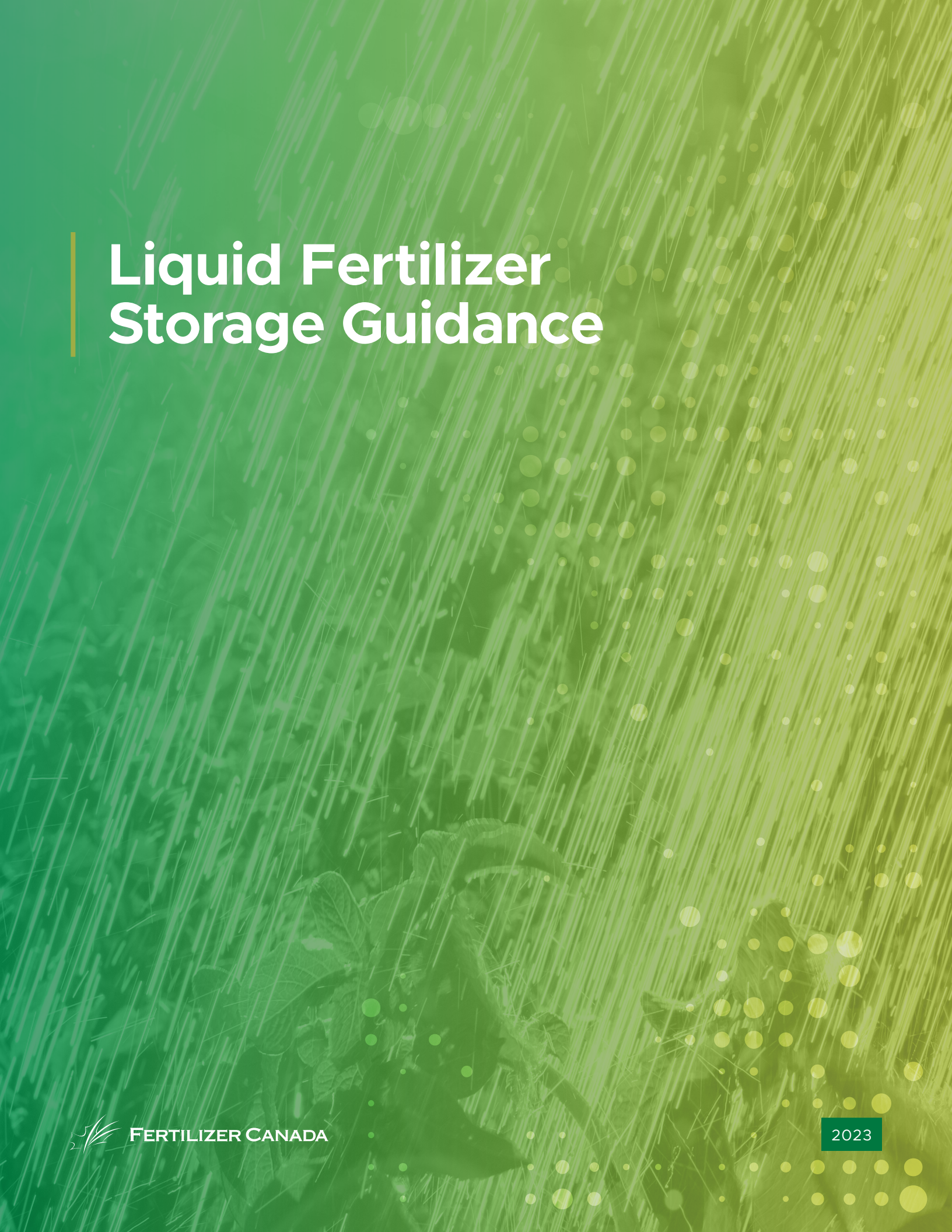
Liquid Fertilizer Storage Guidance



FERTILIZER CANADA

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Liquid Fertilizer Storage Guidance

Purpose

This guidance was developed by Fertilizer Canada and our member companies as part of our industry's commitment to the safe and secure storage and handling of our products. This document is intended to provide guidance for facilities (such as agri-retailers, distributors, or on-farm end-users) that store and handle liquid fertilizer products including urea ammonium nitrate (UAN) (28-0-0; 32-0-0), ammonium thiosulphate (ATS) (15-0-0-20), and ammonium polyphosphate (APP) (10-34-0) in storage tanks. Existing guidance and best management practices for liquid fertilizer storage are not comprehensive or consistent between jurisdictions.

The Canadian fertilizer industry is committed to improving safety and minimizing the environmental impact of its products. Although incidents involving accidental release of liquid fertilizer are rare, historical incidences of storage tank and containment failures have resulted in significant liability costs to the property owner, fertilizer supplier, and industry for emergency response, environmental assessment and remediation, environmental regulatory fines, as well as negative impacts to the industry's public perception.

As an industry association that works to advance the safe, secure, and sustainable use of commercial grade fertilizer, Fertilizer Canada's safety stewardship programming is paramount. The *Liquid Fertilizer Storage Guidance* document is part of Fertilizer Canada's best-in-class safety stewardship program, Fertilize S.A.F.E.[1] The program works to educate, enable, and empower those in the fertilizer supply chain through the use of industry enforced codes of practice, educational resources, and training tools. Fertilize S.A.F.E. helps define safety and security for all industry players.

Adoption of consistent best management practices for liquid fertilizer storage at facilities across Canada will help raise the bar on safety for Canada's fertilizer industry by:

- reducing associated risks with accidental release of liquid fertilizer from storage tanks by mitigating the associated environmental risk, economic liability, and safety risk; and
- reducing regulatory risk by demonstrating proactivity by the industry and therefore maintaining license to operate.

Background

Fertilizer Canada contracted a third-party report, *Risk Assessment of Liquid Fertilizer Storage*. The risk assessment report comprised of a regulatory review, an agri-retailer survey to gather information on current types of storage and practices, a review of historical incidents, and a qualitative risk assessment based on known and potential environmental risk factors.

Storage tanks and containment for liquid fertilizer are not covered by regulations in Canada.

Liquid fertilizer products, including but not limited to urea ammonium nitrate (UAN), ammonium thiosulphate (ATS), and ammonium polyphosphate (APP) are stored and used in large volumes across Canada. From the risk assessment report survey, the average volume of liquid fertilizer storage at agri-retail facilities that completed the survey was over 1.36M L (in season), and the average storage tank size is 255,771 L.

While most of the sites surveyed in the risk assessment had implemented several best management practices, sites have not consistently adopted all best management practices that would reduce the relative environmental risk potential of a site.

One of the primary recommendations from the risk assessment report was to develop a best management practices guidance document for liquid fertilizer storage tanks at agri-retail facilities and on-farm.

[1] For more information on Fertilize S.A.F.E. and Fertilizer Canada's commitment to safety and security in our industry, see the following link: https://fertilizercanada.ca/our-focus/safety-security/.

Scope

This document covers best management practices for bulk liquid fertilizer (including UAN 28-0-0/32-0-0, ATS 15-0-0-20, APP 10-34-0, and other liquid NPK blends) stored in tanks at agri-retail/distribution facilities and on-farm in Canada. The guidelines cover tank characteristics, storage characteristics, management and emergency response, mixing and loading practices, and best practices to prevent human and environmental exposure. The guidance in this document is not intended to apply to non-bulk storage of liquid fertilizers, such as products packaged in small plastic containers.

How To Use This Document

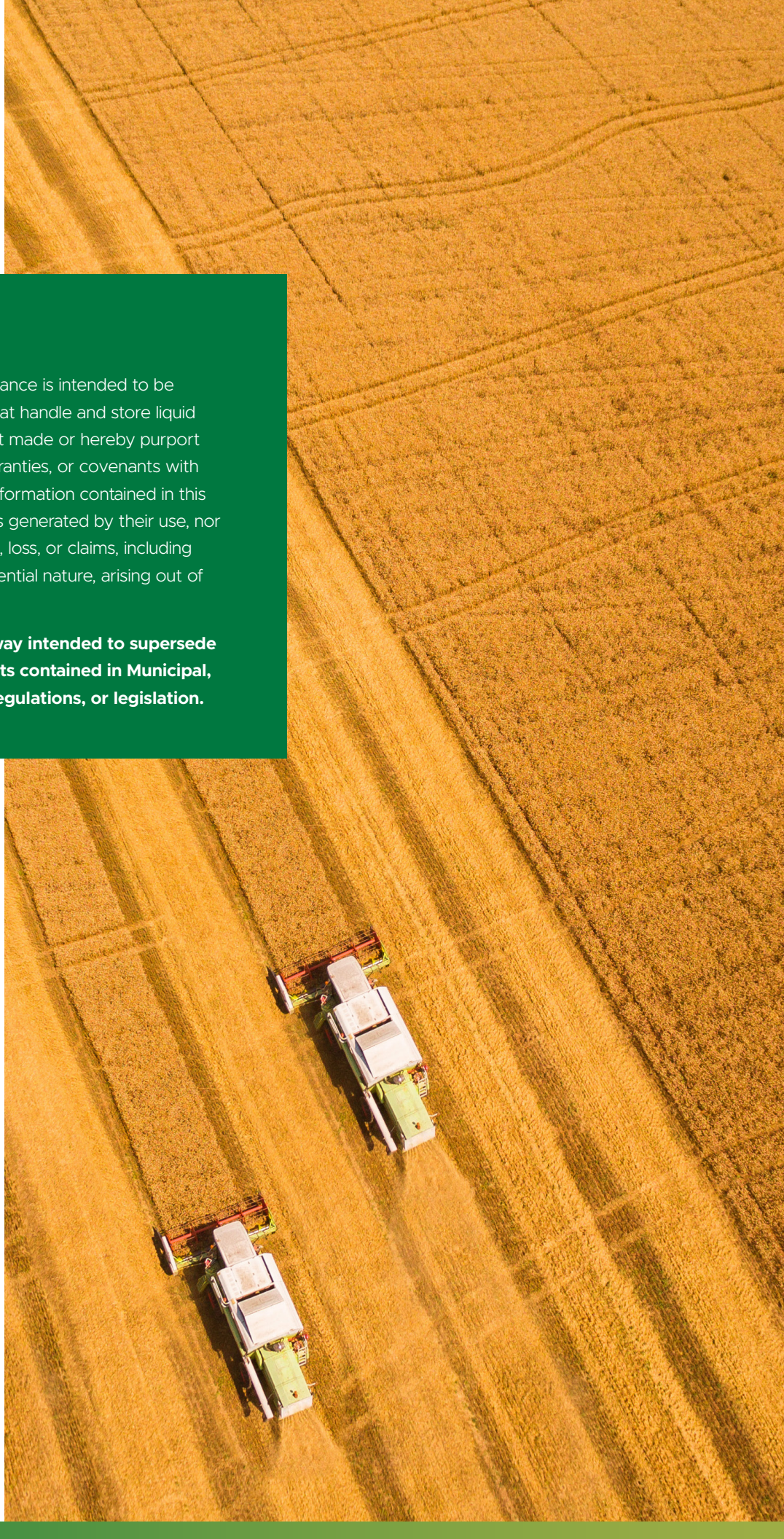
This document serves two functions as both a guide to best management practices for liquid fertilizer storage and as a self-assessment tool that can be used to evaluate a facilities' performance against the recommended best practices. This guidance is voluntary, and Fertilizer Canada encourages our members to consider the practices contained in this document in the context of their particular facilities, locations, and jurisdictional regulatory requirements.

Appendix A contains additional resources on liquid fertilizer storage.

Disclaimer

The Liquid Fertilizer Storage Guidance is intended to be used by facilities and operators that handle and store liquid fertilizer. Fertilizer Canada has not made or hereby purport to make any representations, warranties, or covenants with respect to the specifications or information contained in this Guidance document or the results generated by their use, nor will they be liable for any damage, loss, or claims, including those of an incidental or consequential nature, arising out of these practices.

These practices are not in any way intended to supersede or detract from any requirements contained in Municipal, Provincial or Federal by-laws, regulations, or legislation.



Contents

Definitions

In this document, the terms below are defined as follows:

DISTRIBUTOR

An intermediary between the producer of a product and other sections of the supply chain, primarily retailers.

CARRIER

An individual or a business that transports liquid fertilizer. A carrier may also be responsible for loading or unloading liquid fertilizer at points of pick-up or delivery.

END USER

An individual or a business that uses liquid fertilizer to grow crops or other plants.

FACILITY

A facility that stores and/or handles liquid fertilizer. This can include distribution and retail facilities as well as farms with on-site liquid fertilizer storage.

LIQUID FERTILIZER

Fertilizer that is in a liquid state, including urea ammonium nitrate (UAN), ammonium thiosulphate (ATS), and ammonium polyphosphate (APP).

OPERATOR

An individual or employee who handles liquid fertilizer or manages liquid fertilizer storage.

RETAILER/AGRI-RETAILER

An individual or a business that sells liquid fertilizer to end users.

Tank Characteristics

Section 1 covers tank characteristics. This section provides guidance for liquid fertilizer storage tanks characteristics as well as specific considerations recommended for tanks that are greater than 100,000 gallons and constructed of carbon or stainless steel. Following these best practices can help both agri-retailer/distributor facilities and on-farm end-users to ensure that their liquid fertilizer storage tanks and associated equipment meet general industry standards and are fit for purpose.

1.1 Tank Characteristics

NO.	ACTIVITY	BEST PRACTICE
1.1.1	Tank Gravity	Tanks should have a product specific gravity of at least 1.5. Consult the tank and/or product manufacturer to identify the appropriate product specific gravity for the particular product being stored.
1.1.2	Tank Materials	Tanks and associated equipment, including pipework and valves, should be fit for purpose and corrosion resistant. To prevent corrosion, the outside of steel tanks should be painted with a suitable paint. Copper and brass should not be used in tank construction or associated equipment where there is potential to come into contact with liquid fertilizer. Aluminum should not be used with certain liquid fertilizers (e.g., liquid fertilizers that are phosphate-based or that contain potassium chloride).
1.1.3	Tank/Product Compatibility	Consult with product suppliers prior to filling with fertilizer to ensure tank and product compatibility. Ensure that tanks and associated equipment (valves, pipes, etc.,) materials are compatible with the fertilizer product being stored.

1.2 Considerations for Above Ground Tanks Greater Than 100,000 Gallons, Constructed of Carbon/Stainless Steel

NO.	ACTIVITY	BEST PRACTICE
1.2.1	Build Considerations	Tanks used for liquid fertilizer storage should be fit for purpose and safe to use with the particular liquid fertilizer product being stored.

Storage Characteristics

Section 2 covers storage characteristics. This section provides guidance on secondary containment areas and tank location, tank equipment, volume of product and duration of time kept in storage, and recommended signage for agri-retailers, distributors, and on-farm end-users. Following these best practices can help ensure that appropriate measures are in place for secondary containment in the event of any spills or accidental releases and to prevent unauthorized access to or tampering with the product and/or storage equipment.

2.1 Secondary Containment

NO.	ACTIVITY	BEST PRACTICE
2.1.1	Secondary Containment Area Characteristics	Tanks should be placed within a secondary containment area. Secondary containment areas should meet the following criteria: • The area contains a full curb around the outside; • The area is constructed of impermeable material (e.g. sealed concrete, clay, or liner); • The containment area is sufficient volume to contain a minimum of 110% of the volume of the storage of the largest tank; and • The area does not have a floor drain. All pipes/plumbing, valves, and sight gauges should be within the containment area.
2.1.2	Inspections	Secondary containment areas should be inspected regularly for any defects, including cracks, leaks, or seepage of liquid. Any defects should be repaired immediately.
2.1.3	Disposing of Water Suspected to Contain Trace Amounts of Nutrients	Water suspected to have trace amounts of nutrients should be applied to a cropped area at least 10m from surface water and at least 30m from a well. Nutrient content should be estimated prior to application or treated as full concentration of nutrients. Disposal/application of water suspected to have trace amounts of nutrients should be documented.

2.2 Tank Location

NO.	ACTIVITY	BEST PRACTICE
2.2.1	Tank Location	Tanks should be located away from areas where activities could cause fertilizer spills. To prevent cases of accelerated tank degradation, tanks should be protected from ultraviolet radiation (this is particularly important in the case of polyethylene and fiberglass tanks). This can be done by placing the tank in a sheltered location out of the sun, painting the tank, or by choosing a tank made with UV-resistant resin, for example.
2.2.2	Tank Placement	All tanks should be placed on a proper and level foundation (e.g., where possible, tanks should be placed above grade and with drainage away from the tank). Moisture and debris should be prevented from gathering at the base of the tank.

2.3 Tank Equipment

NO.	ACTIVITY	BEST PRACTICE
2.3.1	Tank Equipment	Tanks should be equipped with sight gauges and locked taps (or lock-on valve). Taps / valves should be locked when the tank is not in use. Taps / valves should be clearly marked to indicate the associated tank and the product being stored. Taps / valves should be configured to allow only authorized personnel to unlock them. Consult the product manufacturer or resources provided by the manufacturer to ensure that the product stored in a tank is compatible with the type of tank and tank equipment being used.

2.4 Signage

NO.	ACTIVITY	BEST PRACTICE
2.4.1	Signage	All tanks should be clearly marked with appropriate signage indicating tank contents consistent with WHMIS/GHS requirements.

Management and Emergency Response

Section 3 covers management and emergency response measures for agri-retailers, distributors, and on-farm end-users. This section provides guidance on tank inspections, tank maintenance, repair and replacement, safety measures during loading, and recommended measures for responding to spills/emergencies. Following these best practices can help ensure that operational procedures at storage facilities include adequate inspection and maintenance regimes, written emergency and spill response plans, and appropriate staff training on emergency and spill response.

Regulatory requirements for emergency response planning and reporting spills may vary between jurisdictions. Please consult the relevant regulations for your jurisdiction in addition to this document.

3.1 Tank Inspection

NO.	ACTIVITY	BEST PRACTICE
3.1.1	Visual Inspections	Tanks should be inspected prior to use. Before filling with fertilizer, tanks should be inspected for any cracks, leaks, or other defects. Tanks, associated equipment (including valves and plumbing), and the secondary containment area should be inspected visually on a daily basis whenever product is stored in the tank. Visual inspections should be conducted by individuals trained on the best practices contained in this document and any facility-specific requirements. This could be either facility staff or third-party contractors.
3.1.2	Monthly Documented Inspections	A thorough inspection of tanks, associated equipment (including valves and plumbing), and the secondary containment area should be conducted at least on a monthly basis whenever product is stored in the tank. Monthly inspections should be conducted by individuals trained on the best practices contained in this document and any facility-specific requirements. This could be either facility staff or third-party contractors.
3.1.3	Electronic Monitoring Systems	Electronic monitoring systems can be installed to notify facility staff of leaks or other tank issues. Electronic monitoring systems can be particularly useful at sites with large storage volumes.

3.2 Tank Maintenance

NO.	ACTIVITY	BEST PRACTICE
3.2.1	Tank Maintenance	Drain all pipework at the end of seasonal usage. Where possible, drain tanks at the end of each seasonal usage.
3.2.2	Maintenance	Document and keep records of tank maintenance and repairs.
3.2.3	Tank Repair	When defects are detected, tank repairs should be completed in a timely manner by a qualified individual. Tanks in need of repair should not be used if defects impact the safe use of the tank. If defects are detected in polyethylene tanks for liquid fertilizer storage, repair is not recommended. In this case, tanks should be replaced.

3.3 Supervision During Loading

NO.	ACTIVITY	BEST PRACTICE
3.3.1	Supervision During Product Transfer/Loading and Unloading	Constant supervision of the product transfer process should be conducted by a qualified individual who is familiar with equipment operation and all emergency procedures.

3.4 Emergency/Spill Response

NO.	ACTIVITY	BEST PRACTICE
3.4.1	Written Environmental Response Plan	All facilities should have a written environmental emergency plan readily available and all personnel should be aware of the plan location. Facilities can include signage in central locations that indicates where the written environmental emergency plan is located. This plan should cover procedures to follow in case of a spill, fire, or other incident during storage, loading, mixing, or application. Where possible, this plan should be developed in coordination with local emergency response officials. The plan should identify contact information for emergency responders as well as the appropriate contacts to notify in case of a spill or human/environmental exposure. All necessary equipment for clean-up should be readily available in case of a spill (preferably located on-site or in another immediately accessible location).
3.4.2	Emergency Response Training	Every person involved in the operation should be fully trained on the appropriate procedures in case of a spill. This training should include requirements for personal protective equipment consistent with the SDS requirements for products being stored and/or handled. Facilities should provide training and orientation as required for carriers coming onto their site. All carriers should be aware of the safety measures in place at the facilities to which they deliver or pick-up product.
3.4.3	Spill Response	Consult your provincial or municipal requirements for spill reporting and spill response. Any spill should be contained and cleaned immediately. Use an inert substance (e.g., sand) for absorbing spills. Do not use sawdust to absorb spills. If spills are released into the environment, the appropriate environmental response agencies should be notified as soon as possible. **See Appendix C for additional guidance on spill reporting.**
3.4.4	Recordkeeping	Consult your jurisdictions Occupational Health and Safety requirements for recordkeeping. Any incident requiring use of emergency procedures should be recorded. All training provided on emergency procedures should be recorded.

Mixing and Loading

Section 4 covers measures for loading and mixing of liquid fertilizer products. Transferring product from one storage vessel to another or from storage vessel to application equipment is often the highest risk activity for leaks and spills of liquid fertilizer. This section provides guidance for agri-retailers, distributors, and on-farm end-users on characteristics of the loading area and recommended practices for mixing and loading. Following these best practices can help ensure that facilities have appropriate operational policies and procedures in place to prevent accidental spills or releases of liquid fertilizer during the mixing and loading processes.

4.1 Mixing and Loading Area

NO.	ACTIVITY	BEST PRACTICE
4.1.1	Designated Mixing and Loading Area	All mixing and loading of liquid fertilizers should be conducted within a permanent, designated area for mixing and loading where spills and leaks can be collected and contained. This can be the same area designated for product transfers/deliveries.
4.1.2	Mixing and Loading Area Floor Characteristics	Mixing and loading areas should have an impermeable floor with no cracks or leaking. Mixing and loading areas should not have a floor drain. If there is an existing floor drain, the area should be constructed in a way that does not allow permeation into the soil.
4.1.3	Mixing and Loading Area Roof Characteristics	Mixing and loading areas should be located under a permanent roof that keeps rainwater out. If the mixing and loading area is not covered, there should be a means to pump out and dispose of rainwater according to appropriate environmental regulations.
4.1.4	Inspection/Monitoring	Mixing and loading areas should be regularly inspected for any defects that could allow spilled product to escape the area.

4.2 Mixing and Loading Practices

NO.	ACTIVITY	BEST PRACTICE
4.2.1	Preventing Backflow	Recommended methods for preventing backflow from a fertilizer tank into surface or well water used for mixing: • Using a separate tank to supply water to the fertilizer tank • Installing a permanent anti-backflow device in the water supply line • Maintaining a permanently fixed 6-inch air gap between the water supply line and the fertilizer tank
4.2.2	Loading Fertilizer	Operators should use a transfer system that transfers fertilizer directly between storage containers or from the storage container to the application equipment to minimize exposure and spills. The tank or container that product is transferred into should be vented in order to prevent damage to the tank or container due to high pressure.
4.2.3	Disposing of Water Suspected to Contain Trace Amounts of Nutrients	Water suspected to have trace amounts of nutrients should be applied to a cropped area at least 10m from surface water and at least 30m from a well. Nutrient content should be estimated prior to application or treated as full concentration of nutrients. Disposal/application of water suspected to have trace amounts of nutrients should be documented.

Carriers and Product Transfer

Section 5 covers measures for carriers who transport and transfer (load/unload) liquid fertilizer products. Transferring product from one storage vessel to another or from storage vessel to application equipment is often the highest risk activity for leaks and spills of liquid fertilizer. This section provides guidance on the area used for product transfers and recommended best practices for carriers. Following these best practices can help ensure that facilities and the carriers they work with have appropriate operational policies and procedures in place to prevent accidental spills or releases of liquid fertilizer during the transportation and transfer processes.

5.1 Product Transfer Area

NO.	ACTIVITY	BEST PRACTICE
5.1.1	Designated Product Transfer/ Delivery Area	All transfer and delivery of liquid fertilizers should be conducted within a permanent, designated area where spills and leaks can be collected and contained. This can be the same area that is designated for mixing and loading. This area should be in good condition, without cracks, leaks or other defects that could result in product loss to the environment.
5.1.2	Inspection/Monitoring	Product transfer areas should be regularly inspected for any defects that could allow spilled product to escape the area.

5.2 Carrier Best Practices

NO.	ACTIVITY	BEST PRACTICE
5.2.1	Training for Carriers	Facilities should provide training and orientation as required for carriers coming onto their site. All carriers should be aware of the safety measures in place at the facilities to which they deliver or pick-up product.
5.2.2	Product Awareness	Facilities should provide carriers with an SDS or product specification sheet to ensure carriers are aware of the appropriate handling of the product. Facilities should provide carriers with emergency contact information in case of an incident with the product in question. This information should be readily available and kept up-to-date. This could be done by including signage with emergency contact information in loading areas. Signage should be clearly visible for carriers in the loading area.
5.2.3	Prior To and During Product Transfer	Carriers should be aware of the positions of all lines, valves, and other related equipment and ensure that nothing is open to the environment.
5.2.4	Completing Product Transfer	Once product transfer is completed, carriers should ensure that all valves, pipes, pumps, etc., are closed off and capped or plugged, and all pumps and other equipment is locked out to prevent any accidental spills.

Prevention of Human and Environmental Exposure

Section 6 covers measures to prevent human and environmental exposure, as well as steps to take in the case the human or environmental exposure does occur. This section provides guidance on separation distances from waterways, wells, and riparian areas, recommended measures for well maintenance, and measures to take in the case of human or environmental exposure. Following these best practices can help agri-retailers, distributors, and on-farm end-users reduce the environmental risk and liability of a facility by minimizing the risk of release of liquid fertilizer into vulnerable areas of the environment. In addition to the recommendations listed in this section, consult the Occupational Health & Safety (OHS) requirements for your jurisdiction.

6.1 Separation Distances

NO.	ACTIVITY	BEST PRACTICE
6.1.1	Distance from Surface Water	Fertilizer storage and mixing areas should be located at least 150m from any surface water. Consult municipal or provincial requirements for separation distances from surface water as local requirements may be more stringent. If storage and mixing areas are located within 100m of surface water, all runoff should be directed away from surface water. This can be done by reshaping the land, building diversions, etc. Consult municipal and provincial requirements prior to undertaking any construction of diversions or land reshaping.
6.1.2	Distance from Wells	Fertilizer storage and mixing areas should be located at least 90m from any wells. Where possible, fertilizer storage and mixing and loading areas should be located downslope of any wells.

6.2 Well Maintenance

NO.	ACTIVITY	BEST PRACTICE
6.2.1	Well Water Testing	On-site wells that are located less than 90m from a fertilizer storage and mixing area should be tested at least once a year for parameters including nitrates. Consult your provincial requirements and guidelines for water quality objectives.
6.2.2	Well Casing	On-site well casing should be inspected at least on an annual basis for any defects, including holes or cracks. Well casing should be in good condition without defects. There should be no spacing or settling between the surface material around well casings.
6.2.3	Unused Wells	Any identified wells that are unused or abandoned should be capped, plugged, or sealed in a timely manner and according to municipal or provincial guidelines and requirements.

6.3 Environmental Exposure

NO.	ACTIVITY	BEST PRACTICE
6.3.1	General Spill/Tank Failure Response	In the case of any spill or tank failure, appropriate remediation efforts should be undertaken immediately to mitigate impacts to the environment. Consult your provincial or municipal requirements for managing and reporting spills. **See Appendix C for additional guidance on spill reporting.**
6.3.2	Spills Near/Into Fish Habitats	Any spills into fish habitats and any resulting fish death should be reported immediately to a fisheries officer and appropriate environmental authorities. **See Appendix C for additional guidance on spill reporting.**

6.4 Human Exposure

NO.	ACTIVITY	BEST PRACTICE
6.4.1	Prevention of Human Exposure	Ensure appropriate personal protective equipment (PPE) is in good condition and readily available to employees. Consult all applicable resources, including the product Safety Data Sheet (SDS), recommendations from product suppliers, and your provincial or municipal OHS PPE requirements. Safety training and PPE should meet all provincial OHS requirements.

Additional Resources

Appendix A provides additional resources on handling and storing liquid fertilizer. Many of these resources were consulted to inform the guidance in the document. Readers are encouraged to consult these resources in addition to the guidance provided in this document.

Agricultural Industries Confederation. "Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Fluid Fertilisers Part 1 SUPPLIERS." Agricultural Industries Confederation, 2014. https://www.agindustries.org.uk/asset/D815E1D2-3F5E-43AF-8D1CC3D7D50E4B18/.

Agricultural Industries Confederation. "Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Fluid Fertilisers Part 3 USERS." Agricultural Industries Confederation, 2014. https://www.agindustries.org.uk/asset/42FF3297-8CC4-4BDE-865AD41A15F5E28E/.

Agricultural Industries Confederation. "Protecting the Environment—The Essentials for Storing Solid and Liquid Fertilisers." Agricultural Industries Confederation, 2021. https://www.agindustries.org.uk/resource/protecting-the-environment---the-essentials-for-storing-solid-and-liquid-fertilisers.html.

The Fertilizer Institute. "Aboveground Storage Tanks Containing Liquid Fertilizer—Recommended Mechanical Integrity Practices." The Fertilizer Institute, 2009. https://www.tfi.org/sites/default/files/updateduanguidelines_-_dec_2_-_km.pdf

Ontario Soil and Crop Improvement Association. "Infosheet #4: Fertilizer Storage and Handling." Ontario Soil and Crop Improvement Assocation, 2015. https://www.ontariosoilcrop.org/wp-content/uploads/2015/08/EFPInfosheet4.pdf.

Risk Assessment of Liquid Fertilizer Storage—Executive Summary

Issue Overview and Background

The Canadian fertilizer industry is committed to improving safety and minimizing the environmental impact of its products. Although incidents involving accidental release of liquid fertilizer are rare, historical incidences of storage tank and containment failures have resulted in significant liability costs to the property owner, fertilizer supplier, and industry for emergency response, environmental assessment and remediation, environmental regulatory fines, as well as negative impacts to the industry's public perception. However, existing guidance and best management practices for liquid fertilizer storage are not comprehensive or consistent between jurisdictions.

In 2019, Fertilizer Canada contracted WSP Canada Inc. (WSP) to conduct a risk assessment of liquid fertilizer storage in Canada at ag-retail facilities and on-farm. The risk assessment report included a regulatory review, an agri-retail survey and analysis of 40 sites with liquid fertilizer storage, an analysis of historical incidents, and a qualitative risk assessment to identify environmental risk from known or potential releases of liquid fertilizer from storage tanks. Additionally, the report documented an estimation of economic impact (estimated environmental liability) associated with low-, medium-, and high-risk scenarios.

Key Findings

REGULATORY REVIEW

A regulatory review was conducted to identify existing regulations that govern liquid fertilizer storage as well as any gaps between existing regulations and recommended best management practices. In Canada, there are currently no existing regulations for liquid fertilizer storage and guidance on liquid fertilizer storage is limited, particularly for agri-retail facilities which store liquid fertilizer in large quantities. Some provincial agricultural agencies provide information on best management practices; however, this tends to be focused on small-scale storage tanks and on-farm storage and use.

AGRI-RETAIL SURVEY

The ag-retail survey was sent to 24 agri-retail companies. Nine companies responded to the survey, encompassing a total of 40 ag-retail sites and 242 liquid fertilizer tanks. A survey for farmers was also developed and distributed, however no responses were received from farmers. The survey assessed the extent to which key best management practices are followed. The practices assessed include:

Use of secondary containment that is considered impermeable

- Use of secondary containment that is at least 110% of the largest tank volume
- Visual inspections prior, during, and after filling tanks
- Presence of an emergency plan
- Use of a permanent loading area with containment or preventative measure against spills
- Supervision during loading, spring-time recirculation, and unloading operations
- Daily visual inspections
- Annual external inspections
- Annual internal inspections
- The agri-retail survey found that while most sites have implemented several best management practices, most sites have not implemented all best management practices.

HISTORICAL INCIDENT CASES

Through a review of historical incident cases, the risk assessment identified a number of factors that are known to cause fertilizer releases, including incorrect tank specifications for stored product, lack of secondary containment measures/permeable secondary containment, operation errors, lack of daily visual inspections, delivery errors, and equipment failures (e.g., valves). The risk assessment also identified factors that appear to be correlated with an increased tendency for liquid fertilizer releases and liability, including tank failure (as opposed to equipment failure), lack of secondary containment, lack of appropriate spill response, contamination of groundwater

and surface water due to a spill, and human and ecological exposures to the spill.

QUALITATIVE RISK ASSESSMENT

A qualitative risk assessment was conducted to evaluate environmental risk from releases of liquid fertilizer from storage tanks, with a focus on the following exposure pathways: leaching into groundwater and ingestion of contaminated drinking water by human receptors, and surface run-off into a water body and direct contact of contaminated water by aquatic organisms. The qualitative risk assessment was supported by the development of a risk ranking system to classify both known and potential releases of liquid fertilizer from storage tanks that are considered to represent high, medium, or low risk for the exposure pathways in question. Risk ranking was based on the following factors that contribute to environmental risk: source (source and quantity spilled or potential for spills based on storage tank characteristics and best management practices), environmental transport (known level of contaminated groundwater or surface water, or the potential for environmental releases based on spill management measures), human health exposure and effects, and ecological exposure and effects.

Conclusions and Recommendations

The risk assessment concluded with multiple recommendations for Fertilizer Canada and the fertilizer industry to mitigate or eliminate risk associated with liquid fertilizer storage, as follows:

Develop a guidance document outlining the best management practices for liquid fertilizer storage tanks specific to agri-retail and farmers;

1. Given the broad range of tanks currently used by agri-retailers, consult with industry on tank lifespan and best management practices related to maintaining tank integrity;
2. Consider targeted advertising to agri-retailers about best management practices related to secondary containment and frequency of inspections (as these are the practices that agri-retailers scored most poorly on);
3. Provide self-management tools that help agri-retailers and farmers identify environmental risk related to site-specific liquid fertilizer storage and use;
4. Consider development of an environmental management plan specific to agri-retailers and farmers for liquid fertilizers to mitigate potential risks;
5. Create a spill database system for agri-retailers to maintain records of spill incidences and related information that could help with future understanding of the conditions under which accidental releases occur and the associated environmental risks and liability.

The Liquid Fertilizer Storage Guidance document was developed to begin addressing these recommendations. For further information on the Risk Assessment of Liquid Fertilizer Storage, please contact Fertilizer Canada.

Guidance for Spill Reporting

Requirements for reporting spills of liquid fertilizer vary between jurisdictions. The information below is intended to provide guidance only. All operators of fertilizer storage facilities should consult the regulations and protocols for reporting liquid fertilizer spills in the province and municipality where your site is located to ensure accuracy. This information should be verified, incorporated into emergency response planning, and kept up to date.

Last Updated: March 28, 2022

PROVINCE	SPILL REPORTING AGENCY	RELEVANT LINKS
Alberta	24/7 Environmental Response Line: 1 (800) 222-6514 Telephone report should be made at first available opportunity and followed by a written report.	Reporting Spills and Releases Alberta.ca
British Columbia	Reporting Telephone Line: 1 (800) 663-3456 Spills can also be reported via the Spill Reporting App for iOS/Android.	Spills and Environmental Emergencies gov.bc.ca
Manitoba	Manitoba Conservation 24/7 Telephone Line: (204) 944-4888	Environmental Emergency Response Program: General Information gov.mb.ca
New Brunswick	During normal operating hours, spill reports should be made to the appropriate regional office of New Brunswick's Department of Environment and Local Government. Consult the department website for the appropriate telephone number. In case contact cannot be made with the regional office, or a spill occurs after-hours, report should be made to the Canadian Coast Guard emergency number: 1 (800) 565-1633	Spill Reporting in New Brunswick gnb.ca
Newfoundland and Labrador	24/7 Environmental Emergency Line: (709) 772-2083 1 (800) 563-9089	Environmental Protection: Environmental Emergencies and Complaints gov.nl.ca
Nova Scotia	Nova Scotia Environment Emergency Response Line: 1 (800) 565-1633	When to Call Nova Scotia Environment Brochure NovaScotia.ca

Ontario	Spills Action Centre 24/7 Telephone Lines: (416) 325-3000 1 (800) 268-6060 (toll-free) 1 (855) 889-5775 (TTY) Spill must also be reported immediately to municipality, owner of the substance (if known), the person in control of the substance (if known).	Report pollution and spills Ontario.ca
Prince Edward Island	During regular business hours, call Environment Division directly at: (902) 368-5700 24-hour Environmental Emergency Response Line (after-hours calls answered by Canadian Coast Guard Atlantic Region/ Environment Canada Pollution Reporting Center): 1 (800) 565-1633	Environmental Emergency Response PrinceEdwardIsland.ca
Quebec	Urgence-Environnement (environmental emergency service): (418) 643-4595 1 (866) 694-5454	Urgence-Environnement, the environmental emergency service Environnement.gouv.qc.ca
Saskatchewan	Spill Control Centre: 1 (800) 667-7525	Hazardous Spills Reporting Saskatchewan.ca

Sample Inspection Checklists

The Sample Inspection Checklists are intended to provide a template that can be adapted as needed to the requirements and conditions at particular storage facilities. Inspections should be conducted by a trained individual on a regular basis.

Consult with the tank manufacturer to identify any specific inspection activities that should be considered for the tank and associated equipment being used.

Daily/Monthly Inspections

TANK & STORAGE AREA CHARACTERISTICS			
NO.	INSPECTION ITEM	INSPECTED	ACTION REQUIRED
1	Tank is clearly marked with appropriate signage indicating tank contents & consistent with WHMIS and GHS requirements	☐	☐
2	Tank is in good condition without cracks, leaks, corrosion, or other defects	☐	☐
3	Tank equipment & associated plumbing is in good condition	☐	☐
4	No moisture or debris around tank base	☐	☐
5	Tank is on a proper and level foundation	☐	☐
6	Taps and valves are locked when tank is not in use	☐	☐
7	Secondary containment area is in good condition without cracks, leaks, or loss of liquids to the environment	☐	☐
Notes & Action Items:			
Inspected by:		**Date:**	

FACILITY CHARACTERISTICS

NO.	INSPECTION ITEM	INSPECTED	ACTION REQUIRED
1	Emergency response kits and first aid kits are appropriately supplied, readily available, and accessible to staff	☐	☐
2	General housekeeping (e.g., all unnecessary equipment & tools stored out of the containment area, combustible/organic materials properly stored, general cleanliness, etc.)	☐	☐
3	Check for any cracks or concrete damage, wall damage, or roof damage	☐	☐
4	Electrical and lighting in good condition (e.g., check for any loose or frayed wires or other items in need of repair, ensure that lights are operational)	☐	☐
5	Fire extinguishers and hydrants inspected and in working condition	☐	☐
6	Floor and walking pathways are clear of obstructions and floor is in good condition	☐	☐
Notes & Action Items:			
Inspected by:		**Date:**	

TRANSPORT & HANDLING CHARACTERISTICS

Product transfer/loading should be conducted in a permanent, designated area where spills and leaks can be collected and contained.

NO.	INSPECTION ITEM	INSPECTED	ACTION REQUIRED
1	Loading/transfer area is in good condition without cracks, leaks, or other defects that could result in loss to the environment	☐	☐
2	All pumps and other equipment are locked out once transfer is complete, and all pipes, valves, pumps, etc., are closed off and capped or plugged	☐	☐
3	Material/equipment to mitigate spills is readily available (e.g., Oil-Dri)	☐	☐
4	Copy of SDS or product specification sheet is provided or is readily available to carrier	☐	☐
5	Appropriate PPE for the facility and the product is in good condition and in use	☐	☐
Notes & Action Items:			
Inspected by:		**Date:**	

Environmental Response Plan Template

This template is intended to be adapted to the specific needs and conditions of individual businesses. The Emergency Response Plan template is intended to provide a baseline of minimum requirements for emergency planning for liquid fertilizer storage only. The Emergency Response Plan template is not intended to meet the requirements of an Environmental Emergency (E2) Plan as required under the Environmental Emergency Regulations, 2019 (SOR/2019-51).

Local emergency responders should be aware of the emergency response plan in place at your facility as well as the quantity, type, and locations of any hazardous materials on-site.

LIQUID FERTILIZER EMERGENCY RESPONSE PLAN
Business name:
Business address:
Business phone number:
Business manager:
Date of last plan update/review:

EMERGENCY CONTACTS *(Include contact information for local first responders, relevant facility personnel, etc.)*
Fire department:
Police:
Poison control centre:
Business emergency contact:

ON-SITE RESOURCES *(Include location and description of emergency equipment, water supplies, etc.)*
First-aid equipment:
Hydrant(s):
Spill response equipment/supplies:
Secondary containment:

SITE HAZARDS *(INCLUde a listing of all major hazards on-site, including any dangerous goods storage, fire hazards, etc.)*

REPORTING CONTACTS *(Consult the reporting requirements for your jurisdiction for spills or environmental exposure of liquid fertilizer and include the appropriate contact phone number(s) here)*

EMERGENCY PROCEDURES—SPILL	
Notify:	*[insert emergency contacts to be notified]*
Plan of Action:	

Sample Tank Maintenance Record

Liquid Fertilizer Tank Maintenance Log

TANK ID/LOCATION:

DATE	MAINTENANCE/REPAIR PERFORMED	EMPLOYEE SIGNATURE