

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, Line Heater Operations

A line heater is a trailer mounted piece of equipment used on flowback sites to warm inherently cold fluids in order to prevent ice buildup in lines and equipment at the well site. A line heater is typically rigged into the gas mainline after the sand separator and before all other flowback appurtenances. Line heaters are typically used for newly producing wells, in predominantly dry gas areas, and in condensate producing areas.

This SOP will focus on four basic tasks associated with line heater usage:

- Mobilization/rig up
- Lighting the line heater
- Line Heater Operation
- Rig down/demobilization

Mobilization/Rig Up steps

During this phase of the project, the following operational steps must be followed:

- Since the line heater is a trailer mounted piece of equipment, it must be delivered to the jobsite by an appropriately sized truck operated by a Commercial Driver's License (CDL) holder.
- Prior to departing the Rockwater facility, all operating pieces of the line heater must be inspected.
- The CDL driver will then conduct the Daily Vehicle Inspection Report (DVIR) on the truck and the trailer. Upon the successful completion of the DVIR, the equipment will then be delivered to the jobsite.
 - The line heater should never be transported while containing fluids; the driver must inspect the unit and ensure that it is empty prior to leaving the Rockwater facility.
- Upon arrival at the jobsite, the line heater should be staged at its designated location. The line heater should be in line at least 75 feet away from the main diffuser tank (where flow of well will commence) and at least 75 feet away from any ignition source.
- Once staged, the line heater trailer should be secured with wheel chocks.
- Fill line heater vessel with fresh water or glycol (as required by operating company) to a maximum of 12" from the top of the vessel.
 - It is imperative that the line heater coils are completely covered with fluid.
- The line heater should then be connected to the mainstream line with high pressure hammer union piping and a manifold valve system (as needed).

Lighting the Line Heater

During this stage of the project, the following operational steps must be followed:

- Pressure up line heater unit using the following steps:
 - Open well to choke manifold
 - Open choke manifold to tank
 - Slowly open three valve series in mainstream line so that line heater receives gas
 - Once line heater has gas, close three valve series to isolate heater
- Open valve allowing gas supply line to burner
 - Ensure that all ignition sources within 75 feet are secured
- Confirm gas is present and close supply line valve
- Allow for accumulated gas in ignition chamber to dissipate
 - Confirm absence of gas with monitoring equipment
- Engage auto ignition switch and confirm that burner is lit.
 - In the event that an auto ignition switch is not present, wrap a dry, clean cloth at the end of an igniting rod (3' long minimum) and light the cloth, then slowly feed the flaming cloth into the ignition chamber.
 - When the igniting rod is in the supply chamber, slowly crack open the supply valve until the burner ignites and remains lit. The supply valve should never be opened more than ¼ revolution of the ball valve.
- Once burner is lit, remove ignition source from chamber and close the ignition chamber cap.
- If ignition rod was used, ensure that flame is out and rod is doused and allowed to cool.

Line Heater Operation

During this stage of the project, the following operational steps must be followed:

- Check and maintain supply pressure to burner; ensure that pressure remains between 20-40 psi to maintain optimal air/gas ratio.
- Set thermostat on line heater to desired operating temperature, as per client requirement and/or well characteristics.
 - Operating temperature will typically be between 110-150 deg F.
- Routinely check supply and pressure of line heater unit to maintain desired operating parameters, as specified by client or well characteristics.
- Record unit temperature and pressure as per client requirements, or a minimum of once per hour.
- In the event that a choke manifold is in line after (i.e., downstream) of the line heater, the line heater choke must be set at a minimum of two sizes larger than the downstream manifold.
- If no choke manifold is present downstream of the line heater, then the line heater choke must be set as per client requirements.

Rig Down/Demobilization

During this stage of the project, the following operational steps must be followed:

- Close supply valve to burner and ensure that flame on burner has been extinguished
- Ensure that all mainstream flow lines are depressurized and bled off
- Break down hammer union iron from line heater unit
- Ensure that fluid has time to cool and arrange for removal of fluids via vacuum extraction from the line heater vessel.
 - It is typically the responsibility of the operating company to contract this service and arrange for ultimate disposition of liquids removed from the vessel.
- Visually inspect vessel and ensure that all fluids have been removed
- Connect trailer to truck and remove chocks.
- CDL driver must perform DVIR on truck and trailer
- Return equipment trailer to Rockwater facility
- Upon arrival at Rockwater facility, inspect all operating pieces of equipment prior to storage or delivery to next jobsite

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.

SOP In-Field Checklist—Line Heater Operations

Mobilization/Rig Up steps

- Equipment must be delivered to jobsite by a CDL operator
- Prior to leaving, all operating pieces of the line heater must be inspected
- The CDL driver will conduct DVIR on truck/trailer, then deliver empty equipment to site
- Stage line heater at least 75' away from main diffuser tank and any ignition sources
- Once staged, the line heater trailer should be secured with wheel chocks
- Fill line heater vessel with fresh water/glycol to max 12" from the top of the vessel
- Connect line heater to mainstream line with high pressure hammer union piping and manifold valve system

Lighting the Line Heater

- Pressure up line heater unit using the following steps:
 - Open well to choke manifold
 - Open choke manifold to tank
 - Slowly open three valve series in mainstream line so that line heater receives gas
 - Once line heater has gas, close three valve series to isolate heater
- Open valve allowing gas supply line to burner, secure all ignition sources within 75'
- Confirm gas is present and close supply line valve
- Allow for accumulated gas in ignition chamber to dissipate
- Engage auto ignition switch and confirm that burner is lit
 - If auto ignition switch is not present, light igniter manually (as described above)
- Once burner is lit, remove ignition source from chamber and close ignition chamber cap

Line Heater Operation

- Check/maintain supply pressure to burner; ensure pressure remains between 20-40 psi
- Set heater thermostat to desired operating temperature, typically between 110-150 deg F
- Routinely check supply/pressure of line heater unit to maintain operating parameters
- Record unit temp/pressure as per client requirements (minimum once per hour)
- If choke manifold is downstream of line heater, line heater choke must be set (min) two sizes larger than downstream choke manifold
- If no choke manifold is present downstream, set line heater choke as per client requirements

Rig Down/Demobilization

- Close supply valve to burner, ensure flame on burner is out
- Ensure all mainstream flow lines are depressurized and bled off
- Break down hammer union iron from line heater unit
- Ensure fluid has cooled; arrange for removal of fluids with operating company
- Visually inspect vessel and ensure that all fluids have been removed
- Connect trailer to truck and remove chocks.
- CDL driver must perform DVIR on truck and trailer
- Return equipment trailer to Rockwater facility, inspect all equipment