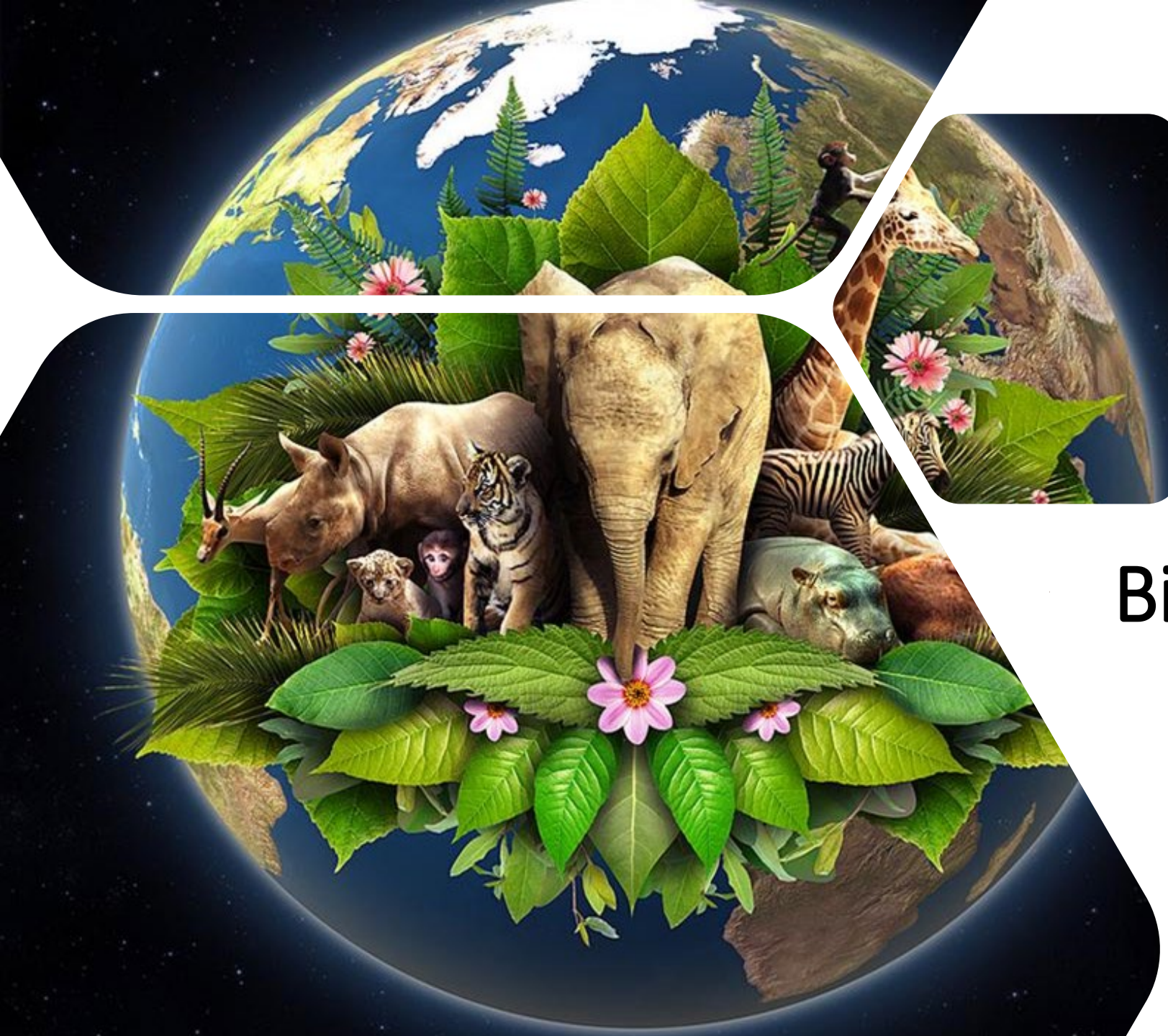


IDEC

Bioremediation For Green Earth

QHSE

IDEC

Bioremediation

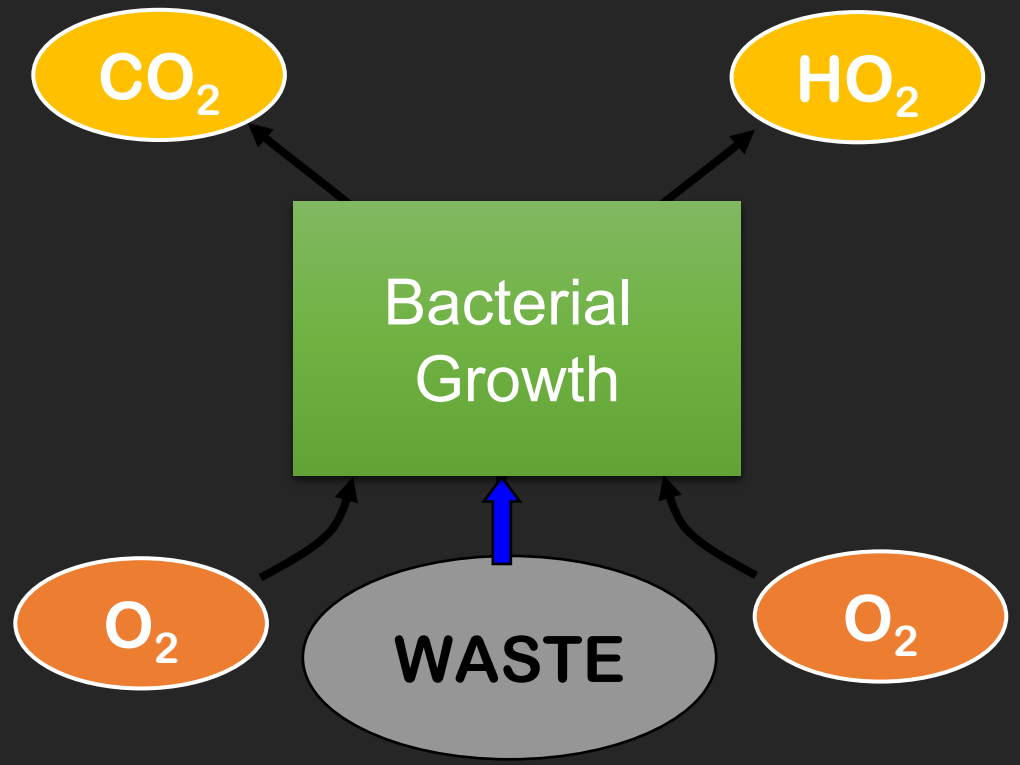
A natural process where adapted micro-organisms degrade hydrocarbon molecular chains to an acceptable level for discharge to the environment.

The objective is to significantly reduce in volume and toxicity the hydrocarbons in drill cuttings to ensure any environmental impact is minimized.

To be effective, it requires oxygen, temperature, moisture and nutrients to be constantly at a desirable levels, which can be difficult in some environments.

Bioremediation

Biodegradation = Conversion of organic material to water, carbon dioxide + biomass by living organisms



Bioremediation = The use of living organisms to treat or clean up hydrocarbon contaminated soil and water

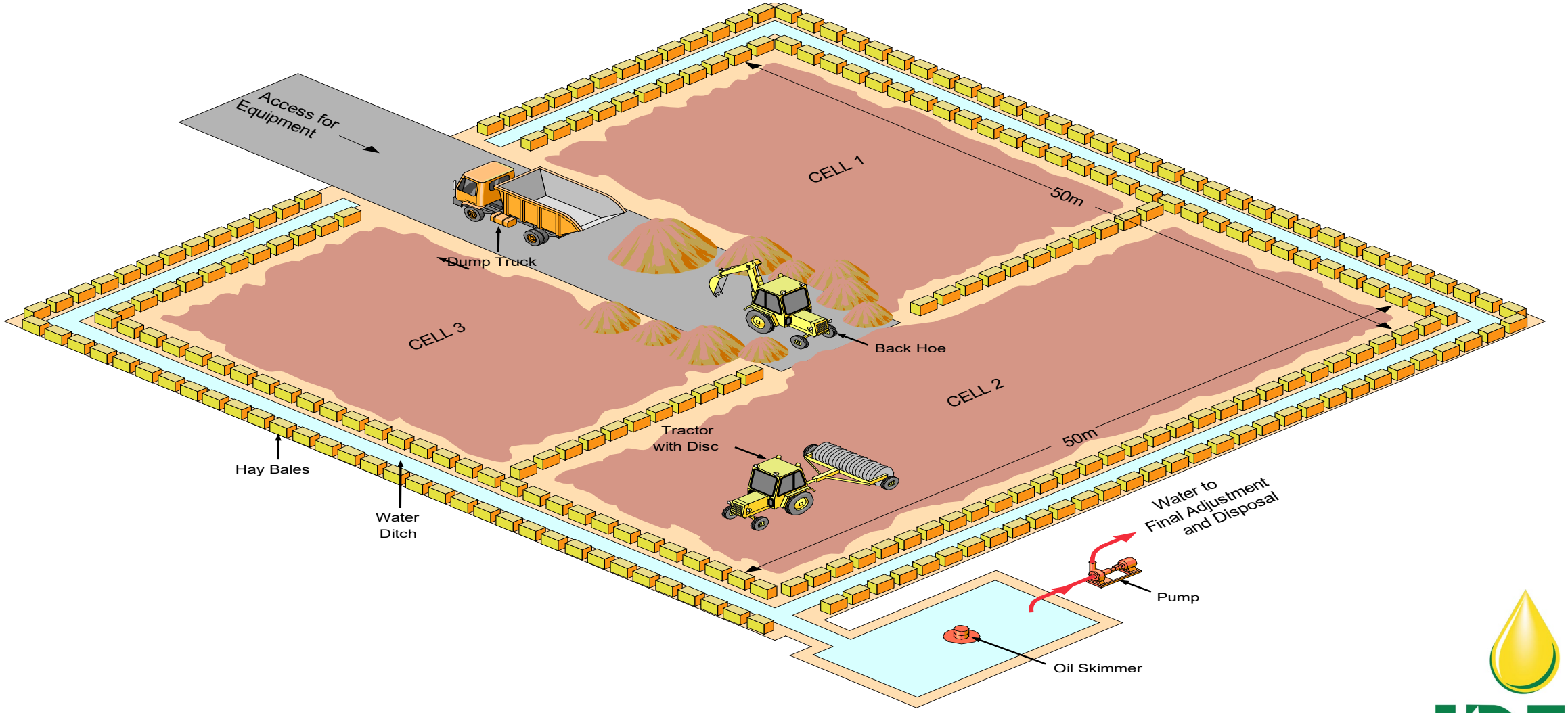
Bioremediation Benefits

- Operationally simple
- Does not need special equipment (farm equipment)
- Cost effective for small and large quantities
- Does not generate a by product, it is recycling the cuttings / soil
- Proven effective natural degradation
- Minimum interference with native ecosystem
- Does not require significant chemical additions

Bioremediation Desirable Conditions

- pH (6 to 8)
- % Moisture (60% to 80% Water Holding Capacity)
- Nutrient content (N,P,K Proportion 100:10:1)
- Dissolved Oxygen > 2 mg/L
- Temperature (50 to 100 ° F)
- SAR < 12 mg/L
- ESP < 15%
- EC < 4 mmho/cm

Bioremediation Land Farming



IDEC Land Farming Site, Kurdstan

Bioremediation Land Farming

- Well established technique
- Removes the contaminant from soils by a combination of volatilization, incorporation of the contaminant into the native soil matrix and degradation
- Volatilization removes a large portion of the lighter hydrocarbons, but the most important mechanism for the treatment of heavier hydrocarbons is degradation
- Limitations include space, climate, and toxicity

Pictures for our Bioremediation operations in Kurdistan

Rolling Over & Preparing The Pit


Rolling Over
& Preparing
The Pit


Rolling Over
& Preparing
The Pit

Rolling Over & Preparing The Pit


Rolling Over
& Preparing
The Pit

Spraying CS-03 (Bio-Remediation Product),

Mixing Fiber Materials

Daily Rolling Over The Pit

Daily Rolling Over The Pit

Bio-remediation operations completed

Bio-remediation operations completed

On site sample testing

Collected Samples

ISO Certified Final Lab Result

مختبر الأمارات الصناعي ش.ذ.م.م
Emirates Industrial Laboratory L.L.C.
Oilfield, Marine & Industrial Consultants
An ISO 9001, ISO 14001 & OHSAS 18001 certified company

DEPARTMENT OF CHEMISTRY
ANALYTICAL REPORT

Client :	EIL Job #	3K -27786
	EIL Report #	08247 – MS
Oren Hydrocarbon	EIL Sample #	C- 08247
P.O.Box : 18159	Date Sample Received	September 09, 2012
Dubai, UAE	Date Analysis Completed	September 09, 2012
Attention : Ms.Leah Espolong	Analyst	358

Job Description: Analysis of sludge sample for Hydrocarbon.
Ref. : LPO No : OREN/EIL/11-12 dated 09/09/2012

TESTS	METHODS	RESULTS, % wt
Total extractable hydrocarbon	Gravimetry	0.42

K. Somanath, Manager

Date of Issue : Sept. 09, 2012

The results shown above related only to the items tested.

Form # 52 Rev. 0 - MS

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Dubai Lab : P.O.Box : 6892, Tel:04-3457480, Fax : 04-3452336
Abu Dhabi : P.O.Box : 26023, Tel:02-5542889, Fax : 02-5542886
Fujairah : P.O.Box : 7761, Tel:09-2229818, Fax : 09-2232009
Website:www.eillab.com,www.eil.ae

دبي :مكتب الرئيسي :ص.ب : ٦٨٩٢ , تليفون : ٠٤-٣٢٧٤٧٨٧ , فاكس :٠٤-٣٢٧٤٧٨٩
دبي : ص.ب : ٦٨٩٢ , تليفون : ٠٤-٣٤٥٧٤٨٠ , فاكس :٠٤-٣٤٥٢٣٣٦
ابوظبي : ص.ب :٢٦٠٢٣ , تليفون : ٠٢-٥٥٤٢٨٨٩ , فاكس: ٠٢-٥٥٤٢٨٨٦
الفجيرة : .ص.ب : ٧٧٦١ , تليفون : ٠٩-٢٢٢٩٨١٨ , فاكس : ٠٩-٢٢٣٢٠٠٩
E-mail:eilab@emirates.net.ae

Key Issues for Successful Project

- Development of a treatment and contingency plan
  - Initial assessment
  - Treatment procedures
  - Monitoring of soil
  - Drainage requirements
  - Control of underground and superficial water
  - Contingency procedures
- Experienced Personnel
- Continuous Monitoring and Reporting :
  - Degradation process, cost, TPH content, personnel and
  - equipment utilization
- Physical and chemical analysis performed by external
- certified laboratory following Standard EPA methods

Thank you