## Aramco Upstream Solution Technathon 2019

## AI Challenge 2: Oil-field Geochemistry Analysis

**Problem:**

Oil companies collect large amount of geochemical data (rock, oil, gas, water) from various fields during exploration and production stages of oil and gas reservoir development. The geochemical data provide important information on the source rock, hydrocarbon migration, trapping and alteration of subsurface fluid paths. During the production phase of the reservoir development geochemistry contains the essential information that helps to maximize and secure the production rate.

**Solution:**

Taking into account the current development in machine learning, it is expected that AI-based algorithm can find hidden patterns in available historical data and predict the geochemical properties in new areas where wells have not yet been drilled.

**Details of the challenge:**

In geochemistry challenge, the participants will be provided a dataset with standard and advanced geochemical measurements on rock and fluids for multiple wells. The participants need to build the algorithms that can:

* Predict geochemical properties in the region between wells based on production data
* Perform feature engineering development to detect novelties and/or anomalies in geochemistry-production data
* Predict and correlate time-lapse geochemical data variation with production and block or field
* Create XYZ (longitude, latitude, depth) maps and visualize time lapse prediction by focusing on the regions with data anomalies

**Evaluation of the performance:**

Participants are expected to deliver a presentation with the solution approach for

1. Predicting seven geochemical properties of gas

The gas dataset consists of the training data (CNS\_gas\_train.csv) and test data (CNS\_gas\_test.csv).

You need to predict GAS\_C1, GAS\_C2, GAS\_C3, GAS\_IC4, GAS\_NC4, GAS\_IC5, GAS\_NC5 and fill respective column values in the CNS\_gas\_test.csv.

For the evaluation you need to send your team name and the file CNS\_gas\_test.csv to [technathon2019@aramcoinnovations.com](mailto:technathon2019@aramcoinnovations.com)

Deadline for sending results - Sunday, December 15, 11:00 am

1. analyzing which of geochemistry properties significantly impacts the production
2. detecting geochemical anomalies
3. predicting time-lapse behavior in geochemical and production data
4. creating a tool to plot geochemical maps and visualize time-lapse behavior and anomalies

**Data:** Public datasets will be provided in the form of the csv files with chemistry measurements, type of fluids or rocks, coordinates, sampling data.