Government of Saskatchewan

Ministry of Energy and Resources Response to Third-Party Engineering Report

Tervita Corporation Waste Processing Facility

WPF 2005-05, LIC#2494

January 28, 2019

1.0 Background

As a result of the January 2, 2018 accidental uncontrolled release of a gaseous substance at the Tervita Unity Waste Processing Facility, the Ministry of Energy Resources (ER) ordered Tervita Corporation on July 24, 2018 (MRO 238/18) to conduct a third-party engineering assessment of its waste processing and disposal system. The objectives of the assessment were to:

- Evaluate the current equipment and its ability to safely receive, process, and dispose of the waste streams Tervita is approved for disposal at the facility;
- Evaluate the adequacy of Tervita's leak detection and response system, including its emergency shutdown procedures and protocols;
- Detail the wastes Tervita has received to date, including those wastes not authorized for disposal pursuant to its licence, and assess how these wastes may interfere with, inhibit or constrain the recoverability or salability of crude oil products stored in the cavern;
- Assess the integrity of the disposal wells and caverns for the continued receipt and storage of wastes authorized pursuant to its licence;
- Evaluate the adequacy of Tervita's emergency response plan and identify actions required to address risks associated with the ongoing operation of the waste processing and disposal system; and
- Identify any other additional actions necessary to ensure the safe and environmentally sound operation of the waste processing and disposal system, from the initial receipt of waste from its source through ground transportation and eventual disposal at the facility.

MRO 238/18 also required Tervita to:

- Prepare a plan acceptable to the Minister to ensure wastes received for disposal at the facility meet the requirements of its licence approval; and
- Prepare a sampling plan and procedure acceptable to the Minister to ensure samples of all materials received for disposal at the facility can be safely collected in the event samples were not taken prior to shipment.

The findings of engineering report as well as ER’s response to its recommendations are summarized below.

2.0 The Report

Tervita Corporation contracted Atlas BA Consulting Inc. (Atlas) to conduct the engineering assessment of the facility. Tervita also contracted with CBW Engineering (CBW) to assess the current integrity of the disposal wells and caverns and their suitability for the continued receipt and storage of wastes authorized pursuant to its current licence.

An initial draft of the report was submitted to ER on October 17, 2018 within the timeframe specified in MRO 238/18. Upon review of the report, ER engineers identified several items that required further review and documentation and provided Tervita until December 19, 2018 to provide this information. The final report was submitted on December 19, 2018. Following a review, ER concluded that the reports fully met the requirements of MRO 238/18. A copy of the reports can be found on Saskatchewan.ca.

3.0 Report Findings and Conclusions

Atlas conducted a detailed analysis of wastes received at the facility from January 1, 2015 to August 1, 2018. The assessment examined the wastes that were received and injected into the storage caverns, materials of construction of the facility equipment and the salability of the oil recovered and whether it could have been affected by any of the materials received. The volume of material received labelled as Class 8 Transportation of Dangerous Goods (TDG) corrosive in that timeframe is less than 0.5 per cent of the total volume of material received at the facility.

CBW concluded, with respect to well integrity, this fluid was in the magnitude of 0.3 per cent - 0.4 per cent of the total fluid injected into this cavern and therefore deemed to have little effect on the current corrosion rate and well life expectancies. The injection of the Class 8 TDG corrosive fluid in such a large cavern would have a negligible influence on brine chemistry, making it undetectable.

Atlas's key findings and conclusions in relation to the current status of the facility are as follows:

- The facility is adequately designed to process the waste streams that the facility was approved to receive in 2006. (Note: This does not include the Class 8 TDG wastes that were being processed at the facility on January 2, 2018. Tervita was not authorized to receive these wastes at its Unity facility.)
- The operational procedures and processes used to receive, handle and dispose of waste material authorized to be disposed at the facility are designed to minimize the possibility of accidental gaseous/odorous releases.

- Multiple safeguards are in place in the form of standard operating procedures (SOPs) for receipt and handling of material, maintenance procedures and ultrasonic testing of piping to determine pipe thickness and timing for replacement of pipe, valves and fittings that are exposed to the slurries that pass through the system.
- The facility automatic leak detection system is well designed and utilizes electronic lower explosive limit (LEL) detection, hydrogen sulfide (H_2S) detection, and liquid level switches. These devices are continuously monitored by the plant programmable logic controller (PLC) which will initiate a plant shutdown if any of these devices record a pre-programmed shutdown level. The H_2S monitor's trigger level is set at 10 parts per million (ppm) which is the 8-hour workplace safety threshold established by Occupational Health and Safety. This is the device that triggered the plant shutdown on the day of the incident, which activated the automatic plant shutdown sequence.
- Tervita's maintenance documents confirm they conduct yearly third-party ultrasound inspections on the facility's piping system and require that each of the tanks are inspected annually for external and internal deficiencies.
- Tervita's SOPs for spill response are intended to protect personnel on-site first and contain the spill within the site boundaries of the facilities. Tervita SOPs that deal with spill response and the Emergency Response Plan (ERP) for their facility have been updated to become compliant with government requirements.
- Based on the volumes of Class 8 TDG corrosive fluids received at the facility, it is unlikely that the material had any impact on the salability of the oil.

4.0 Engineering Recommendations

The Atlas engineering report made three main engineering recommendations related to the future operation of the facility:

1. **Tervita operations to check and maintain the barrier fluid pressure on the slurry pumps between 30-60 psi above the pump seal chamber pressure.** This will ensure the pump operates within the manufacturer's recommended pressure ranges. Tervita has responded to this recommendation and added pressure transmitters to the system to enable its operation staff to monitor barrier fluid pressure. Should pressures deviate from said ranges, the facility will receive a process alarm through the PLC system.

2. **Improve the standards for documentation from waste generators of wastes sent to the Unity facility to ensure proper waste categorization and testing.** When a waste generator contacts the facility regarding a waste stream they need disposed of, all documentation provided by the generator is reviewed by Operations personnel at the facility, and compared against the facility approval acceptance criteria, and the site-specific Waste Characterization Sheet. The Waste Characterization Sheet details the approved substances for the facility, a general description of how the waste could typically be generated, physical description of the waste and any conditions to be noted for the acceptance of the waste. Generator-provided documentation may take the form of laboratory analytical, Safety Data Sheets, historical data, and/or written description of the waste characteristics or the waste generation process. When the waste arrives at the facility, Tervita personnel review the waste documentation to ensure they are consistent with the information previously provided to Tervita by the generator. If all documentation is satisfactory, Tervita will proceed with pre-screening of the waste material with their Waste Unloading Checklist and unloading of the waste to the system.

3. **Add the spill reporting volume guidelines for Saskatchewan to the facility's ERP to ensure Tervita reporting is in line with ER's incident reporting requirements.** Tervita has already implemented this action. Tervita is required to immediately report:
    - Any release containing H_2S in the source of the product greater than 1000 ppm as an incident; and,
    - Any situation where the system shuts down to due to H_2S concentrations greater than 10 ppm as an incident.

In addition to these recommendations, Atlas also found that there is currently no adequate processes or operational procedures in place at the facility to safely collect samples from the volatile offload line prior to disposal in accordance with its licence requirements. The volatile offload line is a sealed system that transports waste directly to the waste caverns. The January 2, 2018 incident involved the failure of a seal within this system when handling unauthorized Class 8 TDG corrosive waste.

5.0 Regulatory Assessment

After reviewing the third-party engineering reports, ER is satisfied that the integrity of the cavern has not been compromised by the unauthorized receipt of Class 8 TDG corrosive fluids at the facility. No additional requirements for cavern maintenance or remedial actions are required at this time beyond those required by the current licence.

The reports confirm ER's assessment that the design of Unity facility together with its operating practices is not compatible with the receipt and disposal of Class 8 TDG wastes. The steps taken by Tervita to prevent these wastes from being disposed at the facility are acceptable to ER.

Tervita's integrity management program, which requires it to conduct yearly inspections of its piping system and tanks, meets ER's regulatory requirements. ER is also satisfied with the report findings related to the screening and sampling procedures at the facility with respect to those wastes that Tervita is authorized to dispose at the facility. Tervita has developed several SOPs and Job Safety Assessments to assist operations with the safe acceptance, offloading and disposal of the waste materials received at Tervita's facilities.

Tervita's current emergency procedures, including those changes implemented since the January 2, 2018 incident, meet regulatory requirements and industry standards. ER is satisfied that no additional measures are required at this time in relation to Tervita's approach to both reporting and responding to incidents at the facility.