced at the consumption site of use. For an industrial applications scale, ozone is produced by electrical discharges in tubular generators, which basically are comprised of two conducting electrodes. Dry-compressed air or oxygen is passed between these two electrodes where it is subjected to a corona in a high-voltage alternating current field. Some of the oxygen is transformed into ozone according to the following equation:

$$3\ O_2 \rightarrow 2\ O_3$$

WORKER SAFETY

Ozone is a bluish gas with a very pungent characteristic odor. The odor threshold for humans is from 0.003 to 0.01 ppm (Sittig, M. 1991). Human nose is the best ozone detector. It is possible to detect ozone at a concentration lower than the exposure limit for an 8-hour period, which is 0.1 ppm.

Ozone is found naturally in the atmosphere as a result of the action of solar radiation and electrical storms. It is also formed around electrical sources. Ozone is used:

- As an oxidizing agent in the organic chemical industry
- As a disinfectant for food in cold storage rooms and for water purification
- For bleaching textiles, waxes, flour, mineral oils and their derivatives, paper pulp, starch and sugar
- For aging liquor and wood
- For processing certain perfumes, vanillin, and camphor
- In treating industrial wastes
- In the rapid drying of varnishes and printing inks
- And for deodorizing feathers

The permissible exposure limits in air have been determined by:

OSHA (Occupational Safety and Health Administration):
The legal permissible exposure limit (PEL) is 0.1 ppm (0.2 mg/m3) average over an 8-hour period (TWA), and the short term exposure limit (STEL) is 0.3 ppm (0.6 mg/m3) for a period of 15 minutes.

NIOSH (National Institute for Occupational Safety and Health):
The recommended airborne exposure limit is 0.1 ppm, which should not be exceeded for any period of time.

ACGIH (American Conference of Governmental Industrial Hygienists):
The recommended airborne exposure limit is 0.1 ppm averaged over an 8-hour work-shift.

FDA (Food and Drug Administration):
The FDA also regulates ozone as a toxic gas (21 CFR, part 801.415). According to this regulation, ozone concentration generated by a device should not exceed 0.05 ppm by volume of air circulated through the device, or the device shall not cause an accumulation of ozone in excess of 0.05 ppm per volume (when measured under standard conditions at 25°C (77°F) and 760 mm of mercury) in the atmosphere of enclosed space intended to be occupied by people for an extended period of time.

EXPOSURE TO OZONE

The ***OZONATOR*** design limits the risk of exposure of personnel running the machine. All ozone produced passes through a catalyst that reverts it back to oxygen before being exhausted into the room. Since the ozone is produced on site, there is no manipulation of the sterilant. The ***OZONATOR*** possesses built-in safety features that protect the user from high ozone concentration exposure. (See p. 14: "Safety Assurance/Process Control".)

TOXICITY OF OZONE

The acute toxicological effects of ozone are due almost entirely to its extreme reactivity and to its being a powerful oxidizing agent. Ozone will oxidize several biochemical compounds, including fatty acids, amino acids, nucleotides, etc., (Carmichael 1982). Lungs are the primary target of airborne ozone.

Signs and symptoms of acute exposure to ozone may be severe and include irritation and burning of the skin, eyes, and mucous membranes. Inhalation of ozone can cause sufficient irritation to the lungs to result in pulmonary edema. The onset of pulmonary edema may be delayed for some hours after exposure (21 CFR, part 801.415).

In accordance with the *Handbook of Toxic and Hazardous Chemicals and Carcinogens*, an exposure level of 0.2 ppm for 3 hours may not produce symptoms. Levels of 0.3 ppm may cause tightness in chest and throat, dry throat; and irritation of throat and lungs within 30 minutes. Levels of 0.5 ppm and above may cause headache, drowsiness, loss of coordination, and accumulation of fluid in the lungs. Levels near 10 ppm may result in immediate, severe irritation of throat and lungs, excessive sweating, continual coughing, decreased blood pressure, weak and rapid pulse, and severe chemical pneumonia (Sittig, 1991).

Several studies among welders (industrial exposures; usually in mixed exposures, not limited to ozone) have shown that there are no effects after brief exposure to 0.2-0.25 ppm of ozone; throat irritation at 0.3-0.8 ppm of ozone; dryness of the mouth and throat, irritation of the nose and eyes at 0.8-1.7 ppm of ozone; severe headache and respiratory problems at 9.2 ppm (Beard 1982). An exposure as high as 11.2 ppm for 2 hours caused perspiration, coughing, and collapsing. Oxygen inhalation relieved the symptoms, and in 2 days all symptoms disappeared.

Although ozone is a powerful oxidant and may be dangerous, ozone has been used since the 18th century. It is possible to use it safely, and many industries have proved it. Ozone was discovered by Schonbein in 1840, and as early as 1856 attempts at room disinfection using ozone were made in Paris hospitals. Water disinfection was one of its first uses, and started more than 100 years ago. The pharmaceutical industry uses ozone to sterilize liquid medications, plastic, and glass containers, as well as the water used in drug manufacturing processes. Bottled water plants also use ozonated water to sterilize their containers. It is now approved to be used in food processing for the decontamination of poultry. The use of ozone is not new, and no evidence suggests that ozone may be a potential carcinogen.

OZONATOR
GENERAL DESCRIPTION

The ***OZONATOR*** doesn't use dangerous and harmful chemicals, and doesn't rely on heat or steam to treat the waste. Rather, the ***OZONATOR*** employs ozone to treat the bio-hazardous waste. The ozone that the unit requires is generated on-board the unit. The ozone, which is highly corrosive, is used to treat the bio-hazardous waste, and then any un-used ozone is converted back to harmless oxygen. The output from the process is shredded, sterilized waste that has been reduced in volume by up to 90%, and is suitable for final disposal at any landfill site as general waste or used as fuel in waste-to-energy facilities.

In that the ***OZONATOR*** is designed to be an immediate and on-site solution, it also eliminates the need for ancillary waste stream expenses such as special boxes, liners, handling, transportation, storage, etc., further reducing a facility's costs related to waste management, as well as reducing their environmental footprint.

From an operating cost perspective, the ***OZONATOR*** also shines. A myriad of energy efficient features included in the technology reduce the costs associated with treating the waste, to mere pennies per pound. As well, ease of operation and operator safety was paramount in the design of this technology. It literally takes only minutes to learn how to run the unit, and no longer are expensive, specialized equipment operators required.

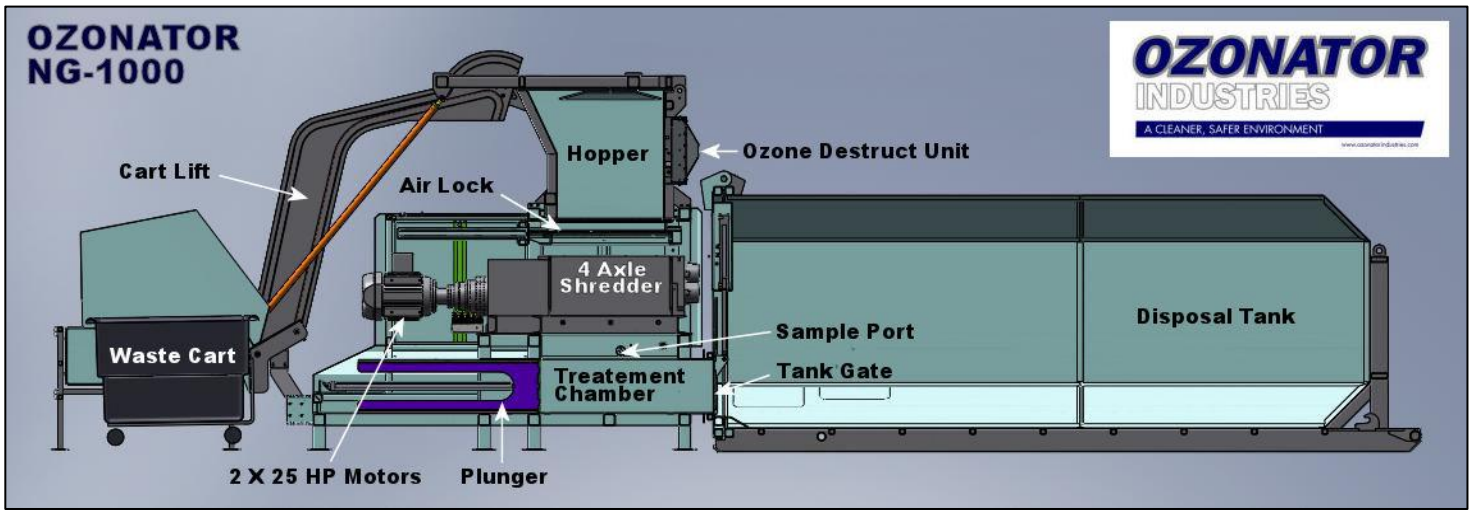
The ***OZONATOR*** sports a number of other great features including data logging which records information such as the weight of each load, which staff member processed it, and where the load of waste came from within the facility. A huge industrial 17" waterproof LCD touch-screen workstation is used to operate the unit, and through remote telemetry, facility staff is able to monitor all the operating specifications in real time. This remote monitoring ability also allows Ozonator Industries to monitor operating parameters in order to monitor the machine's performance, ensure that the facility is using the technology in the most efficient way possible, and to provide software assistance should it be required.

CHARACTERIZATION OF THE TREATMENT PROCESS

The ***OZONATOR*** is a device designed for the treatment of bio-hazardous / regulated medical waste. It can be used as an on-site solution or as part of a commercial service or regional solution.

The functional part of this system is a combined process that loads un-segregated, bio-hazardous waste directly into the ***OZONATOR.*** All hospital waste and bio-medical waste is collected by way of a 27-cubic foot plastic janitorial waste cart on caster wheels, taken directly to the ***OZONATOR*** for processing.

The ***OZONATOR*** can be operated by almost any adult, without the need for specialized training. It is an intelligent system of automated, computer logic and controls that are designed for maximum Operator safety and convenience.



The Operator gathers the waste and then pushes the cart onto the forks of the ***OZONATOR,*** and the safety gate is closed. The Operator then simply pushes the START button. The ***OZONATOR*** dumps the load of waste into the receiving hopper. Once the proper level of ozone has been achieved in the treatment chamber, the shredders are started and the airlock opens up to deliver the waste to the shredders. A sizing screen located under the shredders ensures

that all waste is properly shredded before it reaches the treatment chamber. A plunger on the lid of the receiving hopper extends to help guide the waste through the shredding process, and ensures that all waste has been received by the shredders before the process continues and the airlock is closed. Once the airlock is closed, the ***OZONATOR*** treats the waste with between 7000 and 8000 ppm of ozone. This treatment continues for 900 seconds. Once the 900 second dwell time is complete, the waste is pushed into the disposal tank, and the ***OZONATOR*** resets itself to receive another load. All this is done automatically with just the press of one button. It's just that easy!

If during the treatment cycle there are any anomalies, whether critical to the treatment cycle or just system warnings of abnormal conditions, a warning message will appear on the screen awaiting Administrator clearance before processing and running another cycle.

At the completion of a cycle, all data is recorded and stored on the on-board computer for future retrieval or reporting purposes. For further detailed information regarding operation parameters and alarms, please see the ***OZONATOR*** Operations Manual.

CRITICAL FACTORS OF THE TREATMENT PROCESS

Safety Assurance / Process Control

The ***OZONATOR*** has been designed using the best engineering practices, and with safety being a priority at all facets of design and construction. All critical process parameters are continuously monitored using closed-loop control to insure feedback and proper sequential process logic is present during the cycle. The DCS (Distributed Control System) is designed to be a fault tolerant and fail-safe in the obscure instance of any potentially dangerous or unplanned condition upsets. The DCS holds the logic in non-volatile memory, thus allowing it to retain the step in process should any unscheduled shut down events occur. Along with the memory, the unit has the ability to conduct real-time trending, historical data capture, and time and date stamp all conditions or operations deemed necessary by the user. This allows our users to see, know and understand exactly what has occurred each step of the way and in every load of waste that is treated. From initiation to completion, each cycle is fully monitored and documented in the background, while on the Operator's screen a simple message indicates "Cycle Process Step Completed", insuring that

critical data has been recorded and that the waste has been properly treated. Should there be any anomalies in the processing cycle, our alarming and detail screens point the way toward recovery and troubleshooting techniques to get you back into run mode.

The ***OZONATOR*** also has a secondary containment chamber to ensure that in case of a disaster, no ozone escapes into the operating environment. Should a leak occur in the primary treatment chamber, any escaping ozone will be held within the secondary containment chamber, and is destroyed by the on-board Ozone Destruct Unit. The ***OZONATOR*** also incorporates several ozone samplers to ensure proper levels of ozone within the treatment chamber and to ensure that no ozone is escaping from the unit.

An operator monitoring the ***OZONATOR*** from the Control Panel

Training / Operation

The ***OZONATOR*** unit does not require specialized training. Any staff member can be easily and quickly trained to operate the unit. Specialized programming and safety measures built into the technology ensure that the ***OZONATOR*** unit receiving hopper is evacuated of ozone prior to receiving each load.

Maintenance

The ***OZONATOR*** requires very little maintenance. The design of the unit can incorporate items such as auto-greasers, etc. Weekly routine inspection and maintenance takes approximately 1 hour. A more in-depth inspection is to be performed every 3 months. Complete maintenance information is contained in the ***OZONATOR*** Operations and Maintenance manual.

Waste Compatibility with Treatment Process

The ***OZONATOR*** technology is compatible with the following types of waste:

- Cultures and stocks of infectious agents and associated biologicals
- Liquid human and animal waste, including blood and blood products and body fluids
- Pathological Waste
- Contaminated waste from animals
- Sharps
- General bio-hazardous waste
- General waste (i.e. hospital ward or kitchen waste, etc.)

Applications for the OZONATOR Technology

- Hospitals
- Nursing Homes
- Universities
- Laboratories
- Medical & Dental Facilities
- Research Facilities
- Cruise Ships and Vessels
- Resorts and Hotels
- Remote Communities
- Transfer Stations MSW
- Airports & Terminals
- Military Facilities
- Correctional Facilities
- Industry & Commercial Operations
- Documents and General waste
- Border protection (international and quarantined waste)

QUALITY ASSURANCE AND VERIFICATION OF TREATMENT

Performance Claim Verified by the Canadian ETV Program

Technology Verification

The performance of the ***OZONATOR*** has been verified by the ETV Canada program. The Canadian Environmental Technology Verification (ETV) Program is delivered by ETV Canada under a license agreement from Environment Canada. The Canadian ETV Program is designed to support Canada's environment industry by providing credible and independent verification of technology performance claims.

Please see **Appendix C** for more information regarding the ETV Canada verification.

The ***OZONATOR*** has joined the very small, select group of waste treatment technologies that have been approved as Alternative Medical Waste Treatment systems by the State of California Department of Public Health.

The ***OZONATOR*** has also been approved by the State of Florida Department of Health, as well as the State of New York Department of Health.

Approved August 28, 2012

In the ***OZONATOR***, on-going confirmation of the successful treatment of waste is done in two ways:

Monthly Procedure

On a monthly basis, Biological Indicators are used to confirm that the ***OZONATOR*** process is achieving sterilization (greater than $\log^6$). The Biological Indicators used are manufactured by SGM BioTech, Inc., and specifically for use with ozone and the ***OZONATOR***. The Biological Indicators contain a standardized, viable population of Bacillus atrophaeus and *G. stearothermophilus* spores.

Prior to a treatment cycle, the Biological Indicators are placed in the Test Port of the ***OZONATOR,*** and during the treatment cycle the Biological Indicators are exposed to the same levels of ozone used to treat the waste.

After the Biological Indicators have been exposed during a treatment cycle, they are removed from the bin and allowed to vent. This venting allows any residual ozone to escape or dissipate. If the biological indicators are not allowed to vent, the residual ozone will render the incubation/testing invalid, as the residual ozone will react with the fluids within the biological indicator.

After venting, the Biological Indicators are placed in the appropriate EZTest Incubator. Preliminary results are available within 24 hours and final results are rendered in 48 hours.

Daily Procedure

For the purposes of daily efficacy testing of the ***OZONATOR*** technology, chemical indicators that have been developed by a company called TSO_3 are used. TSO_3 develops technologies that use ozone to sterilize re-usable medical devices. (See TSO3.com)

The daily use of the chemical indicator indicates that the equipment and process are operating properly, and that all conditions are present to achieve the same results as if you were using the SGM BioTech Ltd. EZTest Biological Indicators.

The procedure is as follows:

- A chemical indicator is placed on the probe that is then inserted into the Test Port.
- The chemical indicator is allowed to remain in the Test Port during a treatment cycle.
- The chemical indicator is removed from the Test Port. The dot on the chemical indicator will change color if the appropriate level of O_3 has been achieved.

These chemical indicators are FDA approved, and have been in use for several years. They are very simple to use, and quickly and easily verify the technology.

Post Treatment Residue Disposal, Reclamation, or Recycling

The treated bio-hazardous waste from the ***OZONATOR*** technology can be disposed of in regular municipal landfills as general waste or used as fuel in waste-to-energy facilities.

WHAT OUR CUSTOMERS ARE SAYING

Douglas J. Smith - Union Hospital Health Group
Director of Materials Management

I am writing this letter as a follow-up to the installation of our OZONATOR unit.

I would like to let you know that since the installation of our OZONATOR unit we have experienced an immediate cost savings of over 40% in the first five months of operation. However, this figure is only an approximation. The reality is that the true total cost savings will prove to be higher in that we no longer require special boxes and liners, refrigerated storage, special machine operators, etc. In these days of rising costs, fuel surcharges, etc., it is a pleasant surprise to come across a piece of technology such as yours that can save our facility so much money. Additionally, we are now sheltered from rising service fees and supply costs. As a matter of fact, we have found the unit to be so cost-effective that we now run other waste streams that are generated at our hospital through the OZONATOR.

However, cost savings are not the only issues that have impressed us. In the time that we have had the unit operating on site, it is apparent that your technology is one of the cleanest ways of dealing with regulated medical waste, and I mean that not just from an environmental impact perspective. We have also come to respect the amount of work your company has put into issues such as ease of operation, operator safety, etc. We also are convinced of the sterility of the waste with your proven biological tests and chemical indicators.

Over the past few months we have had many visitors stop in just to see our OZONATOR. From the staff from other hospitals to the State Health and regulatory inspectors, they have all been very impressed.

The science behind the use of ozone and the design of your OZONATOR are definitely huge breakthroughs in how hospitals can now effectively and efficiently treat their regulated medical waste on-site. I believe that your OZONATOR technology will go a long way towards reducing the dangerous pollutants that traditional waste treatment methods emit.

Lastly I would like to thank you and your team at Ozonator Industries for their great customer service. We don't feel that we simply bought a piece of equipment from Ozonator Industries; rather we feel that we now have a partner to help us with our waste management needs.

On behalf of everyone at Union Hospital, thanks for all you've done and we look forward to the next great piece of technology to be released by Ozonator Industries.

Thank you,

Douglas J. Smith
Director of Materials Management
Union Hospital Inc.

OZONATOR NG-1000

Performance Summary Sheet

ASPECT	DATA
Process	Continuous Batch
Cycle Time	Approximately 15 Minutes
Hourly Processing Capacity	Up to 1760 pounds per hour[2]
Output	28 cubic yard Waste Bin (20,000 lbs) Volume reduced by up to 90% Disposal in regular landfill or used as fuel In a waste-to-energy facility
Emissions	NONE
Energy Consumption (hourly)	37 kW at peak load 32 kWh
Operating Costs	Energy USD $3.36 / hour Oxygen / Ozone - generated on board Water - source at facility (less than 1 gal. / hr.)
Effectiveness	6 $\log_{10}$ reduction of spores 99.9999%
Floor Space Requirements[1]	Width – 8.5 feet Length - 43 feet Height – 17.5 feet
Operating Staff Requirements	Current household or maintenance staff
Operator Training Time	Approximately 1 hour
Machine/Shredder Life	Indefinite with regular maintenance
Service Time Required	Approximately 1 hour per week
Utilities	Electricity – 460 V. 3 phase 60 Hz. Electricity – 380 V. 3 phase 50 Hz.

(1) Unit dimensions subject to change. (2) Results may vary. All information subject to change

THE BENEFITS OF THE OZONATOR TECHNOLOGY

When was the last time that a piece of technology came along that was not only cleaner, faster, easier, safer but also more cost effective? The ***OZONATOR*** achieves all this in the space of your current waste compactor. Using proven technology and components, the ***OZONATOR*** makes quick work of all the waste in your facility: from the sterilization of bio-hazardous waste to the destruction of confidential documents.

ENVIRONMENTAL BENEFITS

With our ***OZONATOR*** technology, you gain peace of mind in knowing that your bio-hazardous waste is not being incinerated and thus contributing to the toxic emissions into our environment. Beyond your "peace of mind" is the fact that you have reduced your exposure to litigation and liabilities as a result of the mishandling and transportation your biomedical waste.

The ***OZONATOR*** uses only oxygen and a small amount of water (less than 1 gallons per hour), a little electricity and our unique patented technology. The entire process has a very small environmental footprint.

ECONOMIC BENEFITS

The ***OZONATOR*** provides cost certainty: there is no more guessing on what your waste management costs will be. For just pennies per pound, you can treat your own waste on-site. And, more importantly, because you are not billed by weight, there is no more deciding on what should or should not be included in your bio-hazardous waste management program.

The ***OZONATOR*** can handle not only your bio-hazardous waste, but also nearly all the waste that cannot be recycled. This means less dangerous and labour-intensive (and expensive) waste segregation.

Because you can sterilize your waste immediately on site, there is no need for expensive refrigerated storage facilities. Conventional systems require special packaging prior to transportation. The ***OZONATOR*** system eliminates the need for expensive boxes, liners, containers, etc.

Ease of Operation and Operator Safety

Your facility will no longer require trained specialists to run your sterilization equipment. The system is so simple to operate that all staff can be trained to operate the unit in just minutes. An integrated security system ensures that only authorized staff operates the unit, and then records information on the Operator, time of day, load weight etc., into the on-board computer for later retrieval. Additionally, reports can automatically be emailed to Administrators, and Administrators or support staff can monitor the real-time performance and operation of the unit via remote telemetry (internet connection required).

No longer will your staff be exposed to dangerous pathogens or sharps during waste segregation or the sterilization process. Additionally, the system continuously monitors the operating environment around the ***OZONATOR*** to ensure a safe operating atmosphere.

BIBLIOGRAPHY

AAMI. 1999. Sterilization of health care products - General requirements for characterization of a sterilizing agent and the development, validation and routine control of a sterilization process. Draft, AAMI/DS-1 14937

AORN. 2001 Standards, Recommended Practices & Guidelines.
Beard, R. R. 1982. Inorganic compounds of oxygen, nitrogen, and carbon. Patty's industrial hygiene and toxicology. G. D. Clayton and F. E. Clayton. Toronto, John Wiley & Sons. 2C: 4067-4139.

Carmichael, N. G. 1982. The health implications of water treatment with ozone. Life Sciences 30: 117-129.
—. H. S. 1991. Methods of testing virucides, In : Disinfection, sterilization, and preservation. 4th ed, S. S. Block (ed.), Lea&Febiger, Philadelphia. p.1076-1093.

RIA-IISMA_ 1 AAri Premarket Notification
510(k) - Regulatory requirements for Medical Devices. FDA - CDRH.

FDA. 1993. Guidance on Premarket
Notification (510(k)) submissions for Sterilizers intended for use in health care facilities.

Gurley, B. 1985. Ozone : pharmaceutical sterilant of the future? Journal of Parenteral Science & Technology 39(6): 256-261.

Pflug, I. J. 1999. Microbiology and engineering of sterilization processes. Minneapolis, Environmental Sterilization Laboratory.

Sittig, M. Ozone in: Handbook of toxic and hazardous chemicals and carcinogens. Vol.2 G-Z, 3e ed. Park Ridge, Noyes Publications, p. 1253-1255

APPENDIX – A

TREATMENT OF BIOMEDICAL WASTE WITH OZONE

COLIN D. RASMUSSEN, PH.D., LL.B. – RASMUSSEN, RASMUSSEN & CHAROWSKY, PLC

Introduction

In 2006, the annual American Hospital Association survey on hospitals reported there were nearly 950,000 hospital beds in the U.S.[1] In Canada in 2005 the number of acute care hospital beds was approximately 103,000.[2] Combined, there are over 1 million hospital beds in Canada and the U.S. Annual waste production in hospitals is about 2 tonnes per hospital bed, or about 2,000,000 tonnes in total.[3] Of this, about 15% is considered hazardous waste, including materials such as biomedical, pharmaceutical, chemical, and laboratory wastes.[4] In addition, there are about 500,000 private clinics, not reflected in the statistics cited above.[5] As a result, the amount of biomedical waste produce in North America each year is significant.

Conceptually, there are essentially two ways in which to deal with biomedical and other hazardous wastes. One is through segregation. Hazardous wastes can be separated from non-hazardous materials, and then placed in designated containers designed to prevent release into the environment. The second is by waste treatment, where the wastes are treated in some way to render them non-hazardous.

There are significant problems with segregation-type waste management. These include finding acceptable locations for the containers, as well as

[1] American Hospital Association 2006 Survey – http://www.aha.org/aha/resource-center/Statistics-and-Studies/fast-facts.html.

[2] Based on 3.2 beds per 1,000 population as reported in OECD Health Data 2005: How does Canada Compare – http://www.oecd.org/dataoecd/16/9/34969633.pdf; Population of Canada in 2005 was estimated to be 32,312,077 according to Statistics Canada – http://www.statcan.ca/english/freepub/98-187-XIE/pop.htm#table3.

[3] P2 Fact Sheet – Pollution Prevention in the Health Sector – http://www.ec.gc.ca/nopp/docs/fact/en/health.cfm; Rutala et al., Medical Waste: SHEA Position Paper, Infection Control and Hospital Epidemiology, January 1992, pp.38-28 – http://www.sheaonline.org/Assets/files/position_papers/Med-Waste92.PDF.

[4] Rutala et al. (1989). Management of Infectious Waste by Hospitals. JAMA, 262: 1635-1640.

[5] U.S. Environmental Protection Agency. Medical Waste Management in the United States: First Interim Report to Congress. EPA/530-SW-90-051A; 1990.

designing containers that will not permit release of the waste for extended periods of time. The challenges faced by the nuclear power industry with respect to the removal and storage of spent nuclear fuel is a primary example of the difficulties that arise when segregation-type waste management is used.

There is a similar public concern over biomedical waste, particularly in view of several well-publicized cases in the 1980's where biomedical waste was found to have washed up on public beaches. Because of the concern over AIDS and other infectious diseases, the public perceives that the unregulated handling of biomedical waste poses a serious threat to health and safety.[6] In 2004 the World Health Organization (WHO) released a policy paper on the subject of biomedical waste, underscoring the risk of infection by exposure to biomedical waste, especially in areas where needles and syringe are scavenged from waste areas and dump sites. For example, the WHO estimated that in 2000, worldwide there were 21 million hepatitis B virus (HBV) infections, 2 million hepatitis C virus (HCV) infections, and 260,000 HIV infections due to injections with contaminated syringes.[7] The WHO also states that the chance of infection from one needle-stick from a needle used on an infected source patient is 30% for HBV, 1.8% for HCV, and 0.3% for HIV.

Since that the proportion of waste that has actually come in contact with an infected patient is a small fraction of total biomedical waste, the overall risk of random infection will of course be lower than the risks of infection reported by the WHO, cited above. However, despite the low risk, and because of the current trend in society towards "zero risk", these occurrences and the public perception of risk they created, has led to the passage of biomedical waste regulations by a number of states in the U.S. and similar legislation in Canada. The handling and management of biomedical and other hazardous wastes is under ever-increasing regulation and scrutiny, which has in turn led to a significant increase in the cost of handling biomedical waste.[8] As a result, there is a need to develop waste management technologies that meet the standards imposed by government regulations, but which do so at an economically

[6] Burdick, A. Hype tide. The New Republic, June 12, 1989; pp.. 15-18.

[7] Safe health-care waste management, World Health Organization Policy Paper, August 2004; http://www.who.int/water_sanitation_health/medicalwaste/en/hcwmpolicye.pdf

[8] The cost of regulated medical waste in a New York university hospital went from $1.04 to $5.19 per patient per day; Marchese, J.T. et al., (1990). Regulated Medical Waste Disposal at a University Hospital: Future Implications. Third International Conference on Nosocomial Infections, July 31-August 2, 1990, Atlanta, GA.

sustainable cost. In addition, any waste management system should be as "environmentally friendly" as possible, given emerging trends and policies with respect to energy use and the potential for environmental contamination, especially ground water.

One problem that has arisen in the area of biomedical waste management is the improper characterization of some waste as regulated waste in order to ensure compliance with regulations. Some savings can be made through training of healthcare workers in order to reduce the amount of material that is improperly placed in the biomedical waste stream. In another example, Toronto's Hospital for Sick Children reported a 35% reduction of hazardous waste resulted in a 50% savings in overall waste management costs.[9] Therefore, even small improvements in biomedical waste management can yield significant economic benefits.

However, there will always be an unavoidable amount of waste that is legitimately biomedical waste and which must be treated in order to meet local, regional, or national standards with respect to handling of potentially hazardous materials. As a result, there remains a strong demand for viable solutions to the management of potentially infectious biomedical waste.

Approaches to Treatment of Biomedical Waste

In general, the approach in North American healthcare facilities has been either to incinerate waste, encapsulate it, or to treat it such that it is safe for transport and placement in landfills. While incineration is effective, it is energy and thus cost-intensive, and can lead to the production of toxic by-products (e.g., fly ash, metals) that are released into the atmosphere. In addition, there is a general "not in my backyard" attitude among the public towards incineration facilities. Similarly, encapsulation is expensive both in terms of equipment needed for containing waste, and the space needed for storage. In addition, encapsulation technologies do not necessarily inactivate the waste, such that the risk of biological or chemical contamination remains should the containment system be compromised.

Thus, the most favoured solution to the handling is to process such wastes so that they can be safely placed in sanitary landfills. However, two fundamental

[9] Toronto Hospital for Sick Children.

problems must be addressed in any waste management process that ultimately results in material ending up in landfill facilities. First, to meet regulatory standards the material must be made biologically safe. That means that any pathogens or other infectious agents must be effectively inactivated. Pathogenic agents commonly include bacteria, viruses, fungi, and proteinacious infectious agents (termed 'prions').

Secondly, the waste must be made chemically safe. This means either degrading or otherwise inactivating chemical components of the material, typically pharmaceuticals, hormones, and chemotherapy drugs. Removal of drugs in waste destined for landfills is of particular concern as it has been shown that these compounds make their way into the water table, and thus create a potential for comprising fresh water supplies destined for human or animal consumption.[10]

Existing Technologies

As suggested above, there are a number of methods that can be used to treat waste in order to inactivate potentially hazardous pathogens and chemicals pathogens.

Incineration

In general, incinerators use very high temperatures (1800°F and above) to combust waste products.[11] All biological compounds are completely destroyed at these temperatures, and so incineration is very effective at inactivating pathogenic agents. The primary disadvantages inherent in the use of incinerators are the cost due to the energy intensive nature of the process, and the potential for release of toxic compounds into the atmosphere, which in the past included dioxins and furans.[12]

[10] Jasim, S.Y. et al., (2006). Presence of Pharmaceuticals and Pesticides in Detroit River Water and the Effect of Ozone on Removal. Ozone: Science and Engineering, 28: 415-423; Ikehata, K., et al., (2006). Degradation of Aqueous Pharmaceuticals by Ozonation and Advanced Oxidation Processes: A Review. Ozone: Science and Engineering, 28: 353-414; Drury, D.D., et al. (2007). Investigating Ozone. Water Environment and Technology, May 2007: 56-60.

[11] http://www.etc.org/technologicalandenvironmentalissues/treatmenttechnologies/incineration/

[12] Thornton, J. et al., (1996). Dioxin and Medical Waste Incinerators. Public Health Reports, 111: 299- 313.

Non-Incineration Methods

In these processes, various methods of heating without combustion are used to inactivate biological compounds. These methods include steam sterilization (autoclaving), dry heat, and microwave processes. Other methods include the use of gamma-irradiation to inactivate biological pathogens that may be present in the waste. As with incineration, these processes can either be relatively energy intensive (e.g., autoclaving, microwaves, heating) or potentially involve handling of dangerous energy sources (gamma irradiation devices). In addition, these processes are time-consuming and as a result more costly to perform. In addition, the use of steam, heat, or radio wave energy poses an additional occupational risk to workers involved in handling and treating the waste materials.

In addition to non-incineration methods that use various forms of energy to heat waste, chemical treatment is also used as a method for treating biomedical wastes. For example, compounds such as chlorine and various chlorine derivatives, or ethylene oxide, can be used as effective ways in which to disinfect materials. However, chemical treatment methods generally require significant contact time in order to inactivate pathogens. In addition, the use of chemicals can create their own hazardous material problem in that the disinfectant may be dangerous to handle and/or difficult to dispose of safely.

Ozone[13]

Ozone is a form of oxygen, consisting of three oxygen molecules (O_3). Unlike diatomic oxygen (O_2; the breathable oxygen present in the atmosphere), ozone is very unstable, and decays to O_2 within about 30 minutes under normal atmospheric conditions. Ozone is a powerful oxidizing agent. It is able to oxidize a number of molecules including metals (with the exception of gold, platinum, and iridium), nitrogen oxides, carbon, ammonia, and sulfides, to name a few. Ozone is of particular value as a disinfectant, as it is able to promote the oxidation of carbon-carbon double bonds (C=C). This type of bond is found in many biological molecules, and in other types of organic compounds, most notably pharmaceuticals. As a result, ozone is effective to kill

[13] See: http://en.wikipedia.org/wiki/Ozone

essentially all pathogens, including bacteria, fungi, viruses, as well as prions.[14] Ozone is also effective to promote the degradation of a large number of drug compounds.[15]

The generation and handling of ozone is relatively simple using a variety of available technologies that make use of oxygen in the ambient atmosphere. As a result, ozone is conveniently generated on site, and does not require specialized containers for transport, as are required with other chemicals. Further, ozone degrades naturally into oxygen in a relatively short period of time (10-30 min), and thus does not leave any toxic residue behind.

Use of Ozone as a Disinfectant

The use of ozone has been widely investigated for use in water treatment, as well as for the treatment of biomedical waste. The Clark County (Nevada) Water Reclamation District recently reported the results of their own studies suggesting that ozonation is an effective method for disinfecting drinking water.[16]

Systems using ozone to disinfect biomedical waste have been developed. The TSO_3 Company offers an ozone sterilizer for use in disinfecting medical instruments.[17] While the unit is compact, it is not designed to use in treating mixed biomedical waste. In particular, the TSO_3 system does not have the ability to shred materials prior to ozone treatment, and thus is only effective for topical sterilization.

[14] Burleson, G.R., et al., (1975). Inactivation of Viruses and Bacteria by Ozone, With and Without Sonication. Applied Microbiology, 29: 340-344; Mari, M. et al., (2003). Non-Conventional Methods for the Control of Post-Harvest Pear Diseases. Applied Microbiology, 94: 761-766; Murray, B. (2006). Rapid Inactivation of Prions by Ozone. 106th General Meeting of the American Society for Microbiology. May 21-25, 2006. Orlando, Florida.

[15] Ikehata et al., (See Note 12 above).

[16] See Drury et al., (See Note 12 above).

[17] http://www.tso3.com/en/img/video.swf

Ozonator™ System for Biomedical Waste Management

More recently, Ozonator Industries has developed an ozone treatment system specifically designed for high-throughput treatment of biomedical wastes. The Ozonator™ system combines a shredding step to reduce the waste to smaller particles (less than 30 mm), and then treats the shredded material with ozone. The design of the Ozonator™ system effectively provides a continuous batch process, with each batch taking about 15 minutes to process. Current models of the system allow for a maximum 200 kg (440 lbs) load per cycle. Shredding provides an additional advantage in reducing the volume of the waste up to 90%, and increases the overall cost-effectiveness of the system in reducing landfill costs.

Ozone is generated on-site using source water, and either ambient atmospheric oxygen or medical oxygen supply commonly available in healthcare facilities.

The power consumption of present units is 37kW (peak). At commercial power costs of $0.105 per kWh, the cost of energy for the system is about $ 3.36 USD per hour.[18] (32 kWh per hour of operation)

The entire process, from loading, through shredding, ozone treatment, and unloading, is fully automated, reducing the exposure of workers to materials. The system also has a variety of safety features to ensure shutdown should any part of the process fail to operate within defined parameters. The system is also easy to train on, and workers can be fully trained in its operation in about an hour.

Once materials are loaded into the system, ozone begins to flood the chamber. When ozone levels reach 1000 ppm shredding begins. During the treatment phase, ozone levels are maintained at a level of at least 3500-4500 ppm.[19, 20]

[18] Based on average U.S. Commercial Electrical Power rates as of May 2008; http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.html

[19] Typically ozone levels of 10-50 ppm are effective to kill bacteria in water environments. See http://www.edstrom.com/Resources.cfm?doc_id=149

[20] Ozone levels are monitored in the post-treatment chamber in the airspace above the treated material. Since ozone has a density greater than air, it is expected that ozone levels in the treated material are greater than that in the airspace; and as a result, the actual ozone concentration in the treated material is likely greater than the measured value. In addition, ozone has a half-life of about 30 minutes under ambient atmospheric conditions. Since no additional ozone is actively added after the material is moved to the post-treatment chamber, the ozone present after treatment begins to naturally decay. Therefore, the residual ozone in the post-treatment chamber is likely lower than the levels attained during the material treatment phase of the process. As a result, the levels of ozone, as measured, likely represent less than actual ozone levels during treatment, and therefore can likely be considered minimum levels attained.

Efficacy Testing

To test the effectiveness of the Ozonator™ system, three different assays have been used. In the first set of experiments, a total of 20 STS Spore strips, each strip containing 6 x 105 Bacillus atrophaeus, and 1 x 105 Geobacillus stearothermophilus spores respectively, were treated with ozone for one hour.[21] After ozone exposure, the strips were sent to an independent laboratory to be tested for spore viability.[22] Spores were germinated at 35°C and 55°C in liquid culture and on agar plates. The results showed at least a 104-fold reduction in spore viability, and 39/40 strips were negative for growth (no viable spores) after treatment in the Ozonator™ system.

In a second method, 3M Attest™1294 Biological indicators were used to test bacterial spore viability after ozone treatment. 3M Attest™1294 indicators contain a standardized population of viable Bacillus subtilus ATCC 9372 spores. The results of these tests showed at least a 106-fold reduction in spore viability after treatment with the Ozonator™ using standard treatment protocols.

Finally, within each batch the Ozonator™ system has the ability to include an FDA-cleared, ozone-specific colorimetric indicator to confirm that ozone levels have reached a pre-determined minimum level.[23]

The output from the Ozonator™ system is sterile waste that is landfill-ready. Testing of material processed using the Ozonator™ shows that at least 99.9999% of microorganisms are killed by the ozone treatment process (a 1 million-fold reduction in pathogen levels).[24] After processing, waste is discharged into a disposal tank, which is then suitable for removal to a landfill site or for use in waste-to-energy facilities.

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[21] STS Spore strips are compliant with ANSI/AAMI/ISO/EN 11138 series of standards, and USP where applicable.

[22] BDS Laboratories, Qu'Appelle, SK

[23] http://www.tso3.com/en/products-services/accessories.php

[24] Using 1294 ATTEST™ Biological Indicators; available from the 3M Company.

The Ozonator™ has been recently approved by: the North Carolina Department of Environment and Natural Resources for use in treating regulated medical waste, including microbiological and pathological wastes;[25] the Mississippi Department of Environmental Quality; the California Department of Public Health; the New York Department of Health; the State of Florida Department of Health; and the Colorado Department of Public Health and Environment. Approval in other states is expected as the system is introduced.

Summary

Taken together, the features of the Ozonator™ provide for an energy-efficient, environmentally friendly, and cost-effective[26] alternative to traditional biomedical waste treatment methods.

[25] As of January 2, 2007.

[26] Union Hospital in Terre Haute, Indiana reports a 40% reduction in waste handling costs in the first months of operations of an Ozonator™ waste processing system.

Dr. Rasmussen has a Ph.D. in Cell Biology from Baylor College of Medicine at the Texas Medical Center in Houston, Texas. From 1991 – 1997, he was an Associate Professor of Cell Biology at the University of Alberta, and for part of that time Director of the NCI Molecular Mechanisms in Growth Control Research Group. From 1997 – 2003, he was an Associate Professor of Anatomy & Cell Biology at the University of Saskatchewan. He has extensive experience in biochemistry, molecular biology and cellular biology, as well as experience in immunology and microbiology.

APPENDIX B – OZONATOR AWARDS AND RECOGNITION

SASKATCHEWAN CHAMBER OF COMMERCE ABEX AWARDS FOR BUSINESS EXCELLENCE

Winner – Physical Environment

In 1984, the Saskatchewan Chamber of Commerce introduced the ABEX Awards to honor outstanding achievements in business excellence. The award has gained prominence as the most highly esteemed symbol of business excellence in this province. The ABEX awards highlight pivotal business elements of provincial prosperity, and are the only business award that honors all private sector enterprises in Saskatchewan regardless of size and economic activity.

The Physical Environment Award is awarded to the Saskatchewan business that best demonstrates excellence in development of programs, products or services offering improvement for environmental purposes.

SASKATCHEWAN TRADE AND EXPORT PARTNERSHIP (STEP) - EXPORTER OF THE YEAR AWARD.

In their first year of exporting, Ozonator Industries had been nominated and was a finalist for the "Exporter of the Year Award" from the Saskatchewan Trade Export Partnership (STEP).

HazMat Magazine

Spring 2008

In the Spring 2008 issue of HazMat Magazine, John Nicholson, M. Sc., P. Eng. wrote an article on Ozonator Industries for the Environmental Business section of the publication.

> *It appears, however, that ozone technology may be a superior and commercially viable alternative. Ozonator Industries is posed to carve out a niche in this specialized waste industry with its "ozonator" processing unit.*
>
> - *John Nicholson, M. Sc., P. Eng.*

HealthCare Magazine

March/April 2008

The word is spreading surrounding the benefits of the Ozonator Industries OZONATOR technology. The March/April 2008 issue of HealthCare Magazine featured an article on the OZONATOR technology.

Regina's OZONATOR impresses Federal Environment Minister

The day after announcing $230 million over four years for clean-energy research, Federal Environment Minister John Baird got a first-hand look at the OZONATOR when he travelled to Regina and visited Ozonator Industries.

> *According to Mr. Baird, "Applying this type of technology will be good for the Canadian environment, but also has great potential for economic development by taking this technology around the world."*

LEADER-POST

OZONATOR INDUSTRIES HIGHLIGHTED AS ONE OF THE HOTTEST TECHNO TECHNOLOGIES IN SASKATCHEWAN.

In the December 30th issue of the Regina Leader Post, Ozonator Industries OZONATOR technology was highlighted as one of the hottest technologies to watch in 2007. The article subsequently appeared in Edmonton Journal, Vancouver Sun, Ottawa Citizen and the National Post.

Canadian Prime Minister Stephen Harper Tours the Ozonator

On a swing through Saskatchewan, Canadian Prime Minister Stephen Harper stops in to see the OZONATOR in action, and to learn how this type of Canadian technology can help Canada and the world reduce greenhouse gas emissions.

APPENDIX C – ETV CANADA / ENVIRONMENT CANADA VERIFICATION OF THE OZONATOR TECHNOLOGY

The Ozonator™ technology recently underwent an extensive review and analysis by the ETV Canada Program.

The Canadian Environmental Technology Verification (ETV) Program is delivered by ETV Canada under a license agreement from Environment Canada. The Canadian ETV Program is designed to support Canada's environment industry by providing credible and independent verification of technology performance claims.

More information on our ETV review/approval is available on our website at www.OzonatorIndustries.com.

The Canadian Environmental Technology Verification Program

.....enhancing the credibility of environmental technologies

OZONATOR INDUSTRIES LTD.

The efficacy of the Ozonator NG-1000 for treating bio-hazardous and regulated medical wastes has been tested employing a surrogate bacterium, *Bacillus subtilus* (*B. atrophaeus*), and a surrogate waste composed of 10% glass/sharp, 30% plastic, 20% paper, 20% cloth/woven materials, and 20% liquids/organics. The waste was shredded, loaded into the treatment chamber and ozonated for 900 seconds. The ozone concentration in the treatment chamber ranged from 4000 to 8000 ppm; temperature ranged between 17 to 24 °C; and humidity was between 70 and 100 per cent. Test results show the Ozonator NG-1000 was able to kill *B. subtilus* and reduce its viability by at least 6 orders of magnitude or 6 $\log_{10}$ with 95% confidence.

Verified* Performance July 2010

License Number: ETV 2010-01
Issued to: Ozonator Industries Ltd.
Expiration Date: July 2013

Kevin Jones
President and CEO

Canada

* Refer to Technology Fact Sheet for additional information on the verification of this performance claim.

For information on the ***OZONATOR***, contact

Remediation Earth, Inc.

805-522-9100

www.RemediationEarth.com