Update on Romgaz due diligence process at December 19, 2019

Romgaz has provided Micromem with a series of questions for which Romgaz has requested responses. We have worked directly with a senior engineer from Chevron to prepare the responses as below - note that the responses from the senior engineer are in his role as the Chevron Project Manager of the Micromem Project; Chevron policy does not, in normal course, endorse partner/vendor products.

1. **ROMGAZ Question**: *Introduction: Chevron's Senior engineer's role and background / the Chevron R&D team and their credentials:*

Response:

a. The Chevron senior engineer is the lead contact at Chevron who has been working with Micromem on the interwell tracer development project since 2018. He is currently a waterflood advisor for Chevron with many years of experience and is the project manager for the Micromem tracer pilot.

He joined Chevron in 1981. Since then, he has held positions of increasing responsibility related to reservoir engineering and petroleum engineering, including management positions, in Houston, Texas, and New Orleans, Louisiana, as well as postings in the Middle east and Africa. He has a Masters in Petroleum Engineering from the University of Houston.

b. The development project with Micromem has had the full participation and support of the Chevron labs whose team and facilities , based in Houston Texas, are regarded as, perhaps, best in the world - the team is able to measure tracers at industry leading levels, allowing them to perform analytical steps beyond just observing communication between injectors and producers at very low concentrations. The key individuals who have participated from Chevron Labs include the Production Chemistry Team Lead, a senior water flood optimization engineer and a senior chemical engineer.

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2. **ROMGAZ Question:** Describe the *working arrangements with Micromem / the time and cost that Chevron devoted to the project over the past 6 years or so / the live testing done on the well site preceded by bench test sampling in the lab:*

CHEVRON/MICROMEM response:

a. The project began in 2011-2012 when Micromem (through its wholly-owned subsidiary, MAST Inc. – hereinafter collectively referred to as Micromem) began working on the technology application. The Joint Development Agreement was executed between Micromem and Chevron in late 2013.

The overall goal of the project has been to develop more precise, more detailed, more accurate and more timely information regarding the characteristics of the water flooded producing oil wells which Chevron owns and operates and where it is tasked with Enhanced Oil Recovery (EOR) of these operating wells.

We have built the project around a proprietary, patented technology, the Aroma Tracer analyzer technology, which has been developed by Entanglement Technologies and for which Micromem has had a license to exploit in the interwell tracer device vertical.

In substance, the process involves the drilling of injector wells around a series of producing wells. Chemical tracers are injected and the interwell tracer device receives real time signals from the tracers which allow the unit to provide very precise measurements of the characteristics of the wells (measuring precision in parts per billion).

b. Micromem has incurred $4.65 million of direct out of pocket costs to subcontractors since inception. Additionally, it estimates that the direct costs associated with its staff who have worked on the project since inception and related out of pocket travel related costs totals an additional $1.5 million.

c. Chevron has made comparable payments to Micromem since the JDA was executed as reimbursement of the costs that it has incurred for subcontractors and suppliers. Additionally, it has incurred additional internal costs relating to its personnel, its lab facilities, the field trials and other management related time (the total spend by Chevron is confidential).

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3. **ROMGAZ Question***: Did the unit work in the field the way it was anticipated to work?*

CHEVRON response:

Yes, it did:

a. We ran a field brine (we used the same pilot project produced water for a field brine) test and this blind test of the tracers used in the field had a better than R2 >.99 on the full range of the designed tracer concentration response.

b. The measurements were possible at lower concentration levels than we normally analyze in our labs, i.e. the lower threshold amounts produced in the field tests using this technology were lower than our nominal detection limits in the Chevron lab.

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4. **ROMGAZ Question:** *What was your experience with the technology?*

CHEVRON response:

a. Chevron encouraged Micromem to use the AROMA system on alcohol tracers.

b. Micromem completed the initial catalog library of alcohol tracers in Q1 2017.

c. The project extended to complete system improvements, a portable prototype unit, and field testing into 2018.

d. Results of previous experiments with Micromem/Entanglement have demonstrated very low practical quantification limits (PQL), where we can detect the alcohol, but also quantify it and interpret as a tracer: < than 50 ppb for medium alcohols and < than 20 ppb for heavy alcohols.

e. In 2019, we started a pilot of the technology in a US. domestic oil field.

f. We successfully completed a blind test of a stimulated well.

g. We continue to test samples retrieved from the field site in our labs for comparison to the test results measured by the technology deployed in the domestic field.

In 2013, when we started, we did not know if alcohol tracers could be accurately measured by the AROMA technology. We determined that they were effective by 2015. Prior to 2015, we did not know if practical interwell tracers using alcohol tracers could be developed; we have since determined that they can be effectively measured in the PPB range which is an excellent result for a field-rated instrument.

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5. **ROMGAZ Question:** *Will you be deploying the technology in future?*

CHEVRON response:

a. Yes, we plan to use this technology as needed.

b. There are multiple applications for this technology which can be adapted to offshore wells, gas fields, fracking applications etc. / Additionally, the tracer device can be adapted to test for FBA tracers, nanotechnology tracers, etc. with the appropriate amount of new product testing and development for these applications.

c. Specific details re Chevron's go forward deployment strategies are confidential.

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6. **ROMGAZ Question**: *Would you recommend / endorse the technology to others for the purpose you used it for?*

CHEVRON response:

a. Yes, we also recommend its use for other potential applications, in particular for use around refineries and environmental testing issues.

b. For refineries, this technology can be adapted to sample for potential chemicals that the refinery is working with to detect potential system upsets or leaks before they become problematic. This should result in higher run time efficiency and may prevent a catastrophic incident. The AROMA unit can detect multiple compounds in an environmental sample and can quickly help determine the best remedial action in the event of spills, seeps or clean-ups.

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7. **ROMGAZ Question:** *How does this technology compare to other technology options?*

CHEVRON response:

We also use conservative tracers for interwell analysis and also use partitioning tracers to help determine S_o when applicable.

Chevron uses various types of analytical equipment to measure the concentration of conservative and partitioning tracers including Gas Chromatography, Liquid Chromatography, and Mass Spectroscopy.

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8. **ROMGAZ Question**: *Does it make sense to deploy the technology at each well head?*

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CHEVRON response:

a. This technology is a key component in building "smart wells" with an IOT focus to ensure full real time diagnostics on each well.

b. The consideration is that the cost of the technology must be such that a return on the investment case is made for adopting the technology. Costs per unit at scale levels of production should result in a suitable economic case to be made for installing a unit at each well head - the cost per unit needs to have a competitive $/boe oil metric .

c. A real component in the value proposition is that the current cost of sampling tests can be reduced significantly by having real time testing done in the field at the wellhead or production header; additionally there is the added benefit of real time diagnostics available versus the lag time in sending samples to an offsite lab .In some countries, it is very difficult or not permitted to transport samples away from the well head to a remote lab location – this problem is eliminated with having the technology on site at the wellhead.

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9. **ROMGAZ Question**: *How advanced is the IOT diagnostic capabilities of the technology or what is the potential IOT technology incorporating this technology?*

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CHEVRON response:

a. This technology fits in well with Chevron's go forward digital efforts.

b. This technology is a key component in building "smart wells" with an IOT focus to ensure full real time diagnostics on each well.

c. Chevron's specific digital strategies and rollouts are confidential.

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10. **ROMGAZ Question:** *What were the field test results?*

CHEVRON response:

a. **In early 2019, we started a tracer study in certain operating wells in California on two injectors using a combination of conservative and partitioning (alcohol) tracers. We utilized the AROMA system onsite to run background samples and the initial set of producer samples. After several months of onsite testing, we reduced the sampling frequency and continued to test the wells using the AROMA system and in the Houston labs. This effort continues.**

b. The results to date , over almost 7 months of testing , indicate that the Aroma tracer technology device is performing as expected and is reporting results that are conforming with the Chevron lab results while reporting at a greater degree of precision (in terms of parts per billion) than is nominally available in the Houston lab results.

c. **Chevron initiated a simulated well tracer breakthrough to confirm the accuracy of the AROMA system. This test was very successful.**

d. The test results have been illustrative for Chevron as the chemical tracers have given diagnostics about the reservoir sweep that Chevron did not have available before the pilot test was conducted.

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11. **ROMGAZ Question:** *Can this technology be adapted for gas wells?*

CHEVRON response:

a. Yes, it can be used everywhere alcohol tracers can be used.

b. There are multiple applications for this technology which can be adapted to offshore wells, gas fields, fracking applications etc. / Additionally, the tracer device can be adapted to test for FBA tracers, nanotechnology tracers, etc. with the appropriate amount of new product testing for these applications.

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