

Procedure for Performing SPL Removal at the Lamagna Cheese Site PADEP Facility ID #02-27697; USTIF Claim #2013-0066(S)

PURPOSE: The purpose of this document is to outline the procedure for performing separate phase liquid (SPL) removal events at the Lamagna Cheese Site. The goal of this procedure is to maximize the amount of SPL, contaminated groundwater, and soil vapor removed from select Site monitoring wells while minimizing the depression of the groundwater table to avoid further smearing SPL.

BACKGROUND INFORMATION: SPL has historically been reported in monitoring wells MW-2, MW-3, MW-4, MW-6, MW-8, MW-11, MW-23, and MW-26. Letterle performed three vac-out events on monitoring wells that contained measureable SPL on January 3, 2015, February 10, 2015, and March 10, 2015. Recent SPL thickness measurements followed by the historic SPL thickness range in each of these wells are as follows:

- MW-2: 0.12 feet (6/27/17), not detected to 0.28 feet
- MW-3: 0.02 feet (6/27/17), not detected to 3.74 feet
- MW-4: not detected (6/27/17), not detected to 0.79 feet
- MW-6: 0.02 feet (6/27/17), not detected to 2.11 feet
- MW-8: not detected (6/27/17), not detected to 0.20 feet
- MW-11: not detected (6/27/17), not detected to 0.12 feet
- MW-23: 0.07 feet (6/27/17), not detected to 0.66 feet
- MW-26: not detected (6/27/17), not detected to 0.11 feet

OBJECTIVES: Based on the remedial goal for the Site, which is to obtain relief from liability for diesel fuel substances using the Site Specific Standard for groundwater and soil, the SPL procedure has the following objectives:

1. Reduce the amount of SPL in the subsurface at the Site by removing it (either using a vacuum truck or bailing) without creating a significant groundwater table depression that would encourage smearing SPL vertically,
2. Reduce the dissolved-phase concentrations of fuel substances in groundwater over time by removing SPL (which acts as a continuing source for dissolved-phase concentrations of fuel substances) and contaminated groundwater,
3. Reduce the amount of SPL accumulation in each monitoring well over time,
4. Remove soil vapor from the subsurface, and
5. Minimize, or preferably eliminate, SPL in each monitoring well following each SPL removal event so that groundwater purging tubing can be placed in the well immediately following the event for future groundwater sampling events (if applicable).

PROCEDURE: The procedure for removing SPL from the Site has been broken down into four tasks: Pre-Vac-Out Site Visit, Manual Bailing, Vac-Out, and Post-SPL Removal. The procedures for each of these tasks are presented below.

Pre-Vac-Out Site Visit: This task includes the collection of depth-to-SPL, SPL thickness, and depth-to-water measurements in monitoring wells MW-2, MW-3, MW-4, MW-6, MW-8, MW-11, MW-23, and MW-26. All measurements shall be collected using an electronic conductance-type interface probe with a 0.01 foot resolution and be recorded for future use. The purpose of the SPL Measurement task is to ensure that measurable SPL is present at the Site for the Vac-

Out task. The SPL Measurement task should be performed between 24 and 72 hours prior to the Vac-Out task. The following criteria shall be used to determine if the Vac-Out step will occur:

- At least one monitoring well located outside of the Lamagna Cheese factory building that has historically contained SPL (MW-2, MW-3, MW-4, MW-6, MW-8, and MW-11) has a measured product thickness of 0.01 feet or more during the SPL Measurement step.

If the criteria described above are not met, then the consultant shall contact ICF or PAUSTIF to determine if the Vac-Out task should be skipped.

Manual Bailing: This task includes the use of disposable bailers to physically remove SPL and contaminated groundwater from the Site. Manual bailing shall be employed whenever any amount of SPL is measured in the two monitoring wells located inside of the Lamagna Cheese factory building that has historically contained SPL (MW-23 and MW-26). The manual bailing should be performed during the Pre-Vac-Out Site Visit.

Manual bailing of SPL from the monitoring wells located inside the Lamagna Cheese factory building will be performed by following these steps:

1. Remove the disposable polyethylene tubing (if present) and petroleum absorbent sock (if present) from the well to be bailed and dispose of properly.
2. Using a disposable bailer, gently and slowly lower enough of the bailer into the SPL to remove the SPL without significantly drawing the water table down. Caution should be exercised to avoid emulsifying the SPL. Less than one foot of groundwater should be observed in the bailer beneath the SPL after it is withdrawn from the monitoring well. The SPL and contaminated groundwater should be containerized for appropriate future disposal.
3. Repeat Step 2 until SPL is no longer visible in the bailer while not drawing the groundwater elevation down more than three feet below the initial depth-to-water.
4. If the next scheduled site visit is for the collection of groundwater quality samples, continue to step 5. If the next scheduled Site visit is for a vac-out event, skip to step 6.
5. Set a length of disposable polyethylene tubing comparable to the total depth of the groundwater monitoring well in the well. This tubing will be used for purging and sampling the well with a peristaltic pump during the sampling event scheduled to occur before the next SPL Removal event.
6. Lower a petroleum absorbent sock into the monitoring well with string until it floats on the surface of the groundwater. After allowing enough slack in the string to account for fluctuations in the groundwater table, tie the string to the monitoring well's well cap.
7. Replace the monitoring well's well cap and manhole cover.
8. Document the approximate volume of SPL removed from each monitoring well.

Vac-Out Site Visit: This Task includes the use of a vacuum truck to physically remove SPL and contaminated groundwater and soil vapor from the monitoring wells located outside of the Lamagna Cheese factory building that have historically contained SPL (MW-2, MW-3, MW-4, MW-6, MW-8, and MW-11).

SPL removal via vacuum extraction shall only be performed on the monitoring wells with a measurable SPL thickness of 0.01 feet or more during the Pre-Vac-Out Site Visit.

During each vac-out event, it is expected that a minimum of six cumulative hours of vacuum will be applied to the subsurface in one day. The objective of each vac-out event is to maximize the amount of SPL and contaminated groundwater and soil vapor removed from the Site. It is expected that professional judgment will be applied to the general guidelines provided below to achieve the objectives of this procedure. For example, in the event that one monitoring well contains significantly more SPL than the other monitoring wells, consideration shall be given to applying a vacuum to that well for a longer duration than the other wells.

- If 6 of the 6 outside monitoring wells that have historically contained SPL contain a SPL thickness of 0.01 feet or more during the SPL Measurement task, then:
 - Three 2-hour vacuum extractions will be performed during each vac-out event. Each 2-hour vacuum extraction will include two monitoring wells connected to the vacuum truck via a manifold. The two-well vacuum extraction configuration will progress until a vacuum has been applied to all six monitoring wells.
- If 5 of the 6 outside monitoring wells that have historically contained SPL contain a SPL thickness of 0.01 feet or more during the pre-vac-out step, then:
 - One 2-hour vacuum extraction will be performed on the monitoring well that contains the greatest measured SPL thickness. Following the one-well vacuum extraction, two 2-hour two-well vacuum extraction events will be performed on the remaining four monitoring wells. Each 2-hour two-well vacuum extraction will include connecting two monitoring wells to the vacuum truck via a manifold. The two-well vacuum extraction configuration will progress until a vacuum has been applied to the remaining four monitoring wells.
- If 4 of the 6 outside monitoring wells that have historically contained SPL contain a SPL thickness of 0.01 feet or more during the pre-vac-out step, then:
 - Two 3-hour vacuum extractions will be performed during each vac-out event. Each 3-hour vacuum extraction will include two monitoring wells connected to the vacuum truck via a manifold. The two-well vacuum extraction configuration will progress until a vacuum has been applied to all four monitoring wells.
- If 3 of the 6 outside monitoring wells that have historically contained SPL contain a SPL thickness of 0.01 feet or more during the pre-vac-out step, then:
 - One 2-hour vacuum extraction will be performed on each of the three monitoring wells.
- If 2 of the 6 outside monitoring wells that have historically contained SPL contain a SPL thickness of 0.01 feet or more during the pre-vac-out step, then:
 - One 3-hour vacuum extraction will be performed on each of the two monitoring wells.
- If 1 of the 6 outside monitoring wells that have historically contained SPL contain a SPL thickness of 0.01 feet or more during the pre-vac-out step, then:
 - One 6-hour vacuum extraction will be performed on the monitoring well.

Each vacuum extraction will be performed by following these steps:

1. Record the depth-to-SPL, SPL thickness, and depth-to-water in monitoring wells MW-2, MW-3, MW-4, MW-6, MW-8, and MW-11 using an electronic conductance-type interface probe with a 0.01 foot resolution and be recorded for future use.
2. Remove the disposable polyethylene tubing (if present) and petroleum absorbent sock (if present) and dispose of properly.

3. Connect a drop tube, outfitted with Fernco®-type fitting sized to seal the drop tube to the well casing and modified so that its terminal end is cut to a 45-degree angle, to the vacuum truck. If a vacuum is to be applied to more than one monitoring well, a manifold should be used to allow for two drop tubes to be connected to the vacuum truck. A drop tube should be dedicated to each monitoring well.
4. Following the startup of the vacuum, the drop tube(s) will be slowly lowered into the well to the depth of the SPL. Once SPL removal commences, the drop tube should be slowly lowered into the well a distance no greater than 4 feet.
5. Once the drop tube is at the target depth, the drop tube should be secured at that depth by securing and sealing the drop tube to the well casing with the Fernco®-type fitting for the duration of that well(s) vacuum time. By sealing the drop tube to the well casing a vacuum will be created within the well above the slightly depressed water table in the well.
6. Once the prescribed amount of time for each vac-out expires, the drop tube will be slowly withdrawn from the well(s).
7. Turn off the vacuum, making sure that the contents of the drop tube and vacuum hose are free of liquids.
8. Record the post-vac-out depth-to-water and depth-to-SPL (if present).
9. To the extent practical, document the approximate volume of SPL and groundwater removed during the vacuum extraction. If the next scheduled Site visit is for the collection of groundwater quality samples, continue to step 10. If the next scheduled Site visit is for a vac-out event, skip to step 11.
10. Set a length of disposable polyethylene tubing comparable to the total depth of the groundwater monitoring well in the well. This tubing will be used for purging and sampling the well with a peristaltic pump during the sampling event scheduled to occur before the next SPL Removal event.
11. Lower a petroleum absorbent sock into the monitoring well with string until it floats on the surface of the groundwater. After allowing enough slack in the string to account for fluctuations in the groundwater table, tie the string to the monitoring well's well cap.
12. Replace the monitoring well's well cap and manhole cover.