

#### Optimize your asset integrity with LANXESS Microbial Control

LANXESS is one of the leaders in microbial control for oil & gas applications. Combining our broad portfolio of actives with industry leading test methodologies, we can help optimize antimicrobial treatments for water flood operations. By utilizing an effective microbial control treatment program, you will maximize the quantity and improve the quality of hydrocarbon production in mature, valuable assets while supporting more sustainable operations.

#### Choose the correct biocide at each application point

An optimized biocides program applies the right technologies in the different phases of onshore and offshore water flooding applications to maximize microbial control:



from treating topside, protecting near wellbore, sustaining well treatment and remediating produced water. Each application is different and requires a tailored program to meet a variety of needs. In order to provide a holistic treatment of the water flood, a combination of a fast acting biocide and a long term preservative is recommended.

**Table 1: Microbial control biocide selection guide**

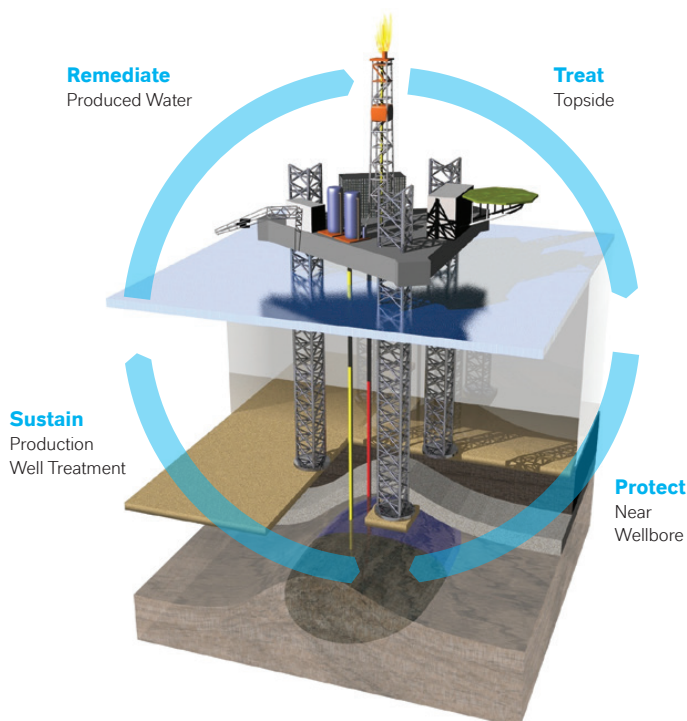
TREAT - Topside (Including produced water reinjected)	If you want to...	... use these biocides
Treatment of the injection water can be anywhere from a produced water treatment facility to on-the-fly application at the injection well.	<ul style="list-style-type: none"> <li>• Eliminate organisms topside to downhole</li> <li>• Eliminate sulfide generation</li> <li>• Improve asset integrity</li> </ul>	<ul style="list-style-type: none"> <li>• Glut</li> <li>• Glut+Quat</li> <li>• Bronopol</li> <li>• THPS</li> </ul>
PROTECT - Near Wellbore		
This biocide treatment is similar to topside treatment – however, protecting near wellbore will help control biofilm for better injectivity rates.	<ul style="list-style-type: none"> <li>• Control biofilm near wellbore</li> <li>• Improve injectivity rates</li> </ul>	<ul style="list-style-type: none"> <li>• Glut</li> <li>• Glut+Quat</li> <li>• DMO</li> <li>• Bronopol</li> <li>• THNM</li> </ul>
SUSTAIN - Production Well Treatment		
Application is typically a shock treatment in which the biocide would be dosed into an offline production well and shut in for a specified duration of time before the well is brought back online again.	<ul style="list-style-type: none"> <li>• Remediate the producing well</li> <li>• Improve productivity</li> <li>• Reduce tubing corrosion</li> <li>• Reduce souring</li> </ul>	<ul style="list-style-type: none"> <li>• Glut</li> <li>• Glut+Quat</li> <li>• DMO</li> <li>• Bronopol</li> <li>• THNM</li> </ul>
REMEDIATE - Produced Water		
This includes the transportation of water from wellhead to treatment facility. Biocides are dosed after the separator and the duration of biocide is generally a batch dose or customized treatment.	<ul style="list-style-type: none"> <li>• Control sulfide generation</li> <li>• Control MIC/Biofilm formation in topside assets</li> </ul>	<ul style="list-style-type: none"> <li>• Glut</li> <li>• THPS</li> <li>• THNM</li> <li>• Glut+Quat</li> <li>• DBNPA</li> <li>• DMO</li> </ul>

**Note:** Different biocide programs can influence several phases. Please check product label for registration restrictions in your region. Check with your Microbial Control representative for more information on biocide programs and registrations.

**Table 2: Waterflood Phase and Biocide Performance**

Example Products*	Treat	Protect	Sustain	Remediate
<b>Glutaraldehyde</b> Aqucar™ GA 50 Aqucar™ GA 24 Aqucar™ GA 25	+++	++	++	++
<b>Glutaraldehyde + Quat</b> Aqucar™ 742 Aqucar™ 714 Aqucar™ 736	+++	++	++	+++
<b>DBNPA</b> Aqucar™ DB 20 Aqucar™ DB 100	+++	—	—	+
<b>Bronopol</b> Aqucar™ BP 10/30/100	+	++	++	—
<b>THNM</b> Aqucar™ TN 25 Aqucar™ TN 50	—	+++	+++	++
<b>DMO</b> Aqucar® A78 Aqucar® A20	—	+++	+++	++

\*Not all products are available in all regions. Check with your Microbial Control representative for more information on product registrations.

**Figure 1: Typical water flooding biocide treatment**

### Expertise in Technology Efficacy

With Customer Application Centers around the world, LANXESS Microbial Control's experts employ state-of-the-art laboratories and testing protocols to address your microbial challenges. We can leverage our experience in the oil and gas industry to assist you and bring value to your operation.

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Energizing Chemistry

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Microbial control/21.09.23/V6