



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, DC 20460

OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION

December 2, 2016

PeroxyChem, LLC  
c/o Coleen Waldenmayer, Scientist  
Keller and Heckman, LLP  
1001 G Street NW, Suite 500 West  
Washington, DC 20001

Subject: Label Amendment – Adding Agricultural and Horticultural Uses  
Product Name: VigorOx 15/23 Antimicrobial Agent  
EPA Registration Number: 65402-8  
Application Date: June 23, 2016  
Decision Number: 519364

Dear Ms. Waldenmayer:

The amended label referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act, as amended, is acceptable. This approval does not affect any conditions that were previously imposed on this registration. You continue to be subject to existing conditions on your registration and any deadlines connected with them.

A stamped copy of your labeling is enclosed for your records. This labeling supersedes all previously accepted labeling. You must submit one copy of the final printed labeling before you release the product for shipment with the new labeling. In accordance with 40 CFR 152.130(c), you may distribute or sell this product under the previously approved labeling for 18 months from the date of this letter. After 18 months, you may only distribute or sell this product if it bears this new revised labeling or subsequently approved labeling. "To distribute or sell" is defined under FIFRA section 2(gg) and its implementing regulation at 40 CFR 152.3.

Should you wish to add/retain a reference to the company's website on your label, then please be aware that the website becomes labeling under the Federal Insecticide Fungicide and Rodenticide Act and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product's label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA's Office of Enforcement and Compliance.

Your release for shipment of the product constitutes acceptance of these conditions. If these conditions are not complied with, the registration will be subject to cancellation in accordance

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Decision No. 519364

with FIFRA section 6. If you have any questions, please contact Terria Northern by phone at 7103-347-0265, or via email at [northern.terria@epa.gov](mailto:northern.terria@epa.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Julie Chao".

Julie Chao, Product Manager 33  
Regulatory Management Branch 1  
Antimicrobials Division (7510P)  
Office of Pesticide Programs

Enclosure: Accepted label

# VigorOx<sup>®</sup> 15/23 Antimicrobial Agent

EPA Reg. No. 65402-8  
EPA Est. 65402-NY-001, 65402-OK-001, 60156-IL-001

## For Industrial Use Only

**ACTIVE INGREDIENTS:**  
Peroxyacetic Acid ..... 15%  
Hydrogen Peroxide ..... 23%  
**OTHER INGREDIENTS:** ..... 62%  
**TOTAL:** ..... 100%

## KEEP OUT OF REACH OF CHILDREN DANGER

VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is for biofouling and slime control in

- Recirculating process and cooling water systems
- Pulp and paper mill systems
- Coating preservation
- Dispersed pigment preservation

VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is for use in wastewater and sewage effluent disinfectant in public and private treatment facilities.

VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is for use in the reduction of algae growth in wastewater and sewage treatment facilities' effluent water and related processing equipment, including on filters and equipment walls.

VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is for use in the sanitization of ultra filtration and reverse osmosis (RO) membranes and their associated distribution systems.

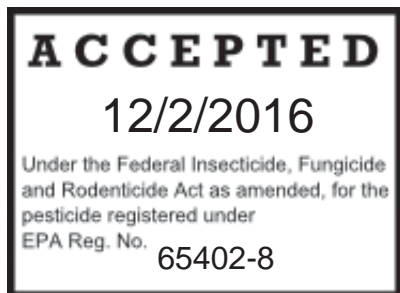
VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is for use in agricultural water and irrigation systems, including greenhouses.

VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is for use in oilfield and gas-field well operations.



Manufactured by:  
PeroxyChem, LLC  
2005 Market St Ste 3200  
Philadelphia PA 19103-7014

Net Contents: Gallons      lbs



### Precautionary Statements Hazards to Humans and Domestic Animals DANGER

Corrosive, causes eye and skin damage. Harmful if swallowed. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Wash thoroughly with soap and water after handling. Do not breathe vapor or spray mist. Do not enter an enclosed area without proper respiratory protection.

### Physical or Chemical Hazards

Strong oxidizing agent. Mix only with water. VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is not combustible; however, at temperatures exceeding 156°F, decomposition occurs releasing oxygen. The oxygen released could initiate or promote combustion of other materials.

*Note to the reviewer: The following bracketed statements will only be present on split-label products with agriculture uses.*

### [Personal Protective Equipment (PPE)]

Handlers who may be exposed to the undiluted product through mixing, loading, application, or other tasks must wear: coveralls over long-sleeved shirt and long pants, rubber gloves, chemical resistant footwear plus socks, and protective eyewear (goggles or face shield).

Handlers who may be exposed to the diluted product during application or other tasks must wear: long-sleeved shirt, long pants, socks, and shoes.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

### User Safety Recommendations

Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing. ]

### Environmental Hazards

This pesticide is toxic to birds, mammals, fish, aquatic invertebrates, shrimp, clams, and oysters. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. In developing the NPDES permit, restrictions on the release of waters containing this product during low-flow periods and/or mixing zones, especially during maximum discharge should be considered.

### First Aid

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

- If in eyes**
- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
  - Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
  - Call a poison control center or doctor for treatment advice.
- If on skin or clothing**
- Take off contaminated clothing.
  - Rinse skin immediately with plenty of water for 15-20 minutes.
  - Call a poison control center or doctor for treatment advice.

<b>If inhaled</b>	<ul style="list-style-type: none"> <li>● Move person to fresh air.</li> <li>● If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth if possible.</li> <li>● Call a poison control center or doctor for further treatment advice.</li> </ul>
<b>If swallowed</b>	<ul style="list-style-type: none"> <li>● Call poison control center or doctor immediately for treatment advice.</li> <li>● Have person sip a glass of water if able to swallow.</li> <li>● Do not induce vomiting unless told to do so by a poison control center or doctor.</li> <li>● Do not give anything by mouth to an unconscious person.</li> </ul>
<b>Note to Physician:</b> Probable mucosal damage may contraindicate the use of gastric lavage.	

## STORAGE AND DISPOSAL

### **STORAGE: NEVER RETURN VigorOx® 15/23 Antimicrobial Agent TO THE ORIGINAL CONTAINER AFTER IT HAS BEEN REMOVED.**

Avoid all contaminants, especially dirt, caustic, reducing agents, and metals. Contamination and impurities will reduce shelf life and can induce decomposition. In case of decomposition, isolate container, douse container with cool water and dilute with large volumes of water.

Avoid damage to containers. Keep container closed at all times when not in use. Keep container out of direct sunlight. To maintain product quality, store at temperatures below 86°F. Do not store on wooden pallets.

### **Procedure for Leak or Spill**

Stop leak if this can be done without risk. Shut off ignition sources; no flames, smoking, flares, or spark producing tools. Keep combustible and organic materials away. Flush spilled material with large quantities of water. Undiluted material should not enter confined spaces.

### **DISPOSAL**

**Pesticide Disposal:** If material has been spilled, an acceptable method of disposal is to dilute with at least 20 volumes of water followed by discharge into suitable treatment system in accordance with all local, state, and Federal environmental laws, rules, regulations, standards, and other requirements. Because acceptable methods of disposal may vary by location, regulatory agencies should be contacted prior to disposal.

VigorOx® 15/23 Antimicrobial Agent which is to be discarded should be disposed of as hazardous waste after contacting the appropriate local, state, or Federal agency to determine proper procedures.

### **Container Disposal**

**Nonrefillable containers less than 5 gallons.** Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

**Nonrefillable containers greater than or equal to 5 gallons.** Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container ¼ full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Empty drums are not returnable to PeroxyChem, LLC unless special arrangements have been made. Dispose of drums in accordance with local, state, and Federal regulations.

**All Refillable containers.** Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Return to PeroxyChem, LLC for reuse.

## DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. [Do not apply this product in a way that will contact workers or persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.]

*Note to the reviewer: The following bracketed statements will only be present on split-label products with agriculture uses.*

### [Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about Personal Protective Equipment (PPE), restricted entry interval, and notification to workers. The requirements in this box only apply to the uses of this product that are covered by the Worker Protection Standard.

A Restricted-Entry-Interval of zero (0) hours is required for VigorOx® 15/23 Antimicrobial Agent in agricultural or horticultural uses.

Keep unprotected persons out of treated areas until sprays have dried.

### Non-Agricultural Use Requirements

The requirements in this box apply to uses of the product that are **not** within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep unprotected persons out of treated areas until sprays have dried.]

### Biofouling Control in Pulp and Paper Mill Systems

For use in the manufacture of paper and paperboard intended for food and non-food contact.

VigorOx® 15/23 Antimicrobial Agent can be used to control bacterial, fungal and yeast growth in pulp, paper and paperboard mills.

1. Severely fouled systems should be cleaned before initial treatment with VigorOx® 15/23 Antimicrobial Agent. Refer to the plant operations manual for directions for cleaning severely fouled systems. The product should be added directly to the system and not mixed with any other chemicals or additives. Other chemicals can be added separately. Contamination with other chemicals could result in product decomposition.
2. Add the VigorOx® 15/23 Antimicrobial Agent at a point in the system where it can be mixed uniformly with the pulp, e.g., the beater, hydropulper, fan pump, broke pump etc.
3. Intermittent feed method: Apply 0.5 lb to 1.2 lb (7 to 16 fluid ounces) of VigorOx® 15/23 Antimicrobial Agent per ton (dry basis) of pulp or paper produced for two to three hours every eight-hour shift. Maintain a concentration that provides adequate control. This will provide 37.5-90 ppm of peroxyacetic acid and 57.5-138 ppm of hydrogen peroxide. Daily rate could change depending on the severity of the biofouling.
4. Continuous feed method: Initially, use the intermittent feed method to achieve control. When control is accomplished, apply VigorOx® 15/23 Antimicrobial Agent continuously at the rate determined adequate for intermittent control. Then reduce the rate of addition to the lowest level sufficient to maintain control. Depending on the severity of the biofouling, control usually can be maintained using a continuous rate of 0.2 to 1.2 lb (2.6 to 16 fluid ounces) of VigorOx® 15/23 Antimicrobial Agent solution per ton (dry basis) of pulp or paper produced on a continuous basis. This will provide 15-90 ppm of peroxyacetic acid and 23-138 ppm of hydrogen peroxide.

### Control of Slime Forming Bacteria in Recirculating Cooling Water Systems (Cooling Towers, Evaporative Condensers) and Non-Food Contact Water Systems (Pulp and Paper Mill Water Systems).

VigorOx® 15/23 Antimicrobial Agent is for use in treating raw (make-up) and process waters, closed and opened loop systems such as heat exchanges, wet scrubbers, cooling towers, evaporative condensers and recirculating industrial process waters, such as pulp and paper mill water systems.

1. Severely fouled systems should be cleaned before adding the VigorOx® 15/23 Antimicrobial Agent solution. Refer to the system operation manual for directions to clean severely fouled systems. The product should be added directly to the system and not mixed with any other chemicals or additives. Other chemicals should be added separately. Contamination with other chemicals could result in product decomposition.
2. Add the VigorOx® 15/23 Antimicrobial Agent solution at a point in the system where uniform mixing and even distribution will occur.
3. Intermittent feed method: When the system is noticeably fouled, apply 0.8 to 1.2 lb (10 to 16 fluid ounces) of VigorOx® 15/23 Antimicrobial Agent solution per 1000 gallons of water in the system (provides 15-23 ppm of peroxyacetic acid and 23-35 ppm of hydrogen peroxide). Repeat until control is achieved. When microbial control is evident, add 1.0 lb (14 fluid ounces) of the solution per 1000 gallons of water in the system every day, or as needed, to maintain control. The daily dose rate could vary depending upon the severity of the biofouling.
4. Continuous feed method: Initial dose – When the system is just noticeably fouled, apply 0.8 to 1.2 lb (10 to 16 fluid ounces) of VigorOx® 15/23 Antimicrobial Agent solution per 1000 gallons of water in the system. When microbial control is achieved, start adding VigorOx® 15/23 Antimicrobial Agent solution continuously at a rate of 1.0 lb (14 fluid ounces) per 1000 gallons of water (provides 17 ppm peroxyacetic acid and 26 ppm of hydrogen peroxide). Then reduce the rate of addition to a level sufficient to maintain control. The dose rate may have to be adjusted to account for losses due to blowdown and evaporation. Add 1.4 fluid ounces of VigorOx® 15/23 Antimicrobial Agent for every 100 gals of make-up water.

### Control of Bacteria and Fungi in Dispersed Pigments

VigorOx® 15/23 Antimicrobial Agent can be used to control bacteria and fungi in the manufacture and storage of dispersed pigments used in paint and paper production such as kaolin clay, titanium dioxide, calcium carbonate, calcium sulfate, barium sulfate, magnesium silicate and kieselsguhr.

Apply 0.2 to 1.2 lb (2.6 to 16 fluid ounces) of VigorOx® 15/23 Antimicrobial Agent solution to each 1,000 lb (454 Kg) of fluid. This will provide 200 to 1200 ppm of product (30 to 180 ppm of peroxyacetic acid and 46 to 275 ppm of hydrogen peroxide).

### For Disinfection of Sewage and Wastewater Effluents in Treatment Plants

Use VigorOx® 15/23 Antimicrobial Agent to treat sewage and wastewater effluent related to public and private treatment plants. VigorOx® 15/23 Antimicrobial Agent may be used to reduce algae growth in wastewater and sewage treatment effluent water and related processing equipment, including on filters and equipment walls. VigorOx® 15/23 Antimicrobial Agent may be applied directly to the effluent or may be used with an appropriate activator such as hydrogen peroxide or other technology. VigorOx® 15/23 Antimicrobial Agent may be applied to effluent water discharged from primary, secondary or tertiary treatments; and to effluent water discharged from trickle bed or percolating fluidized bed filters. The application rate for individual facilities will depend on the degree of bioloading of the effluent stream to be discharged and the local microbial discharge limit and the Dilution Factor (DF) for the receiving stream. Adjust application rate to meet the need of the individual facility.

1. Add VigorOx® 15/23 Antimicrobial Agent to effluent water at a concentration of 0.5 to 25 ppm peroxyacetic acid.



2. Use an appropriate peroxyacetic acid test kit analyzer to ensure that the maximum amount of peroxyacetic acid that can be discharged (1 ppm) is not exceeded unless otherwise specified below in paragraph 3. Contact your PeroxyChem, LLC representative for assistance establishing treatment regimes.
3. THE FOLLOWING DISCHARGE INSTRUCTIONS DO NOT APPLY TO CALIFORNIA - The maximum amount of peroxyacetic acid that can be discharged is:
  - i.  $0.09 * DF$ , when  $DF \geq 12$  and

$$DF = \frac{\text{plant effluent discharge} + \text{receiving stream 7Q10}}{\text{plant effluent discharge}}$$

where 7Q10 is the minimum average 7-day flow expected to occur once every 10 years for the receiving stream; or

- ii. 1 ppm if the 7Q10 is unknown or  $DF < 12$

#### Batch Sanitization of Ultra-Filtration and Reverse Osmosis (RO) Membranes

VigorOx<sup>®</sup> 15/23 Antimicrobial Agent is for use in the sanitization of ultra filtration, medical and non-medical institutional/industrial reverse osmosis (RO) membranes and their associated distribution systems. This product is not for use in kidney dialysis reprocessing equipment.

This product has been shown to be an effective disinfectant when tested by AOAC and EPA methods. This product may not totally eliminate all vegetative microorganisms in reverse osmosis membranes and their associated piping systems due to their construction and/or assembly, but can be relied upon to reduce the number of microorganisms to acceptable levels when used as directed. Check with equipment manufacturer for membrane compatibility with VigorOx<sup>®</sup> 15/23 Antimicrobial Agent.

1. Remove biological or organic fouling from the membrane or other parts of the system with an appropriate cleaner.
2. Flush the system with RO permeate or similar quality water.
3. Remove mineral deposits with an acidic cleaner prior to sanitizing the membranes.
4. Flush the system with RO permeate or similar quality water.
5. Prepare an appropriate volume of 1% solution of the product (6.4 fl. oz. per 5 gallons of water). This will provide 1745 ppm of peroxyacetic acid and 2676 ppm hydrogen peroxide.
6. Fill the entire water circuit to be sanitized with the dilute solution and allow the solution to reach a minimum of 20°C (69°F).
7. Recirculate the dilute solution of VigorOx<sup>®</sup> 15/23 Antimicrobial Agent for a minimum of 10 minutes.
8. Allow membrane elements to soak in the solution for a minimum of 20 minutes.
9. Rinse the RO system and test for residuals to ensure that there is less than 3 ppm peroxygen. Residuals can be reduced by diverting product water to drain.

#### Batch Sanitization of Piping Systems Associated with RO Membranes

1. Isolate incompatible equipment from piping system. This includes activated carbon filters and ion exchange equipment. Turn off power to ultraviolet light units.
2. Estimate total volume of water contained in the system (tanks, rinse stations and piping). Prepare an appropriate volume of 1.0 to 1.5% VigorOx<sup>®</sup> 15/23 Antimicrobial Agent solution by adding 1.0 to 1.5 gallons of the product for every 100 gallons of solution prepared. Use RO permeate or similar quality water for dilution. This will provide 1745-2618 ppm peroxyacetic acid and 2676-4014 ppm hydrogen peroxide.
3. Recirculate the dilute VigorOx<sup>®</sup> 15/23 Antimicrobial Agent solution through the system for a minimum of 4 hours. Process usage valves should be opened and closed to expose internals to the VigorOx<sup>®</sup> 15/23 Antimicrobial Agent solution.
4. Completely drain the system of dilute VigorOx<sup>®</sup> 15/23 Antimicrobial Agent solution. Thoroughly rinse the system by filling with RO permeate or similar quality water and recirculate before drainage. Repeat the process until test for residuals indicates there is less than 3 ppm peroxygen.

#### Agricultural and Horticultural Uses

A Restricted-Entry-Interval of zero (0) hours is required for VigorOx<sup>®</sup> 15/23 Antimicrobial Agent in agricultural or horticultural uses. This product should not be mixed or combined with any pesticides or fertilizers. Upon soil contact, the diluted product decomposes rapidly to oxygen, carbon dioxide and water. This product may be harmful to fish if exposed on a continuous basis at concentrations greater than 1 ppm of active peracetic acid. Meter VigorOx<sup>®</sup> 15/23 Antimicrobial Agent into pressurized pipes using a plastic or stainless steel injection/backflow device installed upstream from the equipment to ensure thorough mixing prior to application. For open bodies of water, allow adequate mixing prior to product flow entering any body of water. If open pouring of this product is required, pour product close to the surface of the water as possible to reduce odor and exposure.

#### Treatment of Agricultural and Irrigation Water Systems

Use VigorOx<sup>®</sup> 15/23 Antimicrobial Agent to control sulfides, odor, slime, and algae in sand filters, humidification systems, storage tanks, ponds, reservoirs, canals. Apply VigorOx<sup>®</sup> 15/23 Antimicrobial Agent at 15 to 75 fluid ounces per 10,000 gallons of water. This provides 2 ppm to 10 ppm peroxyacetic acid. Repeat dose as necessary to maintain control. For prevention of algae, some systems may require continuous low level dosing during warm, sunny periods (2 ppm to 5 ppm peroxyacetic acid).

#### Drip Irrigation Systems

Use VigorOx<sup>®</sup> 15/23 Antimicrobial Agent to clean slime and algae from drip system filters, tapes and emitters, meter VigorOx<sup>®</sup> 15/23 Antimicrobial Agent at 7.5 to 15 fluid ounces per 1,000 gallons. This provides 10 ppm to 20 ppm peroxyacetic acid. Use this product at the recommended dose for a minimum of 30 minutes during normal irrigation cycles. After irrigation cycle, discontinue use, and do not flush the lines.

#### Greenhouses

Use VigorOx<sup>®</sup> 15/23 Antimicrobial Agent to suppress/control algae and slime formations in and around greenhouses. For normal use in various process, irrigation or sprinkler water systems, VigorOx<sup>®</sup> 15/23 Antimicrobial Agent may be used at 1:40,000 to 1:5,000 dilutions, providing 4 ppm to 33 ppm of peroxyacetic acid. Heavily fouled systems, such as evaporative coolers or irrigation/drip lines may need shock doses of up to 100 ppm as peroxyacetic acid (1:1,600 dilution).

#### Continuous/Intermittent Addition to Minimize the Accumulation of Biological Matter Between Intermittent Sanitizing Episodes in Piping Systems Associated with RO Membranes.

1. VigorOx<sup>®</sup> 15/23 Antimicrobial Agent, as received or diluted, may be added continuously to the feed water stream between system sanitizing episodes, to aid in minimizing the regrowth/accumulation of biological matter. The peroxygen residual in the system that is effective will vary with the design and usage characteristics of the system. Adjust the addition rate of VigorOx<sup>®</sup> 15/23 Antimicrobial Agent or the solution and periodically monitor residual peroxygen so that the desired effect is obtained.
2. For continuous addition do not exceed 20 ppm VigorOx<sup>®</sup> 15/23 Antimicrobial Agent (0.1 fl. oz. per 40 gallons of water). This will give 3.4 ppm peroxyacetic acid and 5.2 ppm hydrogen peroxide.
3. For intermittent feed do not exceed 2000 ppm VigorOx<sup>®</sup> 15/23 Antimicrobial Agent (10 fl. oz. per 40 gallons of water). This will give 341 ppm peroxyacetic acid and 523 ppm hydrogen peroxide.

#### For antimicrobial use with aqueous treatment fluids in subterranean oilfield and gas-field well operations such as well drilling, formation fracturing, productivity enhancement and secondary recovery.

VigorOx<sup>®</sup> 15/23 Antimicrobial Agent can be for control of slime forming and spoilage bacteria, yeast and fungi and anaerobic sulfate reducing bacteria, *Desulfovibrio vulgaris*, that lead to reservoir souring and metal corrosion.

This product must be introduced through a closed mixed/loading and delivery transfer system equipped with a metering device that is appropriate for its intended uses.

### Drilling Muds, Fracturing Fluids, Well Squeezed Fluids

For the preservation of drilling muds, workover and completion fluids and other product susceptible to contamination, pre-mix with the fluid or add directly at the point of use at 3.75 fluid ounces per 1000 gallons of water (5.1 ppm of Peroxyacetic acid and 7.8 ppm of Hydrogen Peroxide) to 75.5 fluid ounces per 1000 gallons of water (102.9 ppm of Peroxyacetic Acid and 157.8 ppm of Hydrogen Peroxide) as required. Depending on the severity of the contamination, initial application may be added up to 755 fluid ounces per 1000 gallons of water (1029.4 ppm of Peroxyacetic acid and 1578.4 ppm of Hydrogen Peroxide).

### Flooding, Injection and Produced Water

For Water Flooding operations, add initially at 3.75 fluid ounces per 1000 gallons of water (5.1 ppm of Peroxyacetic acid and 7.8 ppm of Hydrogen Peroxide) to 75.5 fluid ounces per 1000 gallons of water (102.9 ppm of Peroxyacetic Acid and 157.8 ppm of Hydrogen Peroxide) and repeat until control is achieved. Subsequent treatment may be continued on a weekly basis or as required.

Injection wells associated with gas storage systems may be treated up to 102.9 ppm of Peroxyacetic Acid and 157.8 ppm of Hydrogen Peroxide when diluted in the formation water. Any additional top-up water should be treated as required.

For hydrostatic systems, apply 3.75 fluid ounces per 1000 gallons of water (5.1 ppm of Peroxyacetic acid and 7.8 ppm of Hydrogen Peroxide) to 75.5 fluid ounces per 1000 gallons of water (102.9 ppm of Peroxyacetic Acid and 157.8 ppm of Hydrogen Peroxide) depending on the water quality and the duration of the shut-in.

### Pipeline and Tank Maintenance

For microbial control in water-bottoms in crude and refined hydrocarbon storage tanks, piping and transportation systems: Apply 3.75 fluid ounces per 1000 gallons of water (5.1 ppm of Peroxyacetic acid and 7.8 ppm of Hydrogen Peroxide) to 75.5 fluid ounces per 1000 gallons of water (102.9 ppm of Peroxyacetic Acid and 157.8 ppm of Hydrogen Peroxide) in the aqueous phase, directly injected into the water-bottom, pipeline or may be added to the hydrocarbon phase. Treatment may be applied daily or monthly for both storage and transportation systems as needed.

### Note: May cause bleaching of treated surfaces

**Note:** Before using VigorOx® 15/23 Antimicrobial Agent to sanitize metal surfaces, it is recommended that the diluted solution be tested on a small area to determine compatibility.

In all applications always prepare a new solution daily to ensure effectiveness. Do not re-use solutions. Dispose of unused solution.

### EMERGENCY TELEPHONE NUMBERS (24 HOURS)

MEDICAL: COLLECT 303-389-1409

CHEMTREC: 800-424-9300

OTHER: COLLECT 716-879-0400

*A note to the reader: the NSF Logo may only be used on the VigorOx® WWT II product label.*

**[VigorOx® WWT II is an [National Sanitation Foundation] [NSF] listed product.]**



4847-1514-9372, v. 1