Boosting oilfield output to help close the energy gap

About Indorama
Indorama Ventures is a world-class chemical company and a global integrated leader in PET and other petroleum-related applications in diversified end-use markets. Fueled by its size and scale, we develop innovative products to customer needs and to make great products for society. Headquartered in Bangkok, Thailand, Indorama Ventures (also operating Ike in 37 countries in six continents—Asia, Africa, Americas, Europe & Eurasia.}

Integrated Oxides & Derivatives
Indorama Ventures Oxides & Derivatives is a leading integrated world-class propylene platform that engages in the production of highly integrated propylene, propylene glycol, ethylene oxide, ethylene glycol, and various downstream products. Using technology, competences and processes in-house, Indorama Ventures (IVL) offers a wide range of high-quality petrochemical products to customers around the world.

Surfactants, Co-surfactants and Co-solvents
Indorama Ventures surfactants can be used in Surfactant In Oil Recovery (SIO) or Alkaline-Surfactant-Polymer (ASP) packages, in formulations for specific reservoir end-uses. The choice of surfactant depends on the saturated oil, the reservoir temperature, the reservoir characteristics (Total Dissolved Solids and hardness), and formation geology. Indorama Ventures has the technology to create surfactants to meet these varied treatment needs.
Indorama is a global producer and supplier of surfactants. This broad portfolio includes products designed specifically to meet the challenges of the oilfield and EOR markets. Our success stems from innovative technologies, large scale manufacturing capabilities and a global distribution network.

For the EOR market, Indorama manufactures a variety of products for use as primary surfactants, co-surfactants, and co-solvents using the following technologies:

**Alkylation**
Production of Alkylaryl compounds with intermediate length side-chains. After sulfonation these molecules become thermally stable surfactants that are included in many EOR formulations because of their ability to interact with crude oil.

**Alkoxylation**
Reaction of propylene oxide (PO) and ethylene oxide (EO) with active alcohols to produce nonionic surfactants and intermediates for further reaction.

**Sulfation/Sulfonation/Carboxylation**
Addition of a sulfate/carboxylate group to an alkoxylated molecule or a sulfonate group to an alkylaryl molecule.

### PRIMARY SURFACTANTS
Interact with crude oil
- Key ingredients in producing EOR formulations that give ultra-low IFT
- Hydrophobes selected for ability to interact with crude oils

#### Alkylaryl Sulfonates
Products: XOF-22A, XOF-26A and XOF-30A
- These are high active materials that are converted into surfactants by neutralization.

#### Extended Chain Surfactant
- S designated for ether sulfate and C is for ether carboxylate

### CO-SURFACTANTS
Formulation stability

#### Alkyl and Alkylaryl Ethoxylates
Products: SURFONIC® L Series and SURFONIC® N Series
- Increase formulation tolerance to salt and hardness
- Can participate at the oil/brine interface and lower IFT

### CO-SOLVENTS
Performance tuning

#### Short Chain Alcohol Ethoxylates
Products: SURFONIC® L4 Series
- Broad distribution ofethylene oxide (EO)
- Improved brine compatibility
- Shift interfacial tension (IFT) minima to higher salinity

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**Temperature Stability**

**Total Dissolved Solids**

**TDS Usage Range Extension**

**Primary surfactant + Co-surfactant + Co-solvent**

**Primary surfactant + Co-surfactant**

**Primary surfactant**

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**Global Technology**

**UNITED STATES**
- Regional Office: The Woodlands (Texas)
- Research and Development Site: The Woodlands (Texas)
- Manufacturing Location:
  - Clear Lake (Texas)
  - Chocolate Bayou (Texas)
  - Dayton (Texas)
  - Lake Charles (Louisiana)
  - Port Neches (Texas)

**SOUTH AMERICA**
- Regional Office: Mexico City, Mexico

**APAC**
- Regional Office: Mumbai, India
- Botany, Australia
- Research and Development Site: Brooklyn, Australia
- Manufacturing Location:
  - Ankleshwar, India
  - Botany, Australia