

BIO - FUELS

The Downside of “Green”

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Microbial contamination of Fuels

Diesel/MGO (Marine Gas Oil)

Gasoline

Heating Oil

Addition of BIO-FRACTIONS

EU: 2010 5% bio

2020 10% bio

Target EU: 15% bio!!

BIO-FRACTIONS

DIESEL/GASOIL: BIO-ESTERS

“FAME: FATTY ACID METHYL ESTER”

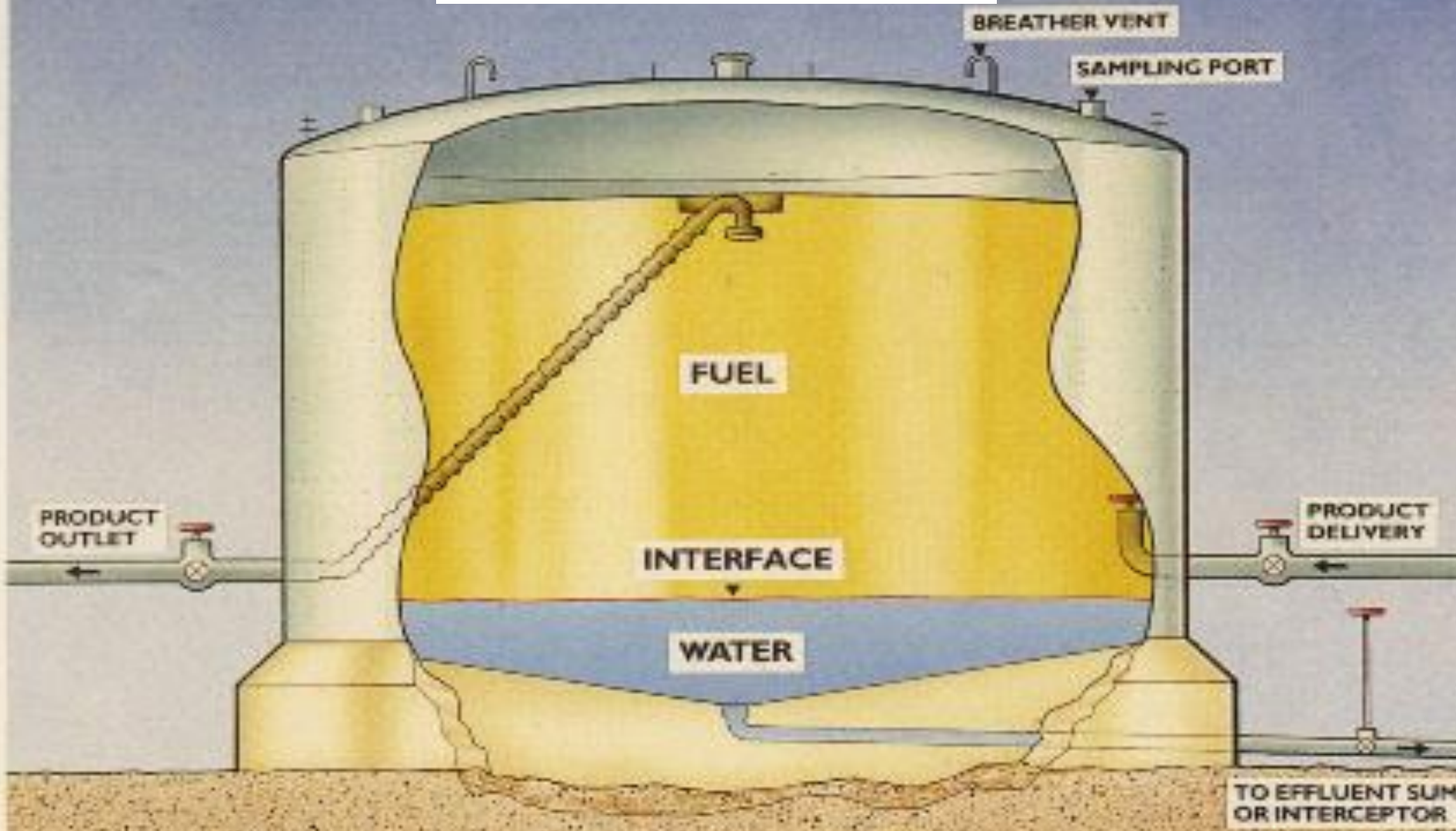
GASOLINE: BIO-ETHANOL

RESULT:

**Proliferation of microorganisms
and the creation of a BIOMASS**

**Potential adverse effects on
engines and the distribution chain:
Blocked filters, tubes, injectors, pumps, corrosion**

TANK OF MINERAL FUEL WITH BOTTOM WATER

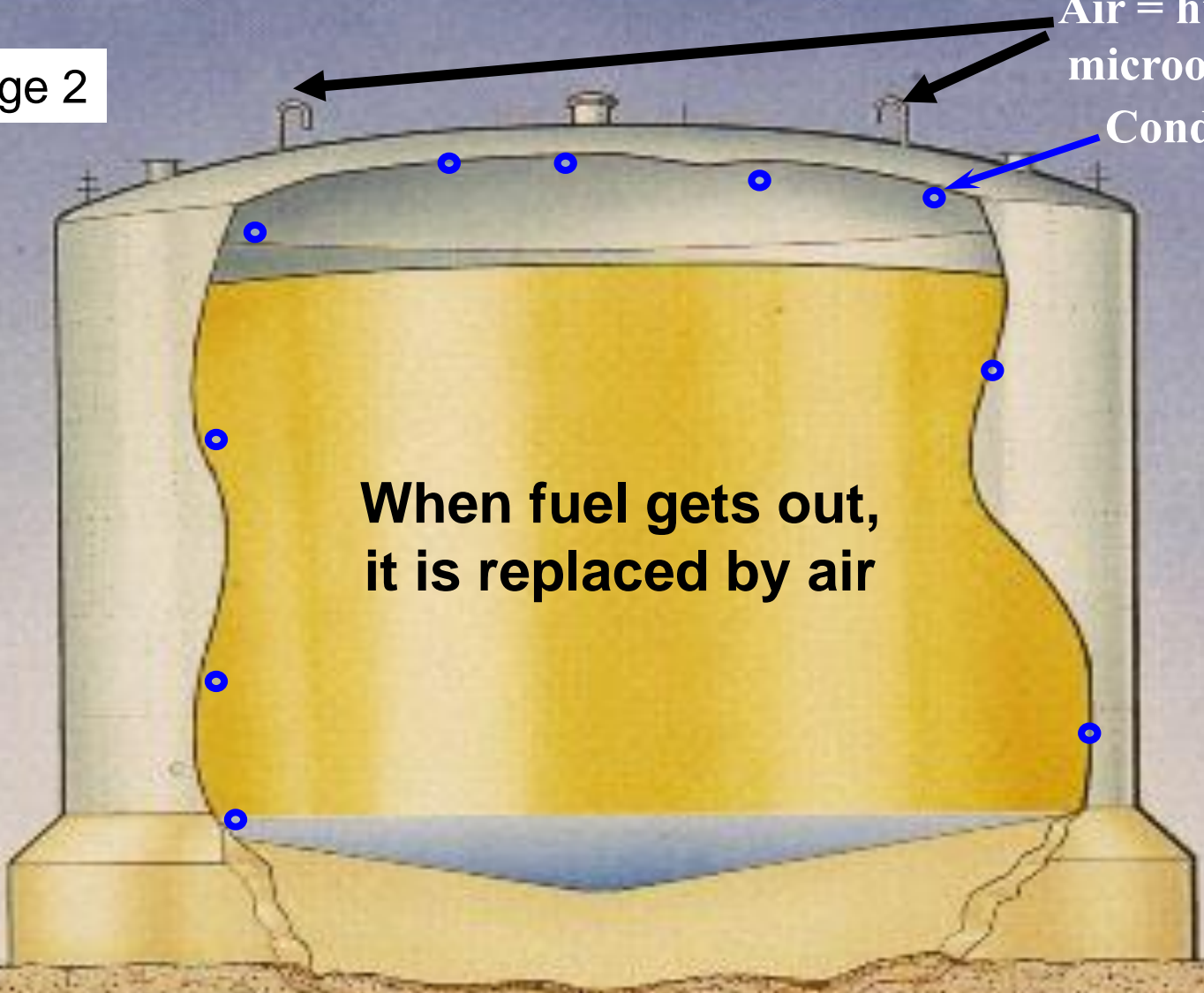


Stage 2

Air = humidity & microorganism !
Condensation

When fuel gets out,
it is replaced by air

ACCUMULATION OF WATER BOTTOM



Fuel from the tank is replaced by air:



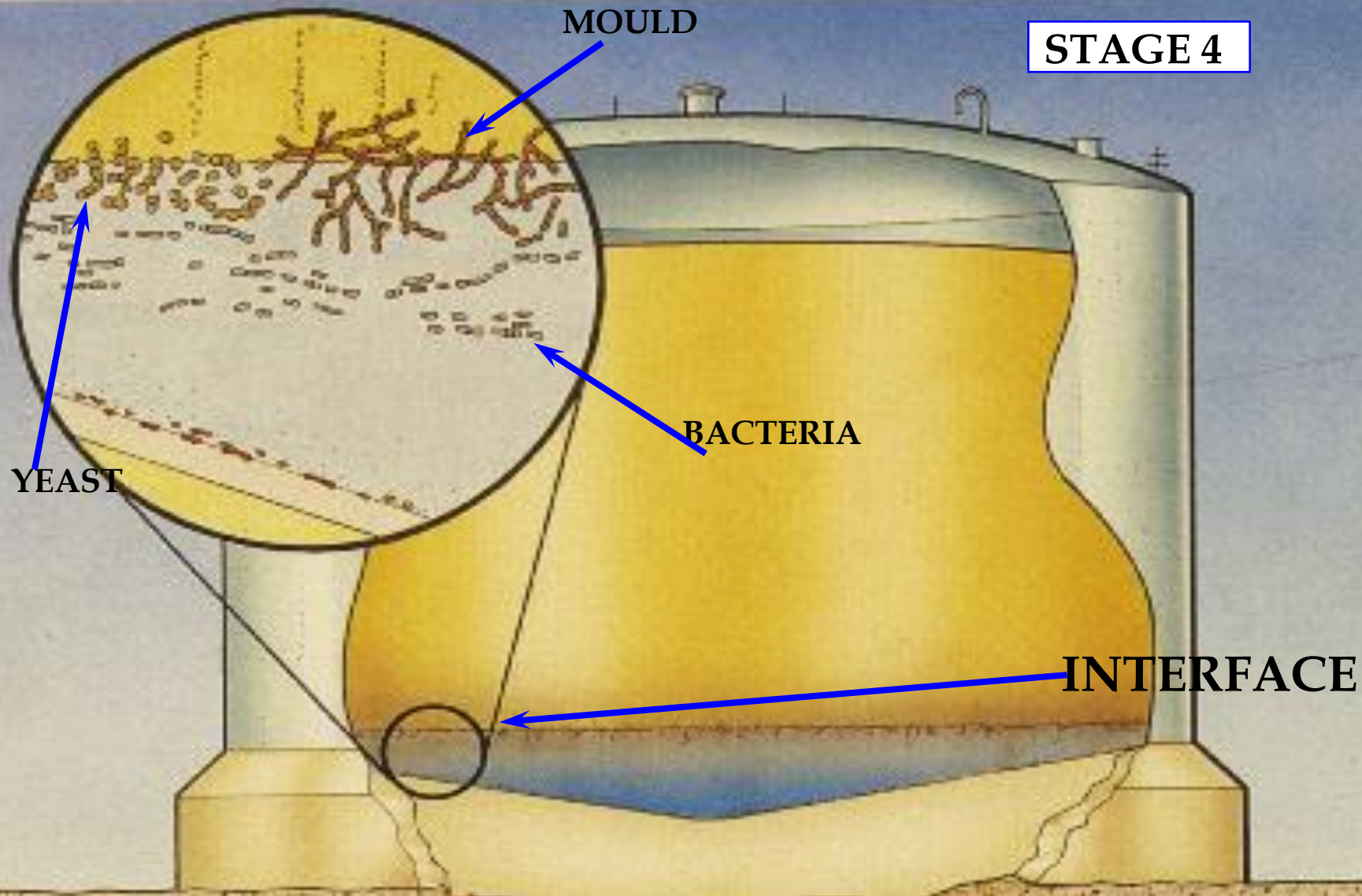
moisture



microorganisms

Moisture

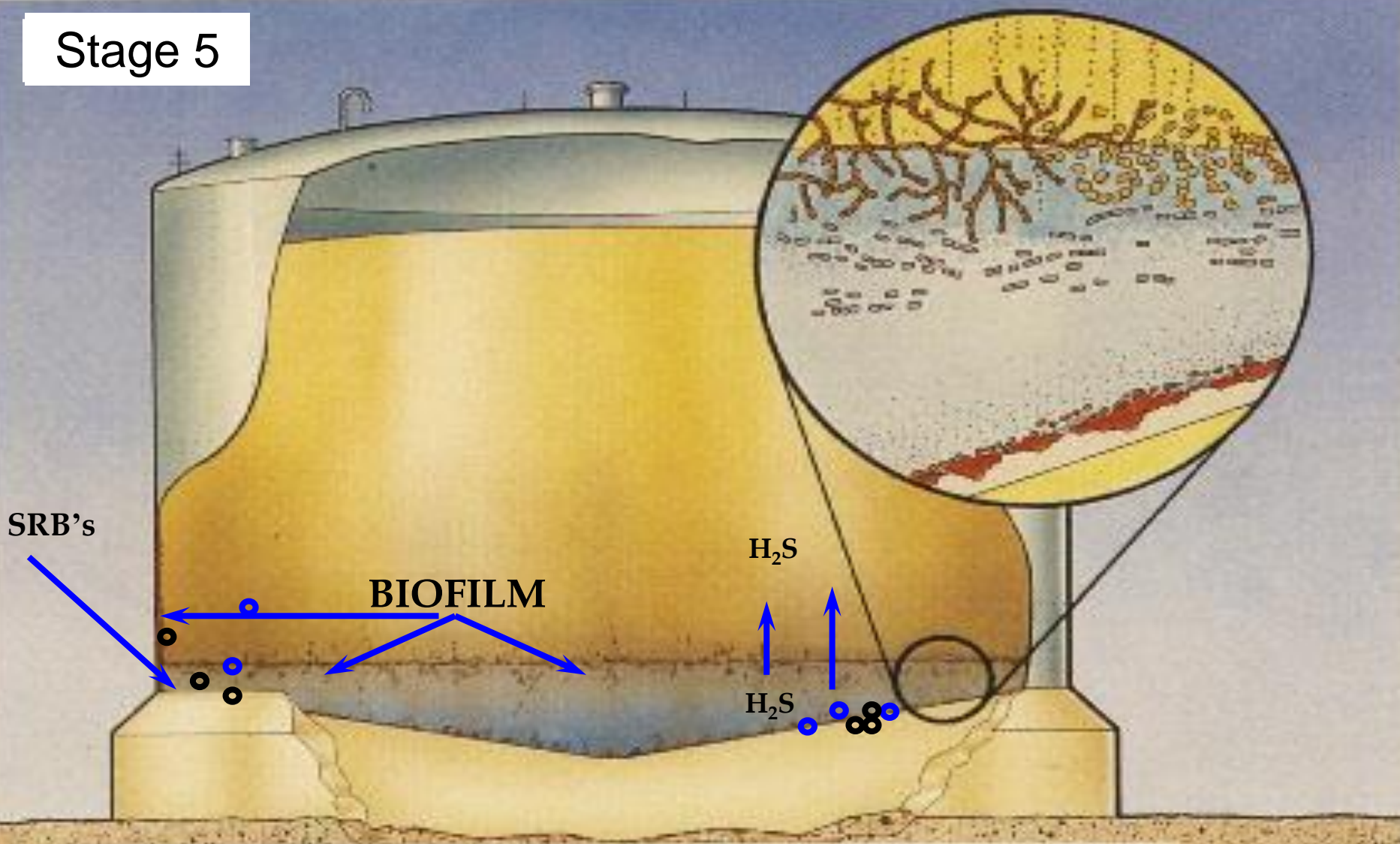
- ➔ condensates in small waterdrops
- ➔ bio-fractions: FAME - absorbs more water than mineral fractions



STAGE 4

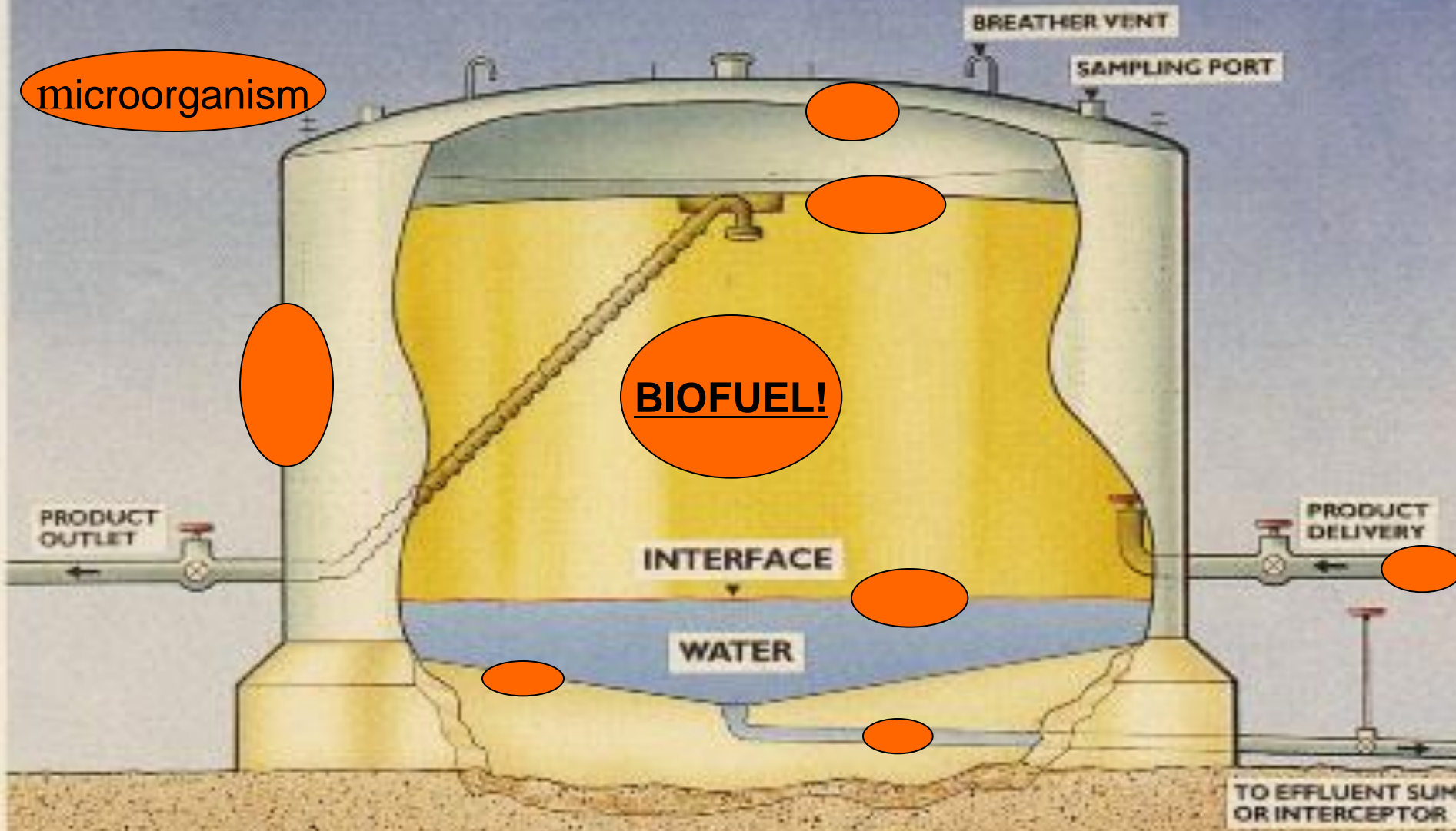
**POPULATION EXPLOSION
WITH RELATED BY-PRODUCTS**

Stage 5



END RESULT: MASSIVE MICROBIOLOGICAL POPULATIONS, CORROSION PRODUCTS AND DETERIORATION OF FUEL QUALITY

Where would I find contamination in the tank ?



microorganism

BIOFUEL!

TO EFFLUENT SUM OR INTERCEPTOR

Propagation of Micro-Organisms: HOW

*** Nutrients * H₂O * T° * pH ***

WHERE


Demarcation line water – fuel
Surface tiny water particles in fuel
Side of fuel particles in sunk water

WHAT

Bacteria*Yeast*Fungi



WYSIWYG

The main image shows the interior of a tank, looking down at the bottom. The floor is covered in a thick layer of dark, wet debris, including what appears to be rust, sludge, and organic matter. The walls of the tank are visible in the background, showing some staining and wear. The lighting is somewhat dim, highlighting the texture and color of the debris.

**Bottom of the tank:
WYSIWYG**

Pitting = Metalcancer

Microorganisms also contain **SULPHO-REDUCING**
and **SULPHO-OXIDISING** organisms

- Sulfur in fuel is transformed in strong acids
- MIC!!! (Microbiological Induced Corrosion)

MIC = Microbiological Induced Corrosion



While microbes feed they secrete organic acids into the fuel.

> Serious damage to fuel injection equipment and tanks

Types of microbial contaminants



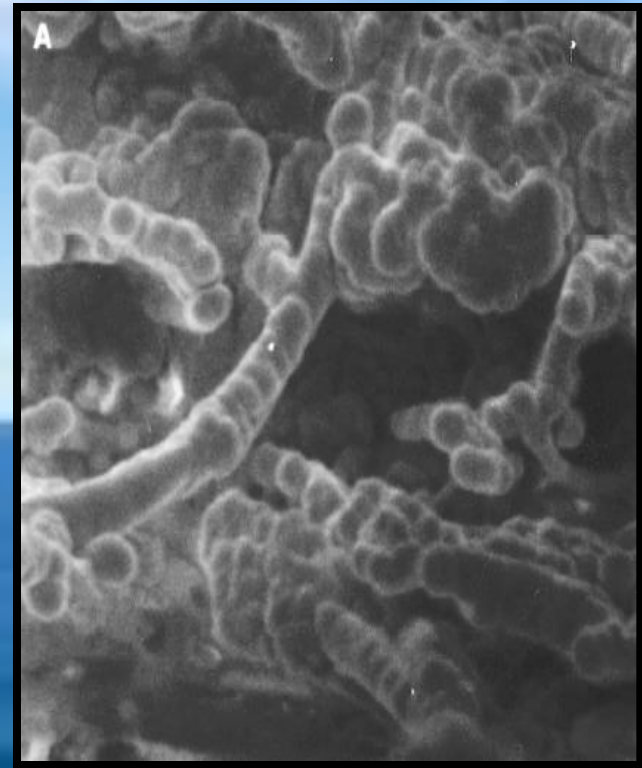
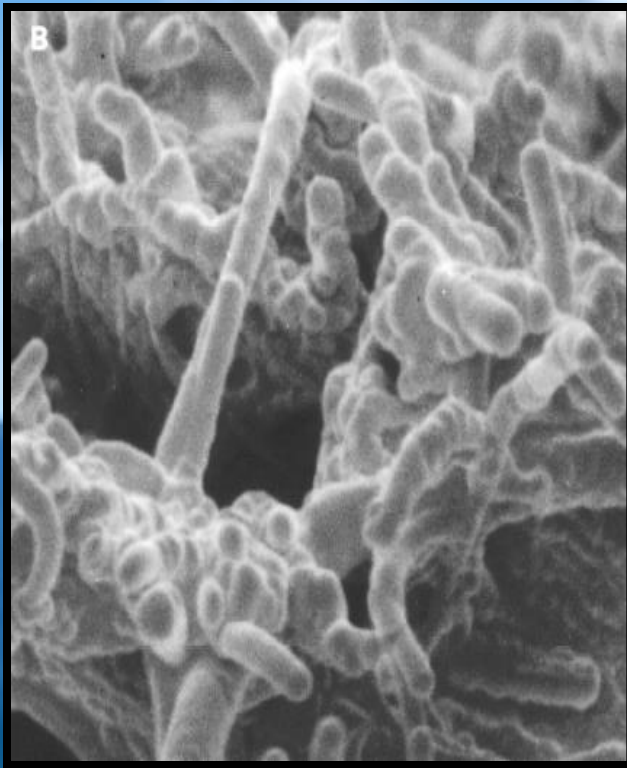
**Bacterial/Fungal
Mix**

**Mainly
Fungal**

**Mainly
Bacterial**

Know your enemy!

Photos of microorganism living in diesel fuel



Conclusion

- The use of “BIO” in FUEL increases the risk of microbial contamination
- The microbiological problem can not be excluded
- Is always and everywhere present
- Fast multiplication

!! ACT PREVENTIVE AND PERMANENT !!

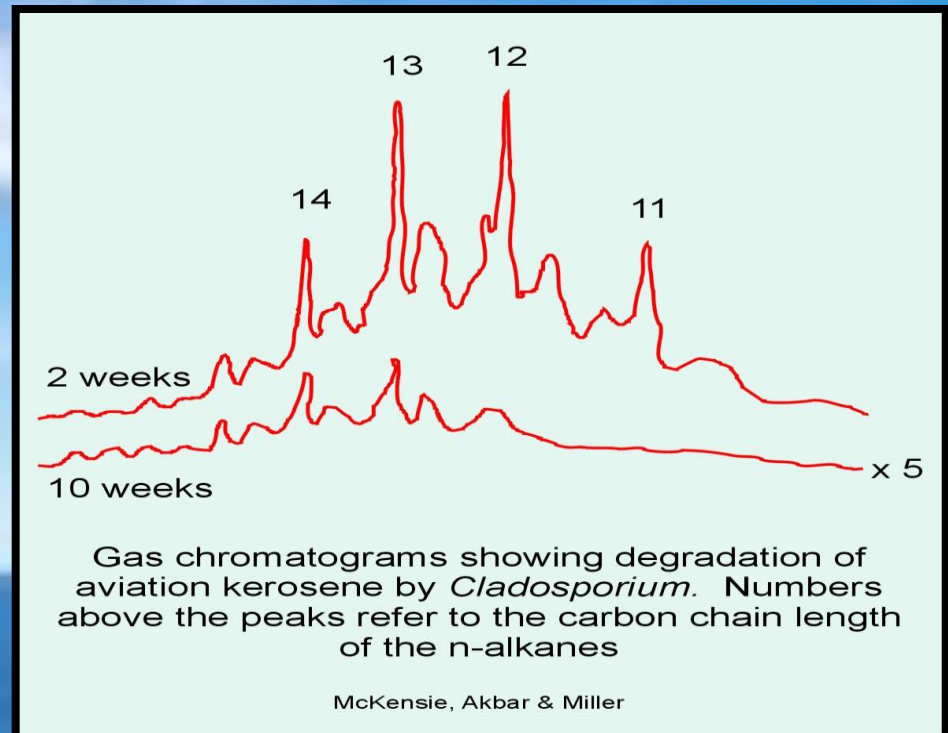
Fuel Degradation

Microbes
break
down the
carbon
chains in
fuel over
time
affecting

- Cold Start
- Combustion
- Emissions
- Engine Efficiency

Surfactant
s promote
wax build-
up.

- Affecting Cloud point
- Viscosity
- Flashpoint



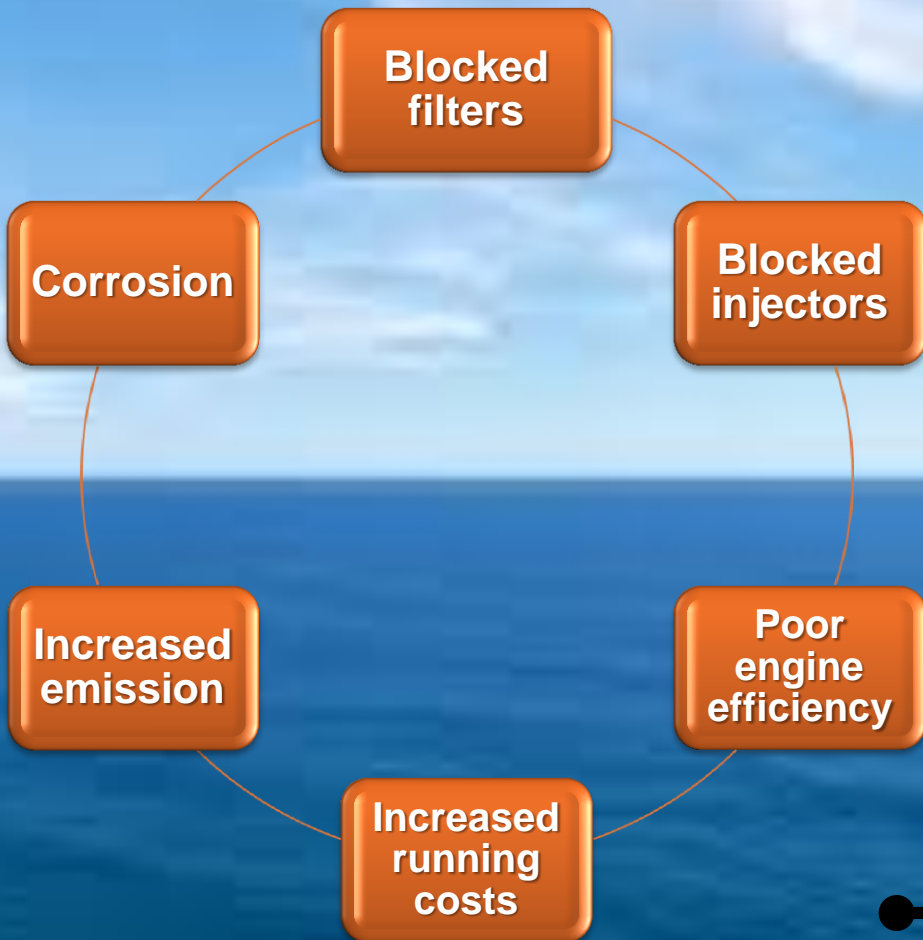
STORAGE LIFE

Under normal storage conditions diesel fuel can be expected to stay in a useable condition for:
12 months or longer at an ambient of 20°C.

6-12 months at an ambient temperature higher than 30°C

Source: BP Document: ADF1403.doc Issued: February 10, 2005 Supercedes: February 7, 2002 BP Australia Limited A.C.N. 004 085 616

The Effects

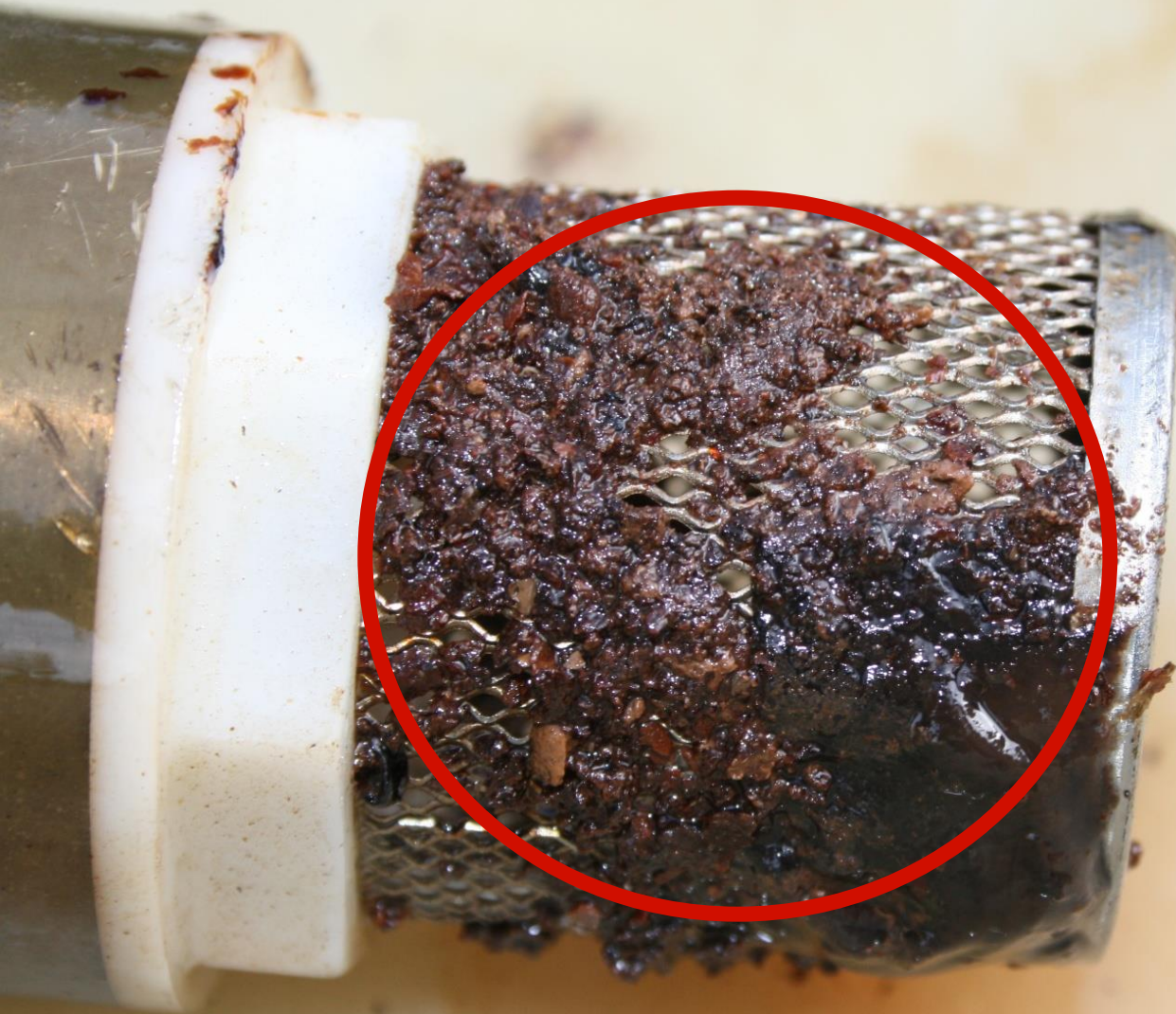


The result: COSTS! ²⁴



Fully blocked filter which was
partially scrapped off to see the
microbiological pollution

Same new filter



Suction line filter / valve of an underground service station tank after 700 litres diesel passed through it!

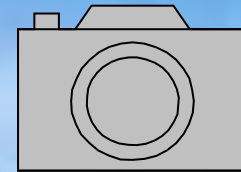


What to do?

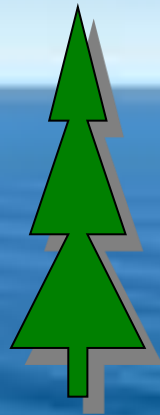
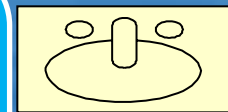
Identify,
act and
control =
3 key steps!



Prevent!



Knowledge!



Purify!

Two Complementary Solutions

- 1. FUEL CONDITIONER**
- 2. WATER SEPARATOR**

Biocide: Curative action

Acticide cmg

Only effective if dispersed evenly

Incubation time: 48 à 72 uur

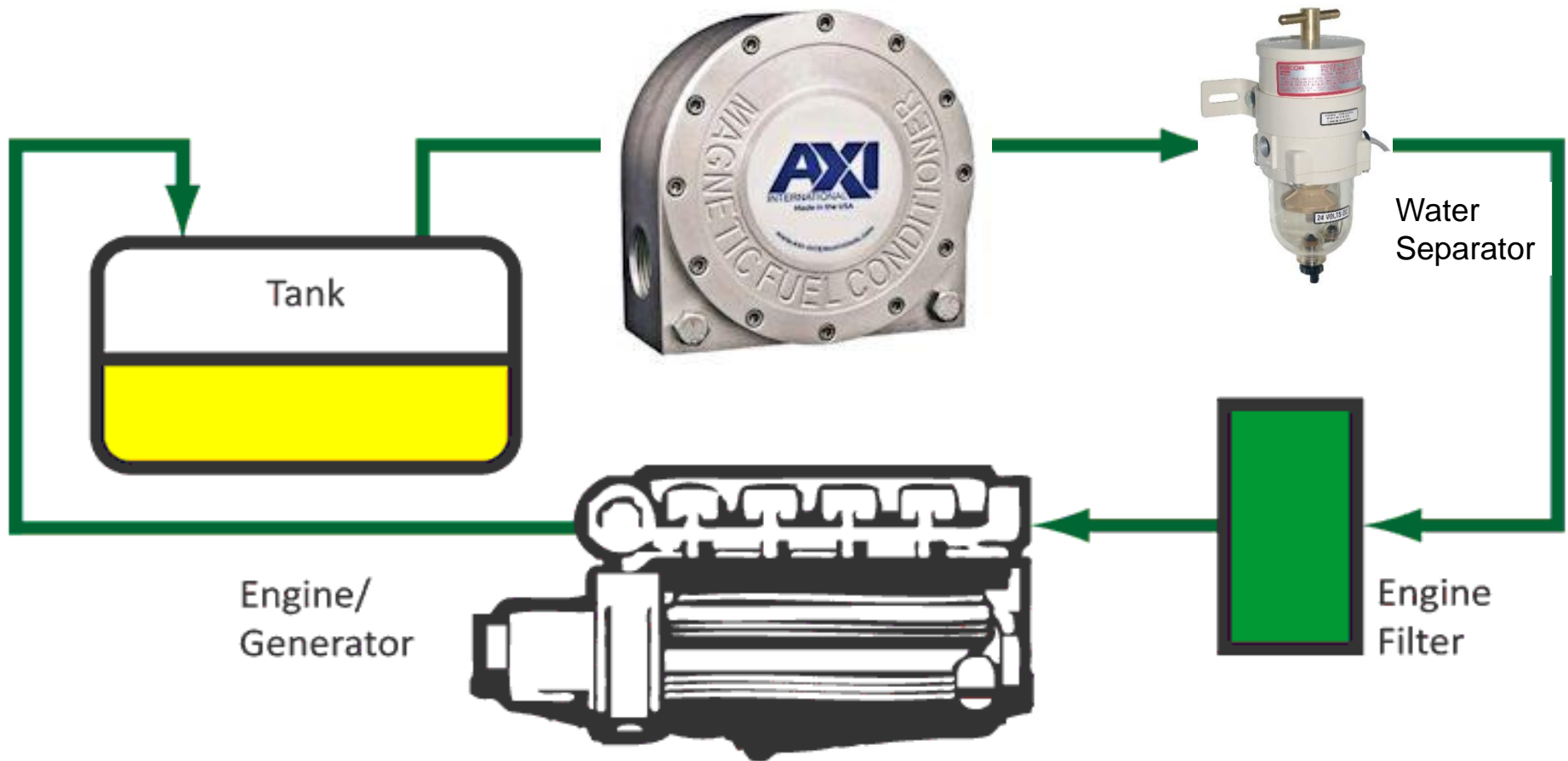
Conditioner



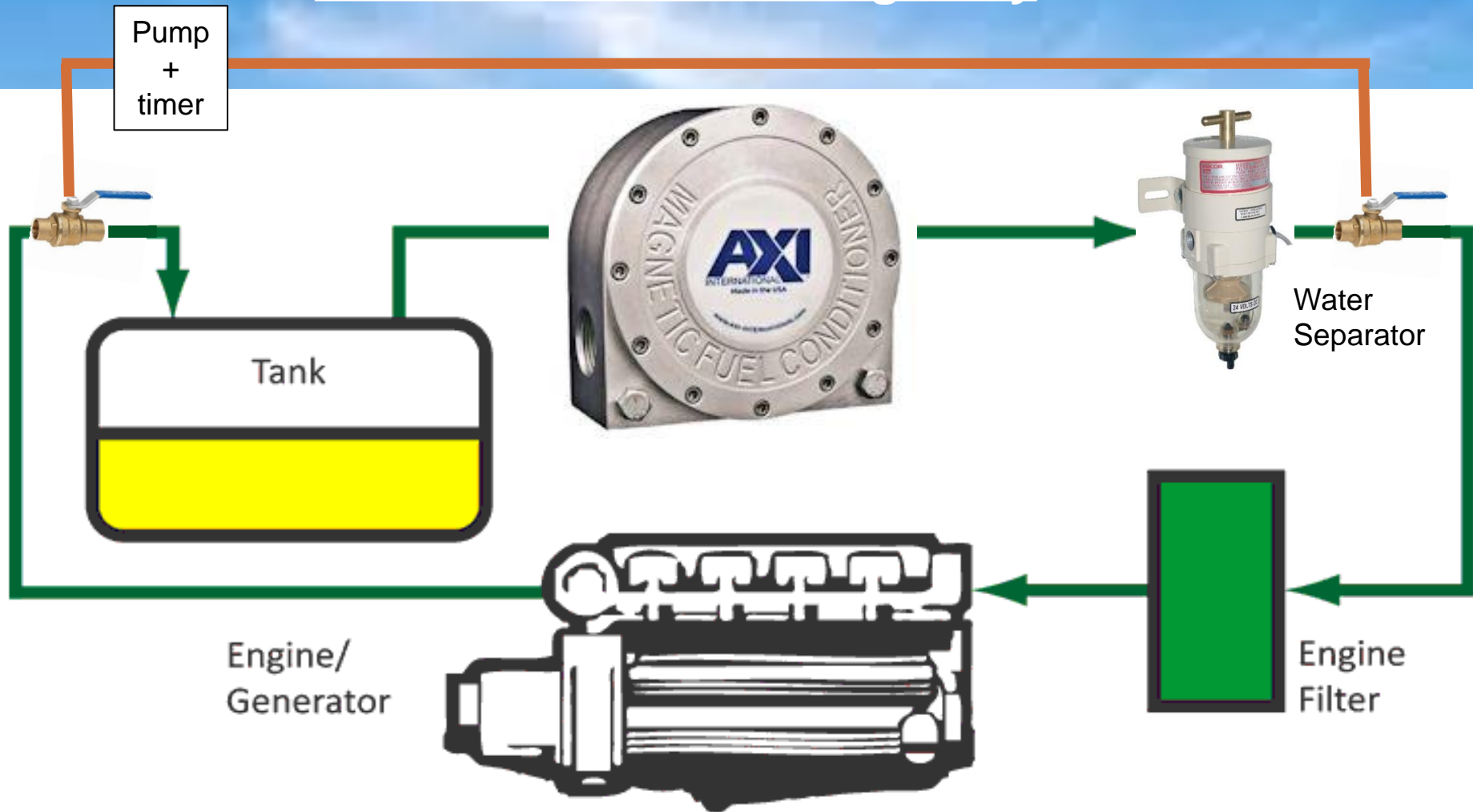
**STRONG PERMANENT MAGNET
DISTURBS THE METABOLISME OF THE MICRO-ORGANISMS**

- **DO NOT MULTIPLY ANYMORE**
- **COLONIES ARE BROKEN DOWN TO INDIVIDUAL CELLS**
- **PASS THROUGH FILTERS AND ARE BURNED**
- **EXTENDS THE LIFETIME OF THE FILTER**
- **STOPS BIOMASS PRODUCTION**
- **PREVENTS BLOCKING OF INJECTORS**
- **PREVENTS PITTING/CORROSION**

Typical Installation



Long storage? Recondition the fuel regularly



What To Do?

- Check STORAGE TANK REGULARY
- DRAIN WATER regularly
- CHECK FUEL STOCK ON CONTAMINATION
 - ➔ *analysis / test kits*
- INSTALL CONDITIONER + WATER SEPARATOR
- Curative: USE COUNTRY / EC APPROVED BIOCIDES – e.g. *ACTICIDE CMG*

Conclusion:



Dealing with “*bio*” in fuel problems?
It’s a tough job! But we deal with it!