

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

JUN 17 2004

The Dow Chemical Company  
1500 E. Lake Cook Road  
Buffalo Grove, IL 60089

Attention: Maureen Mikszal  
Senior Regulatory Specialist

Subject: UCARCIDE 45 Antimicrobial  
EPA Registration No. 464-692  
Amendment Dated March 18, 2004 and  
Letter Dated May 20, 2004

The amendment, submitted in connection with registration under the FIFRA sec. 3(c)(7)(A), to modify the first aid for the eye, to add oilfield claims, to add ventilation information to storage and handling section, to update the identifying statement, to add new MSDS statement and text revision in the directions for use to correct the dosing for density of glutaraldehyde and to add efficacy against an additional organism, to change the primary product name to "UCARCIDE 42 Antimicrobial", to include two additional brand names "UCARSAN 442 Sanitizer" and "AQUCAR 542 Water Treatment Microbiocide" and to amend the basic and alternate Confidential Statements of Formulas (CSFs), is acceptable, provided that you:

1. Submit and/or cite all data required for registration/reregistration of your product under FIFRA sec.3(c)(5) and sec. 4 when the Agency requires all registrants of similar products to submit such data.
2. Submit two (2) copies of final printed labeling before you release the product for shipment.

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA sec. 6(e). Your release for shipment of the product constitutes acceptance of these conditions.

CONCURRENCES

SYMBOL								
SURNAME								
DATE								

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General Comments

The Basic and Alternate Confidential Statements of Formulas dated May 20, 2004 are acceptable.

The two (2) requested alternate brand names "UCONEX 345 Antimicrobial" and AQUCAR 545 Water Treatment Microbiocide" are acceptable.

Your request to change the primary product name of your registration from "AQUCAR 545 Water Treatment Microbiocide" to UCARCIDE 45 Antimicrobial" is acceptable.

A stamped copy of the accepted labeling is enclosed for your records.

If you have any questions concerning this letter, please contact Martha Terry at (703) 308-6217.

Sincerely



Marshall Swindell  
Product Manager (33)  
Regulatory Management Branch 1  
Antimicrobials Division (7510C)

Enclosure

PRECAUTIONARY STATEMENTS  
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

**DANGER**  
**KEEP OUT OF REACH OF CHILDREN**

Corrosive. Causes irreversible eye damage. Causes skin burns. Harmful if inhaled. May be fatal if swallowed. Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Causes asthmatic signs and symptoms in hyper-reactive individuals.

Do not get in eyes, on skin, on clothing.  
Avoid breathing vapor. Do not swallow.  
Wear goggles, protective clothing, and butyl or nitrile gloves.  
Wash thoroughly with soap and water after handling.  
Remove contaminated clothing and wash before reuse.

**ENVIRONMENTAL HAZARDS**

This pesticide is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the 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.

**STORAGE AND HANDLING**

UCARCIDE™ 45 Antimicrobial is incompatible with many commonly used materials of construction such as steel, galvanized iron, aluminum, tin, and zinc. UCARCIDE™ 45 Antimicrobial can be stored and handled in baked phenolic-lined steel, polyethylene, stainless steel, or reinforced epoxy-plastic equipment. This product freezes at about 1°F (-17°C). Therefore, unless the storage tank is inside or underground, heating and insulation may be required. If heating is needed, exposure to high temperatures should be avoided. For short storage times (up to about 1 month), temperatures of up to 100°F (37.8°C) can be tolerated but the preferred maximum storage temperature is about 80°F (26.7°C).

A stainless steel centrifugal pump is suggested for transfer service. Spiral-wound stainless steel with TEFLON® Polymer is suitable for gaskets and packing.

Handle in a well-ventilated area. If vapors are irritating to the nose or eyes, special ventilation or respiratory protection (MSHA/NIOSH approved air purifying respirator equipped with an organic vapor cartridge) may be required.

**LIMITED WARRANTY AND DISCLAIMER**

Seller warrants that the product conforms to its chemical description as contained on this label and is reasonably fit for the purposes stated on this label when used in accordance with directions under normal conditions of use. THE WARRANTIES MADE IN THIS PARAGRAPH ARE SELLER'S SOLE WARRANTIES WITH RESPECT TO THE PRODUCT AND ARE MADE EXPRESSLY IN LIEU OF AND EXCLUDE ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER EXPRESS OR IMPLIED REPRESENTATIONS AND WARRANTIES.

**BEFORE HANDLING OR USING THIS PRODUCT, SEE YOUR EMPLOYER AND READ CURRENT MATERIAL SAFETY DATA SHEET.**

**STORAGE AND DISPOSAL**

**PESTICIDE DISPOSAL:** Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or your Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**CONTAINER DISPOSAL: Metal Containers or Plastic Containers:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or other procedures approved by state and local authorities. **Plastic Containers:** May be incinerated, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. **Metal Containers:** Must not be incinerated. Do not cut or weld on or near metal containers.

ACCEPTED

with COMMENTS  
in EPA Letter Dated:

JUN 17 2004



**NOTICE**

Do Not Ship or Store  
with Food, Feeds, Drugs,  
or Clothing

Under the Federal Insecticide,  
Fungicide, and Rodenticide Act as  
amended, for the pesticide,  
registered under EPA Reg. No.

464-692

A highly effective and Sulfate-Free Scrubbing Systems, Waste Mills and Beetler Systems, Paper and Paper Mills and for use in Processes and Emulsions and Systems and Re Processing Applications and Systems, a Tanks, Flood Water Tanks, Fuel Storage Water Handling:

- If swallowed:
- Call a poison control
  - DO NOT INDUCE VOMITING
  - Do not give anything to eat or drink
- If in eyes:
- Wash immediately with large amounts of water for at least 15 minutes. Remove contact lenses, if available and preferably from another person.
  - Call a poison control
- If on skin or clothing:
- Take off contaminated clothing.
  - Rinse skin immediately with large amounts of water.
  - Call a poison control
- If inhaled:
- Move person to fresh air.
  - If person is not breathing, call a poison control

**NOTE TO PHYSICIAN:** Use of gastric lavage. Have the MSDS and doctor, or going for treatment.

SEE SI



Net Contents: 5, 30.

CONTAINER SIZE	CONTAINER TYPE
55 GAL	TOTE
504 POUNDS	NET WEIGHT
504 POUNDS	NET WEIGHT

IN CASE OF AN EMERGENCY, call collect 989-636-4

375

**PRECAUTIONARY STATEMENTS**  
**TO HUMANS AND DOMESTIC ANIMALS**  
**DANGER**  
**OUT OF REACH OF CHILDREN**

Reversible eye damage. Causes skin burns. Harmful if inhaled.  
Irritant. Harmful if absorbed through skin.  
Repeated skin contact may cause allergic reactions in some  
sensitive individuals. Irritation and symptoms in hyper-reactive individuals.

Wash hands thoroughly with soap and water after handling.  
Do not swallow.  
Do not get in eyes, on clothing, or on skin.  
Wash clothing, and butyl or nitrile gloves.  
Wash hands with soap and water after handling.  
Wash clothing and wash before reuse.

**ENVIRONMENTAL HAZARDS**  
Do not discharge effluent containing this product into lakes, streams,  
rivers, or other waters unless in accordance with the requirements of a National  
Pollution Discharge Permit (NPDES) and the permitting authority has been notified.  
Do not discharge effluent containing this product to sewer systems  
without the local sewage treatment plant authority. For guidance contact your  
local Office of the EPA.

**STORAGE AND HANDLING**  
This product is incompatible with many commonly used materials of construction  
such as iron, aluminum, tin, and zinc. UCARCIDE™ 45 Antimicrobial can be  
stored in phenolic-lined steel, polyethylene, stainless steel, or reinforced epoxy-  
concrete. Freezes at about 1°F (-17°C). Therefore, unless the storage tank is  
insulated and insulation may be required. If heating is needed, exposure to  
open flame should be avoided. For short storage times (up to about 1 month), temperatures  
down to 0°F can be tolerated but the preferred maximum storage temperature is about  
50°F. A pump is suggested for transfer service. Spiral-wound stainless steel with  
gaskets and packing.

In confined areas, if vapors are irritating to the nose or eyes, special ventilation or  
use of a NIOSH approved air purifying respirator equipped with an organic  
vapor cartridge is required.

**WARRANTY AND DISCLAIMER**

This product conforms to its chemical description as contained on the label and is  
suitably fit for the purposes stated on this label when used in accordance with  
instructions under normal conditions of use. THE WARRANTIES MADE BY THE  
SELLER ARE THE SELLER'S SOLE WARRANTIES WITH RESPECT TO THIS PRODUCT  
AND ARE MADE EXPRESSLY IN LIEU OF AND EXCLUDE ANY OTHER WARRANTIES  
OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER EXPRESS OR IMPLIED  
WARRANTIES.

**STORAGE OR USING THIS PRODUCT, SEE  
MATERIAL SAFETY DATA SHEET AND READ CURRENT MATERIAL  
SAFETY SHEET.**

**STORAGE AND DISPOSAL**

Do not contaminate water, food or feed by storage or disposal. Open  
containers and wastes are toxic. Improper disposal of excess pesticide, spray  
equipment, or other containers cannot be disposed of by use  
of ordinary household wastes. Contact your State Pesticide or your Environmental Control Agency, or  
the nearest EPA Regional Office for guidance.  
**Metal Containers:** Triple rinse (or equivalent).  
Conditioning, or puncture and dispose of in a sanitary landfill, or other  
approved facility, and local authorities. **Plastic Containers:** May be incinerated, or, if  
approved by local authorities, by burning. If burned, stay out of smoke. **Metal Containers:**  
Do not cut or weld on or near metal containers.

**ACCEPTED**  
**with COMMENTS**  
**In EPA Letter Dated:**

JUN 17 2004

**SHIPMENT**  
Ship or Store  
in Original Container, Feeds, Drugs,  
or Other Containers

**Under the Federal Insecticide,  
Fungicide, and Rodenticide Act as  
amended, for the pesticide,  
registered under EPA Reg. No.**

464-692

**UCARCIDE™ 45**  
**Antimicrobial**

A highly effective Microbiocide for use in controlling Bacteria including Slime Forming Bacteria,  
and Sulfate-Reducing Bacteria, Fungi (Yeast and Molds) and Algae in Air washers and Industrial  
Scrubbing Systems, Recirculating Cooling and Process Water Systems including those that  
contain Reverse Osmosis Membranes and Service Water and Auxillary Systems, Heat Transfer  
Systems, Wastewater Systems including Wastewater Sludge and Holding Tanks, Beet Sugar  
Mills and Beet Sugar Mill Process Water Systems and in Paper Mills and Paper Mill Process  
Water Systems, Pigments and Filler Slurries for Paper and Paperboard, Water Based Coatings for  
Paper and Paperboard and in Functional Fluids and Lubricants and Aqueous Metalworking Flui-  
ds and for use by Manufacturers as a Preservative in Industrial, Institutional and Consumer  
Processes and Products and for use in Preserving Aqueous-Based Solutions, Slurries and  
Emulsions and a Molluscicide for use in controlling Macrofouling in Service Water and Auxillary  
Systems and Recirculating Cooling and Process Water Systems and in Oil Well Drilling, Oil Field  
Processing Applications, Oil Field Water Systems, Gas Production and Transmission Pipelines  
and Systems, and Gas Storage Fields and Equipment; such as Steam-Injection Water Holding  
Tanks, Flood Water, Injection Water, Holding Pond Water, Disposal-Well Water, Water Holding  
Tanks, Fuel Storage Tanks and related Refinery and Oil Field Closed, Industrial Recirculating  
Water Handling Systems.

Active Ingredient: Glutaraldehyde ..... 45%  
Inert Ingredients: ..... 55%  
Total ..... 100%

**KEEP OUT OF REACH OF CHILDREN**  
**DANGER**  
**FIRST AID**

**If swallowed:**

- Call a poison control center or a doctor immediately for treatment advice.
- DO NOT INDUCE VOMITING.
- Do not give anything to drink.

**If in eyes:**

- Wash immediately and continuously with flowing water for at least 30 minutes.
- Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation,  
preferably from an ophthalmologist.
- Call a poison control center or a doctor immediately 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 a doctor for treatment advice.

**If inhaled:**

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, and then give artificial respiration, preferably mouth-to-mouth if possible.
- Call a poison control center or a doctor for further treatment advice.

**NOTE TO PHYSICIAN:** Aspiration may cause lung damage. Probable mucosal damage may contraindicate the  
use of gastric lavage.

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

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS.

EPA Reg. No. 464-692  
EPA Est. No. 10352-WV-2 (A); 464-WV-1 (B)  
(A) 5 gallon pails in pallets; all drums; bulk  
(B) Single 5 gallon pails only.



**THE DOW CHEMICAL COMPANY**  
Midland, Michigan 48674 U.S.A.  
1-800-258-CHEM  
\*Trademark of THE DOW CHEMICAL COMPANY

Net Contents: 5, 30, 55 gallons or Bulk

L90226 (I 03/04)  
Made In USA  
PE0304

CONTAINER SIZE	CONTAINER SIZE	CONTAINER SIZE	CONTAINER SIZE	SHIPPING	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	
TOTE	55 GALLONS	30 GALLONS	5 GALLONS	NAME	(CONTAINS GLUTARALDEHYDE)	
2,425 POUNDS	504 POUNDS	279 POUNDS	46 POUNDS	HAZARD CLASS	ID NUMBER	PG II
NET WEIGHT	NET WEIGHT	NET WEIGHT	NET WEIGHT	8	UN 3365	

**IN CASE OF AN EMERGENCY** endangering life or property involving this product, call  
collect 989-636-4400.

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## DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

### AIR WASHERS AND INDUSTRIAL SCRUBBING SYSTEMS/ RECIRCULATING COOLING AND PROCESS WATER SYSTEMS

This product may be used only in industrial air washers and air washer systems which have mist-eliminating components.

UCARCIDETM 45 Antimicrobial should be added at the application rates described below, to a water treatment system at a convenient point of uniform mixing such as the basin area. Addition may be made intermittently (SLUG DOSE) or continuously. Badly fouled systems can be shock treated with UCARCIDETM 45 Antimicrobial. Under these conditions, blowdown should be discontinued for up to 24 hours.

UCARCIDETM 45 Antimicrobial can be used in industrial process water systems that contain ultra filtration units and non-medical reverse osmosis membranes (where approved for compatibility by the membrane manufacturer) and associated distribution systems.

#### INTERMITTENT (SLUG DOSE) METHOD

**Initial Dose:** When the system is noticeably fouled, apply 12.7 to 25.4 fluid ounces of UCARCIDETM 45 Antimicrobial per 1,000 gallons of water in the system. Repeat until control is achieved.

**Subsequent Dose:** When microbial control is evident, add 5.1 to 12.7 fluid ounces of UCARCIDETM 45 Antimicrobial per 1,000 gallons of water in the system weekly, or as needed to maintain control. Badly fouled systems must be cleaned before treatment is begun.

#### CONTINUOUS FEED METHOD

**Initial Dose:** When the system is noticeably fouled, apply 12.7 to 25.4 fluid ounces of UCARCIDETM 45 Antimicrobial per 1,000 gallons of water in the system.

**Subsequent Dose:** Maintain this treatment level by starting a continuous feed of 2.5 to 12.7 fluid ounces of UCARCIDETM 45 Antimicrobial per 1,000 gallons of water in the system per day.

Badly fouled systems must be cleaned before treatment is begun.

### SERVICE WATER AND AUXILIARY SYSTEMS

UCARCIDETM 45 Antimicrobial should be used at the same application rates, and in the same manner as described above. It should be added to the system at a point that will allow for uniform mixing throughout the system.

### HEAT TRANSFER SYSTEMS

(Evaporative Condensers, Dairy Sweetwater Systems, Hydrostatic Sterilizers and Retorts, and Pasteurizers and Warmers and Once-Through Cooling Water Systems)

UCARCIDETM 45 Antimicrobial should be used at the same application rates, and in the same manner as described above. It should be added to the system at a point of uniform mixing such as a basin area, sump area or other reservoir or collecting area from which the treated water will be circulated uniformly throughout the system.

### INDUSTRIAL WASTEWATER SYSTEMS

(Wastewater Systems, Wastewater Sludge and Wastewater Holding Tanks)

UCARCIDETM 45 Antimicrobial should be added to a wastewater system or sludge at a convenient point of uniform mixing such as the digester. Add 0.45 to 2.2 gallons (500 to 2,500 ppm UCARCIDETM 45 Antimicrobial) per 1,000 gallons of wastewater or sludge.

### MACROFOULING CONTROL

\*Not for use in state of California

UCARCIDETM 45 Antimicrobial should be added continuously to maintain a level of 20 ppm active ingredient in the system for a period of at least 96 hours.

**Initial Dose:** When macrofouling is present in the system, apply 5.6 fluid ounces of UCARCIDETM 45 Antimicrobial 1,000 gallons of water in the system. Continue to add as needed to maintain the 20 ppm active ingredient level for a period of at least 96 hours.

### BET SUGAR MILLS AND BET SUGAR MILL PROCESS WATER SYSTEMS

UCARCIDETM 45 Antimicrobial should be added to the system at a point of uniform mixing such as the diffuser, transport water pump, weir box, or diffuser feed water pump. Additions may be made intermittently (SLUG DOSE) or continuously.

#### INTERMITTENT (SLUG DOSE) METHOD

**Initial Dose:** When the system is noticeably contaminated, add 6.1 to 15.2 fluid ounces (222 to 560 ppm product) of UCARCIDETM 45 Antimicrobial per ton or 200 to 500 mL of UCARCIDETM 45 Antimicrobial per metric ton of sliced beets as a slug dose. Repeat until control is achieved.

**Subsequent Dose:** When microbial control is evident, add 0.9 to 9.1 fluid ounces (33 to 330 ppm) of UCARCIDETM 45 Antimicrobial per ton or 30 to 300 mL of UCARCIDETM 45 Antimicrobial per metric ton of sliced beets in the system as a slug dose as necessary to maintain control. The total should not exceed 118 gallons per 1,000 tons of beets sliced per day.

#### CONTINUOUS FEED METHOD

**Initial Dose:** When the system is noticeably contaminated, add 6.1 to 15.2 fluid ounces/minute (222 to 560 ppm product) of UCARCIDETM 45 Antimicrobial per ton or 200 to 500 mL/minute of UCARCIDETM 45 Antimicrobial per metric ton of beets sliced per minute in the system via automatic pump of suitable construction.

**Subsequent Dose:** When microbial control is evident, add 0.9 to 9.1 fluid ounces/minute (33 to 330 ppm) of UCARCIDETM 45 Antimicrobial per ton or 30 to 300 mL/minute of UCARCIDETM 45 Antimicrobial per metric ton of beets sliced per minute in the system, or as necessary to maintain control. The total should not exceed 118 gallons per 1,000 tons of beets sliced per day.

### PAPER MILLS AND PAPER MILL PROCESS WATER SYSTEMS

UCARCIDETM 45 Antimicrobial should be added to the paper making system at a point of uniform mixing such as the beaters, broke chest pump, save-all tank, or white-water tank.

**Initial Dose:** When the system is noticeably contaminated, add 0.6 to 3.3 lbs of UCARCIDETM 45 Antimicrobial per ton of pulp or paper (dry basis) as a slug dose. Repeat until control is achieved. Heavily fouled systems should be boiled out prior to initial treatment.

**Subsequent Dose:** When microbial control is evident, add 0.3 to 2.2 lbs of UCARCIDETM 45 Antimicrobial per ton of pulp or paper (dry basis) as a slug dose as necessary to maintain control.

### PIGMENTS AND FILLER SLURRIES FOR PAPER AND PAPERBOARD (For use in food and non-food contact pigments and filler slurries)

Use from 0.11 to 0.7 lbs. of UCARCIDETM 45 Antimicrobial per 1,000 lbs. of dry powder to produce a concentration from 111 to 667 ppm as product (based on slurry solids) in the mixed slurry.

### WATER BASED COATINGS FOR PAPER AND PAPERBOARD

NOTE: For use in non-food contact coatings only.

Use from 0.11 to 0.7 lbs. of UCARCIDETM 45 Antimicrobial per 1,000 lbs. of dry powder to produce a concentration from 111 to 667 ppm as product (based on slurry solids) in the mixed slurry.

### AQUEOUS METALWORKING FLUIDS

UCARCIDETM 45 Antimicrobial should be added to a metalworking fluid system at a point of uniform mixing such as the fluid collection tank. Additions may be made intermittently (SLUG DOSE) at intervals of one week or less.

**Initial Dose:** When the system is noticeably fouled apply 2 to 6 gallons of UCARCIDETM 45 Antimicrobial per 10,000 gallons of metalworking fluid to the system. Repeat until control is achieved.

**Subsequent Dose:** When microbial control is evident, add 0.8 to 4 gallons of UCARCIDETM 45 Antimicrobial per 10,000 gallons of metalworking fluid to the system weekly, or as needed to maintain control. Badly fouled systems should be cleaned before treatment is begun.

### WATER BASED CONVEYOR LUBRICANTS

(Brewery, Juice, Dairy, Beverage, and Food Processing Systems)

**Avoid contamination of food in application of product.**

Thoroughly clean all tracks and conveyors to remove gross soil. Rinse well. Use an automatic feed system as recommended by your Dow representative to provide 1.3 to 7.6 fluid ounces (50 to 300 ppm active) of UCARCIDETM 45 Antimicrobial per 100 gallons of diluted lubricant.

### GENERAL PRESERVATIVE USE

UCARCIDETM 45 Antimicrobial is recommended for use in aqueous or water containing products and systems, including industrial, institutional and consumer in-can processes and products, to control the growth of bacteria and fungi. For effective preservation, add UCARCIDETM 45 Antimicrobial to the product formulation at a rate of 0.022% to 0.22% (222.5 to 2,222.5 ppm) based on the water content of the product (0.22 to 2.2 lbs UCARCIDETM 45 Antimicrobial per 1,000 lbs water content). Mix uniformly.

### PRESERVATIVE FOR CONCENTRATES

For use in concentrates where effective preservation is needed after dilution, add UCARCIDETM 45 Antimicrobial to the product formulation at a rate such that the diluted end-use product will contain 0.022% to 0.22% UCARCIDETM 45 Antimicrobial.

At no time during the preservation process should the level of UCARCIDETM 45 Antimicrobial exceed 2.2%.

### REVERSE OSMOSIS MEMBRANES

For effective preservation of reverse osmosis elements (where approved for compatibility by membrane manufacturer), immerse elements in a tank containing 0.22% to 2.2% UCARCIDETM 45 Antimicrobial.

UCARCIDETM 45 Antimicrobial can also be added to in-line recirculating systems for preservation of installed out-of-service reverse osmosis equipment (where approved for compatibility by membrane manufacturer). Add 0.22% to 2.2% UCARCIDETM 45 Antimicrobial to the tank in the circulating system. Maintain the concentration of UCARCIDETM 45 Antimicrobial by periodic addition to counteract any system leakage.

### CONCRETE ADMIXTURES

For effective preservation of concrete admixtures, add UCARCIDETM 45 Antimicrobial to the product formulation at a rate of 2.22 to 8,889 ppm based on the weight of the admixture (2.2 to 8.9 lbs UCARCIDETM 45 Antimicrobial per 1,000 lbs. concrete admixture). Mix uniformly.

### WATER FLOODS

UCARCIDETM 45 Antimicrobial should be added to a water flood system at a point of uniform mixing.

**Initial Treatment:** When the system is noticeably contaminated, add 110 to 5,500 ppm UCARCIDETM 45 Antimicrobial to the system (0.1 to 4.9 gallons UCARCIDETM 45 Antimicrobial per 1,000 gallons flood water). Repeat until control is achieved.

**Subsequent Dose:** When microbial control is evident, add 22 to 5,500 ppm UCARCIDETM 45 Antimicrobial (0.02 to 4.9 gallons UCARCIDETM 45 Antimicrobial per 1,000 gallons flood water) to the system weekly, or as needed to maintain control.

### DRILLING, COMPLETION, AND WORKOVER FLUIDS

UCARCIDETM 45 Antimicrobial should be added to a drilling fluid system at a point of uniform mixing such as the circulating mud tank.

**Initial Treatment:** Add 55 to 1,100 ppm UCARCIDETM 45 Antimicrobial (0.21 to 4.1 gallons UCARCIDETM 150 Antimicrobial per 100 barrels of fluid) to a freshly prepared fluid depending on the severity of contamination.

**Maintenance Dosage:** Maintain a concentration of 55 to 1,100 ppm UCARCIDETM 45 Antimicrobial by adding 0.21 to 4.1 gallons of UCARCIDETM 45 Antimicrobial per 100 barrels of additional fluid, or as needed, depending on the severity of contamination.

### PACKER FLUIDS

UCARCIDETM 45 Antimicrobial should be added to a packer fluid at a point of uniform mixing such as a circulating holding tank. Add 55 to 666 ppm UCARCIDETM 45 Antimicrobial (0.21 to 2.5 gallons UCARCIDETM 45 Antimicrobial per 100 barrels of fluid) to a freshly prepared fluid depending on the severity of contamination. Seal the treated packer fluid in the well between the casing and production tube.

### GAS PRODUCTION AND TRANSMISSION PIPE SYSTEMS

UCARCIDETM 45 Antimicrobial should be added to a gas production or transmission pipeline via direct injection. The application should be conducted to ensure maximum distribution of the UCARCIDETM 45 Antimicrobial through the entire internal surface of the pipeline. To facilitate application, it may be desirable to dilute the UCARCIDETM 45 Antimicrobial with an appropriate solvent immediately before use.

Injections to the system should be weekly, or as needed to maintain control.

### GAS STORAGE WELLS AND SYSTEMS

Individual injection wells should be treated with a sufficient quantity of UCARCIDETM 45 Antimicrobial to produce a concentration of 556 to 5,556 ppm UCARCIDETM 45 Antimicrobial when diluted by the water present in the formation. Injection should take place before gas is injected (during the summer). Injections should be repeated yearly, or as needed to maintain control.

Individual drips should be treated with a sufficient quantity of UCARCIDETM 45 Antimicrobial to produce a concentration of 222 to 2,222 ppm UCARCIDETM 45 Antimicrobial when diluted by the water present in the drip. Injections should be repeated yearly, or as needed to maintain control.

### HYDROTESTING

Water used to hydrotest pipelines or vessels should contain 110 to 4,444 ppm UCARCIDETM 45 Antimicrobial (0.1 to 3.9 gallons UCARCIDETM 45 Antimicrobial per 1,000 gallons water), depending on water quality and length of time the equipment will remain idle.

### PIPELINE PIGGING AND SCRAPING OPERATIONS

Add UCARCIDETM 45 Antimicrobial to a slug of water immediately following the scraper (ideally this water volume can be kept to a minimum and contained between the scraper and a trailing pig). Sufficient UCARCIDETM 45 Antimicrobial should be added to produce a concentration of 0.11 to 1.1% (0.1 to 1.0 gallon UCARCIDETM 45 Antimicrobial per 100 gallons water), depending on the length of the pipeline and the severity of biofouling.