Hazard Control Technologies, Inc.

Suggested Operating Guidelines

Note: This information is submitted as a suggested guide to establish a Departmental SOG when using HydroLock as part of your degassing, decontamination or cleaning procedures, and should in no way be considered a replacement for existing, established protocol. Hazard Control Technologies, Inc. is responsible for the quality of the product HydroLock only, and will not assume responsibility for any other problem areas encountered when the product is being used.

Suggested Operating Guidelines #01

For the use of HydroLock in Tank Degassing, Decontamination and Cleaning

To: All Personnel

Objective: To Establish a Manner for the Use of HydroLock in Degassing Large Above Ground Tanks (AST)

Responsibility: As Directed by Department Policy

Procedure: This guideline is recommended for the use of HydroLock to reduce explosive limits to below the lower explosive limits (LEL) or other acceptable value as determined by code or company policy. This procedure must be completed prior to personnel entering into a vessel in order to clean tanks or effect repairs, such as welding.

Application:

HydroLock is used at 3% through a variety of nozzles, from structural firefighting nozzles and larger monitors to industrial pressure nozzles through heated high pressure wands and systems.

Apply HydroLock by any of the above means and make sure that the nozzle is open in a spray pattern allowing the water and 3% HydroLock solution to become airborne inside the container to help encapsulate the vapors.

The LEL's will drop immediately. Continue to encapsulate the residual fuel at the bottom of the tank by narrowing the stream from the nozzle and agitating the 3% HydroLock mixture at the bottom of the tank until you have achieved the "0" LEL's desired.

An LEL meter is required to determine the explosive level within the tank structure. A beginning reading is needed and several checks during the vapor mitigation and treatment phase with a final LEL reading taken upon completion. The LEL needs to be below the explosive limits before work can continue where there may be an ignition source present.

There must be a vent hole in place during the entire degassing operation. All personnel need to be in PPE and full SCBA used during the operation.

The residual encapsulated run off will find its way to the lowest point on the tank structure and this will be in the form of sludge which can be pumped off safely. This liquid is now nonflammable, making for a safer work environment.

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Suggested Operating Guidelines #02

For the use of HydroLock in Tank Degassing, Decontamination and Cleaning

To: All Personnel

Objective: To Establish a Manner for the Use of HydroLock in Degassing Underground Storage Tanks (UST)

Responsibility: As Directed by Department Policy

Procedure: This guideline is recommended when using HydroLock to mitigate vapors and reduce the LEL's (Lower Explosive Limits) of underground hydrocarbon storage tanks.

Application of Hydrolock for Mitigating Hydrocarbon Vapors:

Apply HydroLock at a 3% ratio to water through a hose line and nozzle to achieve the vapor and liquid encapsulation of volatile hydrocarbon vapors and residual tank bottom liquid.

Application Methods:

HydroLock can be applied in the following ways to achieve the reduction of LEL's for UST's:

- Through a minimum of 1" hose line typically found on a hose reel of a fire truck through a 25 to 65 gpm nozzle under a minimum pressure of 25 psi up to 100 psi.
- 1.5" hose line with a fire department nozzle flowing 95 gpm and a minimum of 50 psi up to 100 psi.
- PVC piping with various spray mist nozzles
- Eductor attached to a hose line and nozzle with a setting of 3% at the proportioner and pressurized with water at a minimum of 50 psi up to 100 psi.

Tank Degassing Procedure:

Apply HydroLock by any of the above means and make sure that the nozzle is open in a spray pattern allowing the water and 3% HydroLock solution to become airborne inside the container to help encapsulate the vapors.

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The LEL's will drop immediately. Continue to encapsulate the residual fuel at the bottom of the tank by narrowing the stream from the nozzle and agitating the 3% HydroLock mixture at the bottom of the tank until you have achieved the "0" LEL's desired.

Residual Effluent:

Once the vapors and residual bottom liquid are encapsulated, the residual effluent can now be pumped into the vacuum truck for disposal. The liquid is now nonflammable, making it safer to transfer of liquid out of the UST and into the waste removal vehicle to be transported to the disposal site.

Suggested Operating Guidelines #03

For the use of HydroLock in Tank Degassing, Decontamination and Cleaning

To: All Personnel

Objective: To Establish a Manner for the Use of HydroLock in Degassing Hydrocarbon Tank Trucks

Responsibility: As Directed by Department Policy

Procedure: This guideline is recommended when using HydroLock to mitigate vapors and reduce the LEL's (Lower Explosive Limits) of hydrocarbon tank trucks.

Application of HydroLock for Mitigating Hydrocarbon Vapors:

HydroLock can be applied in the following ways to achieve the reduction of LEL's for hydrocarbon tank trucks:

- Through a minimum of 1" hose line typically found on a hose reel of a fire truck with a 25 to 65 gpm nozzle under a minimum pressure of 25 psi up to 100 psi.
- 1.5" hose line with a fire department nozzle flowing 95 gpm and a minimum of 50 psi up to 100 psi .
- PVC piping with a variable array of spray mist nozzles
- Eductor attached to a hose line and nozzle with a setting of 3% at the proportioner and pressurized with water at a minimum of 50 psi up to 100 psi.
- 1.5" hose line with an attached "cellar nozzle" (sprays in many directions from the water pressure) enabling the encapsulating process

Tank Truck Degassing Procedure:

Apply HydroLock by any of the above means and make sure that the nozzle is open in a spray pattern allowing the water and 3% HydroLock solution to become airborne inside the container to help encapsulate the vapors.

The LEL's will drop immediately. Continue to encapsulate the residual hydrocarbon at the bottom of the tank by narrowing the stream from the nozzle and agitating the 3% HydroLock mixture at the bottom of the tank until you have achieved the "0" LEL's desired.

Heating of the Water:

The HydroLock will provide a faster penetrating effect when the water is heated to a temp not to exceed 150ºF. The heated 3% HydroLock water will penetrate through any caking on the interior walls of the tanker allowing for an easier removal.

Residual Effluent:

Once the vapors and bottom liquid are encapsulated, the residual effluent can now be pumped into the vacuum truck for disposal. The liquid is now nonflammable, making it safer to transfer out of the tank truck and into the waste removal vehicle to be transported to the disposal site.

Suggested Operating Guidelines #04

For the use of HydroLock in Tank Degassing, Decontamination and Cleaning

To: All Personnel

Objective: To Establish a Manner for the Use of HydroLock in Mitigating Explosive Gases in Confined Spaces and Tanks Prior to Entry.

Responsibility: As Directed by Department Policy

Procedure: This guideline is recommended for the use of HydroLock to reduce explosive limits to below the lower explosive limits (LEL) or other acceptable value as determined by code or company policy. This procedure must be completed prior to personnel entering into a confined space in order to clean tanks or effect repairs, such as welding.

Equipment: 95 gpm Turbo-jet nozzle, 95 gpm in-line eductor, 1 ½" hose line, LEL meter, vacuum truck or vacuum-type pump equipment, temporary flexible manhole cover with flexible boot.

Application:

1. Prior to performing any activity that is outlined in this suggested operating procedure, proper protective clothing should be worn, including but not limited to, fire protective overalls or bunker gear, self-contained breathing apparatus, helmet with face shield visor or splash-proof eye goggles, rubber gloves and rubber boots.
2. Prepare a 1" or 1 1/2" hose line from an acceptable water source to the tank or confined space, which requires de-vaporization. This setup should consist of placing a 95 gpm Turbo-jet nozzle at the end of the line and a 95-gpm in-line eductor with pickup tube between the nozzle and water source (e.g., stand pipe, pump, etc.). Note that the water pressure needs to be sufficient (e.g., 100-200 psi) to operate the eductor properly. The eductor will draw HydroLock from a pail or vessel.
3. Open or remove the tank's standard manhole or entry access port and cover the opening with an impermeable, protective, flexible cover. The cover should be affixed to the tank in a manner that prevents explosive gases from escaping, yet allows intermittent access to provide for LEL readings. Cover should be fitted with a flexible boot sized to fit snugly over the tip of the fire hose nozzle where it is firmly attached using a hose clamp. The goal of this type of

setup is to allow for flexible maneuvering of the nozzle without allowing the explosive gas to escape into the atmosphere.

4. Obtain and record initial LEL readings from within the confined space area using an approved and calibrated LEL meter. Usually the initial reading is obtained during the change out from the standard manhole or entry access port to the temporary flexible manhole cover.

5. Once the initial readings are obtained and the temporary flexible manhole cover and boot are secured to the manhole opening and nozzle respectfully, the de-vaporization process may begin. Several applications of the 3% HydroLock solution may need to be applied to obtain the desired result. The duration of the application of the 3% HydroLock solution should be recorded.

6. Set the eductor to a 3% setting and place the pickup tube into the pail or drum of HydroLock.

7. Open the nozzle gate fully to begin drawing HydroLock through the eductor. HydroLock flow verification should be visible through the eductor pickup tube. An operator should be stationed at the eductor to verify HydroLock flow and place the pickup tube in subsequent 5 gallon pails as the HydroLock is exhausted from each pail.

8. Adjust the spray pattern to approximately a 30º fog pattern. Apply a 3% solution of HydroLock to the entire exposed vertical length of the inside periphery of the walls. It will be difficult to get all 360º if the access port is on the side of the tank. In this case, every effort should be made to get a minimum of 300–330º of the wall periphery. Also apply the 3% HydroLock solution to the ceiling and floor of the tank. As the HydroLock penetrates into the build-up, it forces vapors out, which are subsequently trapped in a HydroLock molecule micelle. The entire inner surface of the tank should be treated with the 3% HydroLock solution. The 30º fog pattern should be sufficient to induce some water misting throughout the air volume within the tank so the vapors can be encapsulated by the HydroLock.

9. After the first application of 3% HydroLock solution, record the application duration. Open the temporary flexible manhole cover and record the LEL reading.

a. If the LEL has not been reduced to acceptable limits in accordance with local, state and federal regulations (e.g., typically less than 10% [most tank cleaning companies require less than 5%]), the temporary flexible manhole cover shall be re-secured for an additional application of 3% HydroLock.

De-vaporization Worksheet

HydroLock Application #	**Application Duration**	**LEL Reading**
0	Initial reading	
1		
2		
3		

b. Once the LEL has been reduced to acceptable limits noted above, the temporary flexible manhole cover may be removed and the tank may be entered. Caution: All personnel entering the tank shall have protective clothing as outlined above.

10. Once entry into the confined space or tank is achieved, an application of 3% HydroLock solution should be applied to all areas previously inaccessible from the manhole.

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11. All sludge and HydroLock water solution with the encapsulated vapors should be removed from the bottom of the tank prior to starting any repair work. All liquid removed from the tank by vacuum truck or other means, must be properly disposed of in a safe and lawful manner in accordance with local, state and federal regulations. Note: Any sludge or material left in the bottom of the tank may emit vapors, which will increase the LEL over a period of time.
12. The LEL should be continuously monitored during the tank repair operations. Protective clothing, as outlined above, should be utilized at all times during the tank repair operation. If LELs begin to rise above the lower acceptable limits, repair work should cease, all workers and equipment should be removed and another application of 3% HydroLock should be applied.
13. After tank repairs are completed, all nozzles, eductors and hoses should be cleaned and restored to their original stocking locations.

Caution: If work and continuous monitoring of LEL ceases for a period of time, new initial LEL readings should be obtained and evaluated prior to allowing any personnel to enter the confined space or tank.

Suggested Operating Guidelines #05

For the use of HydroLock in Tank Degassing, Decontamination and Cleaning

To: All Personnel

Objective: To Establish a Manner for the Use of HydroLock in Degassing Cargo Ship Tanks and Cargo Holds

Responsibility: As Directed by Department Policy

Procedure: This guideline is recommended for the use of HydroLock to reduce explosive limits to below the lower explosive limits (LEL) or other acceptable value as determined by code or company policy. This procedure must be completed prior to personnel entering into a confined space in order to clean tanks or effect repairs, such as welding.

Equipment: 95 gpm Turbo-jet nozzle, 95 gpm in-line eductor, 1 ½" hose line, LEL meter, vacuum truck or vacuum-type pump equipment, temporary flexible manhole cover with flexible boot.

Application:

1. Prior to performing any activity that is outlined in this suggested operating procedure, proper protective clothing should be worn, including but not limited to, fire protective overalls or bunker gear, self-contained breathing apparatus, helmet with face shield visor or splash-proof eye goggles, rubber gloves and rubber boots.
2. Setup a 1" or 1 1/2" hose line from an acceptable water source to the tank or confined space, which requires de-vaporization. This setup should consist of placing a 95 gpm Turbo-jet nozzle at the end of the line and a 95-gpm in-line eductor with pickup tube between the nozzle and water source (e.g., stand pipe, pump, etc.). Note that the water pressure needs to be sufficient (e.g., 100-200 psi) to operate the eductor properly. The eductor will draw HydroLock from a pail or drum.
3. Open or remove the tank's standard manhole or entry access port and cover the opening with an impermeable, protective flexible cover. The cover should be affixed to the tank in a manner that prevents explosive gases from escaping, yet allows intermittent access to provide for LEL readings. The cover should be fitted with a flexible boot, sized to fit snugly over the tip of the fire hose nozzle where it is firmly attached using a hose clamp. The goal of this type of

setup is to allow for flexible maneuvering of the nozzle without allowing the explosive gas to escape into the atmosphere.

4. Obtain and record initial LEL readings from within the confined space area using an approved and calibrated LEL meter. Usually the initial reading is obtained during the change out from the standard manhole or entry access port to the temporary flexible manhole cover.

5. Once the initial readings are obtained and the temporary flexible manhole cover and boot are secured to the manhole opening and nozzle respectfully, the de-vaporization process may begin. Several applications of the 3% HydroLock solution may need to be applied to obtain the desired result. The duration of the application of the 3% HydroLock solution should be recorded.

6. Set the eductor to a 3% setting and place the pickup tube into the pail or drum of HydroLock.

7. Open the nozzle gate fully to begin drawing HydroLock through the eductor. HydroLock flow verification should be visible through the eductor pickup tube. An operator should be stationed at the eductor to verify HydroLock flow and place the pickup tube in subsequent 5 gallon pails as the HydroLock is exhausted from each pail.

8. Adjust the spray pattern to approximately a 30º fog pattern. Apply a 3% solution of HydroLock to the entire exposed vertical length of the inside periphery of the walls. It will be difficult to get all 360º if the access port is on the side of the tank. In this case, every effort should be made to get a minimum of 300–330º of the wall periphery. Also apply the 3% HydroLock solution to the ceiling and floor of the tank.

As the HydroLock penetrates into the build-up, it forces vapors out, which are subsequently trapped in a HydroLock molecule micelle. The entire inner surface of the tank should be treated with the 3% HydroLock solution. The 30º fog pattern should be sufficient to induce some water misting throughout the air volume within the tank so the vapors can be encapsulated by the HydroLock.

9. After the first application of 3% HydroLock solution, record the application duration. Open the temporary flexible manhole cover and record the LEL reading.

a. If the LEL has not been reduced to acceptable limits in accordance with local, state and federal regulations (e.g., typically less than 10% [most tank cleaning companies require less than 5%]), the temporary flexible manhole cover shall be re-secured for an additional application of 3% HydroLock.

De-vaporization Worksheet

HydroLock Application #	Application Duration	LEL Reading
0	Initial reading	
1		
2		
3		

b. Once the LEL has been reduced to acceptable limits noted above, the temporary flexible manhole cover may be removed and the tank may be entered. Caution: All personnel entering the tank shall have protective clothing as outlined above.

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10. Once entry into the confined space or tank is achieved, an application of 3% HydroLock solution should be applied to all areas previously inaccessible from the manhole.
11. All sludge and HydroLock water solution with the encapsulated vapors should be removed from the bottom of the tank prior to starting any repair work. All liquid removed from the tank by vacuum truck or other means, must be properly disposed of in a safe and lawful manner in accordance with local, state and federal regulations. Note: Any sludge or material left in the bottom of the tank may emit vapors, which will increase the LEL over a period of time.
12. The LEL should be continuously monitored during the tank repair operations. Protective clothing, as outlined above, should be utilized at all times during the tank repair operation. If LELs begin to rise above the lower acceptable limits, repair work should cease, all workers and equipment should be removed and another application of 3% HydroLock should be applied.
13. After tank repairs are completed, all nozzles, eductors and hoses should be cleaned and restored to their original stocking locations.

Caution: If work and continuous monitoring of LEL ceases for a period of time, new initial LEL readings should be obtained and evaluated prior to allowing any personnel to enter the confined space or tank.

Suggested Operating Guidelines #06

For the use of HydroLock in Tank Degassing, Decontamination and Cleaning

To: All Personnel

Objective: To Establish a Manner for the Use of HydroLock in Pipe and Pipeline Cleaning

Responsibility: As Directed by Department Policy

Procedure: This guideline is recommended for the use of HydroLock to reduce explosive limits to below the lower explosive limits (LEL) or other acceptable value as determined by code or company policy. This procedure must be completed prior to personnel working on pipelines.

Application:

HydroLock is used at 3% through a variety of nozzles, from structural firefighting nozzles and larger monitors ato industrial pressure nozzles through heated high pressure wands and systems.

An LEL meter is required to determine the explosive level within the tank structure. A beginning reading is needed and several checks during the vapor mitigation and treatment phase with a final LEL reading taken upon completion. The LEL needs to be below the explosive limits before work can continue where there may be an ignition source present.

There must be a vent hole in place during the entire degassing operation. All personnel need to be in PPE and full SCBA used during the operation.

The residual encapsulated run off will find its way to the lowest point of the pipeline and this will be in the form of sludge which can be pumped off safely. This liquid is now nonflammable, making for a safer work environment.

Pressure wands using clean, fresh water will assist in the final cleaning and breakdown of any sulfur or hydrocarbon buildup on the pipe walls.