

Section 1.0—Introduction and Background

Rockwater Energy Solutions, Inc. (and all its affiliated and subsidiary companies, hereinafter collectively referred to as “Rockwater”) is committed to providing its employees a safe working environment and avoiding injury to our contractors, customers, and neighbors. As part of our overall commitment to safety, Rockwater seeks to prevent acts or conditions that could result in injury and/or illness to any employee, customer, contractor, neighbor, and/or the environment.

In an effort to prevent potentially harmful acts or conditions, Rockwater has developed this *Standard Operating Procedure* (SOP). This SOP will discuss steps to be taken to promote a safe process, as well as a list of potential hazards that should be identified and remediated prior to commencing these activities.

This SOP will be reviewed and revised on an ongoing basis to keep pace with best oilfield practices. This SOP will be a part of the training provided to all affected employees when they begin their employment with Rockwater and any time the plan is changed. This SOP will also be reviewed with an employee if his/her responsibilities change under the plan. A written copy of this plan will remain in the regional Safety Office, and will be available for employee review. The Vice-President of Health Safety and Environment, or his agents, may be contacted by any employee if he/she needs additional information about this SOP.

This SOP has been developed to assist affected employees with the operational steps that may be used to complete the task safely. It must be noted, however, that the experience and background of a trained flowback operator is essential to the success of any project or task. Nothing contained in this SOP is a substitute for each employee’s individual judgment in any given situation. In the event that any employee believes that any task outlined in any SOP cannot be completed safely, then that employee should immediately halt the performance of such task and notify their direct supervisor.

In addition to this SOP, the policies and procedures of each operating company will be strictly observed by Rockwater personnel.

Section 2.0—Background and Process Steps, Frac Tank Operations

A frac tank is an industry term that refers to mobile, temporary water storage vessels. These tanks are typically constructed of steel and have a capacity of 500 barrels of liquid. This SOP for *Frac Tank Operations* has been broken down into three basic categories:

- Tank mobilization
- Daily operation
- Tank cleanup/demobilization

Tank Mobilization

The frac tanks are typically owned by a third party contractor and leased or rented to either Rockwater or the operating company for use at the job site. As such, the tank owner or rental company will deliver the tanks, and they will be staged as per the instructions of the operating company.

At a minimum, the following steps should be performed when tanks are mobilized to the jobsite:

- Multiple tanks should be connected for equalization using the provided hardware and in accordance with the manufacturer's specifications. Although this task is typically performed by a third party, the tanks and connections should then be inspected by Rockwater personnel prior to commencement of onsite activities.
 - Manifold tanks for equalization of fluid levels, as per the direction of the operating company.
 - 4" diameter hoses of sufficient construction and pressure rating should be used for tank manifolding.
 - Equalize higher port to lower port whenever possible to avoid sand carry over.
 - In the event that the frac tanks are equipped with integral manifolds, use the provided hardware for all connections.
- Confirm integrity of all valves
 - Visually inspect butterfly valves prior to filling tank
 - 4" diameter threaded caps should be placed in all unused ports
- Check for leaks
 - When tank is first filled, make routine visual inspections for leaks
- Inspect rails and hatches
 - When present, ensure that hand rails are raised into upright position around all tank walkways
 - Inspect tank prior to use for toe boards and fall protection devices
- Inspect tank containment (typically installed by third party contractor)
 - Containment should be installed around tank battery as per specifications of operating company
 - Confirm that containment is free of leaks, tears, folds, or any other defect which could result in an environmental impact
- Inspect bonding and grounding (typically installed by third party contractor)
 - All tanks must be bonded and grounded
 - Highlight/mark ground stakes and bonding wires to minimize trip hazards
 - Secure exposed ends of grounding rods with blunt covers
 - When all tanks are grounded, conduct electrical continuity test to confirm grounding

Daily Tank Operations

- Measure tank fluid levels as per operating company requirements
 - Proper measurement technique includes the following:
 - Measure from same spot to ensure consistency
 - Use manufacturer's capacity chart for barrel measurements. Chart may be on side of tank or in Rockwater binder/job pack.
 - Be wary of condensate fumes and gas around tanks
 - Ensure that all ignition sources are secured and prohibited from tank area
 - Always use explosion-proof or intrinsically safe flashlights
 - Ensure personnel are grounded before ascending steps; grasp metal with bare hand

- Be aware that the presence of sand will negatively affect fluid measurements; ensure that measuring sticks penetrate solid debris and contact base of tank
- As required by operating company, use gauging paste to determine quantities of liquid hydrocarbons floating on water inside tank; record data as needed

Cleaning and Demobilization (typically performed by third party contractor)

- Remove any saleable condensate/oil from frac tank via vacuum extraction
- Ensure that remaining fluids are removed from the tank for ultimate disposition
- Any residual solids should then be removed via vacuum extraction
- Ensure that all hatches/valves are closed prior to frac tank demobilization
- Ensure that there are no loose debris/objects on frac tank trailer prior to demobilization
- Inspect tires and connection at truck prior to demobilization

Section 3.0—Potential Hazards

Any time that flowback operations are in progress, the following potential hazards must be considered and mitigated:

- Latent natural gas
- Wind direction
- Ignition sources within 100 feet of the wellhead and/or frac tanks
- Pressure
- Line of fire/body placement/grease valve placement
- Hydrogen Sulfide (H₂S)
- Stored energy
- Overhead work or suspended loads

Section 4.0—Other Safety Items

In addition to the above potential hazards, the following items should be discussed and implemented during the pre-project tailgate safety meeting and JSA process, prior to commencement of onsite activities:

- All possible flammable gas or liquid sources are to be identified and controlled or remediated.
- All possible ignition sources are to be identified and controlled or remediated.
- Environmental controls;
 - Erosion and Sedimentation (E&S) controls in place?
 - E&S controls appropriately located?
 - E&S controls adequate for situation?
- Ensure that safety equipment and personal protective equipment (PPE) is onsite and available and properly utilized when necessary or otherwise required pursuant to this SOP or the operating company's policies and procedures.
- Access signs or tape (as required) are available.
- Non-sparking tools for potential leaks are available.
- Potential communication issues should be identified and resolved;
 - Among Rockwater employees.
 - Between Rockwater and other contractors onsite.
- Strategies for limiting site access should be discussed and implemented, if possible.

- Rally points for and routes for emergency evacuations should be identified.
 - Identify a secondary rally point, along with a secondary evacuation route.
- Grounding and bonding of tanks and equipment must be completed.
- Appropriate actions on/around tanks must be discussed.
- Spill/leak cleanup procedures must be reviewed.
- Containment requirements must be reviewed.
- Reporting requirements and procedures must be reviewed.
- Discuss that the integrity of lines is not guaranteed, and can be negatively impacted by
 - Pressure;
 - Vibration;
 - Torque; or
 - Binds.
- Record-keeping and project log requirements should be reviewed.
- Water for pressure testing, purging requirements and processes must be identified.
- A minimum of two workers must be present onsite at all times.

In addition to the above mentioned safety items, the following should also be considered when working on sites with frac tanks:

- Always use a personal air monitoring meter when mounting tanks
- Tank “sight glass” tubes may be used to measure fluid levels
- Always use three points of contact when elevated
- Do not climb on top of frac tank, or exit any elevated secured work area, without proper fall protection equipment
- Inspect gas buster inlets prior to each rig up; these connections are prone to washing out due to high fluid velocity and the presence of abrasive solids
- Establish a safety zone of 30’ around frac tanks; use cones, caution tape, or other barriers
- All vacuum truck drivers working at the frac tanks must be notified of the dangers inherent at flowback operations; ensure that drivers review and sign JSA each day

SOP In-Field Checklist, Frac Tank Operations

Tank Mobilization (typically done by third party)

- Ensure multiple tanks are connected for equalization; inspect prior to project start
- Use 4" diameter hoses for tank manifolding
- Equalize higher port to lower port to avoid sand carry over
- Confirm integrity of all valves
- Visually inspect butterfly valves prior to filling tank; insert 4" diameter caps into unused ports
- Check for leaks
- Inspect rails and hatches; ensure hand rails are raised
- Inspect tank prior to use for toe boards and fall protection devices
- Inspect tank containment; confirm that containment is free of leaks/tears/folds/defects
- Inspect bonding and grounding (typically installed by third party contractor)
- When all tanks are grounded, conduct electrical continuity test to confirm grounding

Daily Tank Operations

- Measure tank fluid levels as per operating company requirements
 - Measure from same spot to ensure consistency
 - Use mfg.'s capacity chart for barrel measurements; may be on side of tank or in Rockwater binder/job pack.
- Be wary of condensate fumes and gas around tanks
- Ensure that all ignition sources are secured and prohibited from tank area
- Always use explosion-proof or intrinsically safe flashlights
- Ensure personnel are grounded before ascending steps; grasp metal with bare hand
- Ensure measuring sticks penetrate solid debris and contact base of tank
- Use gauging paste as per operating company request to determine hydrocarbon levels; record data as needed

Cleaning and Demobilization (typically performed by third party contractor)

- Remove any saleable condensate/oil from frac tank via vacuum extraction
- Ensure that remaining fluids are removed from the tank for ultimate disposition
- Any residual solids should then be removed via vacuum extraction
- Ensure that all hatches/valves are closed prior to frac tank demobilization
- Ensure that there are no loose debris/objects on frac tank trailer prior to demobilization
- Inspect tires and connection at truck prior to demobilization

In addition to the above mentioned safety items, the following should also be considered when working on sites with frac tanks:

- Always use a personal air monitoring meter when mounting tanks
- Tank "sight glass" tubes may be used to measure fluid levels
- Always use three points of contact when elevated
- Do not climb on top of frac tank, or exit any elevated secured work area, without proper fall protection equipment
- Inspect gas buster inlets prior to each rig up
- Establish a safety zone of 30' around frac tanks; use cones, caution tape, or other barriers
- Review JSA with vacuum truck drivers daily