Manure Spills, Accidents, and Discharges

Learning from the mistakes of the past provides the opportunity to make appropriate changes for the future. With this thought in mind, learn from prior "mishaps" to avoid making them in the future. The following six case studies review several manure spills that occurred to livestock and poultry operations. These events actually happened, and unfortunately reflect other manure discharges and spills that have recently occurred to North American surface waters and groundwaters. As you read these cast studies, ask yourself the following questions:

- Was the manure spill an accident?
- What could have been done to prevent this spill from happening?
- Could this spill occur on my farm?
- Would I know how to handle or would I have the resources to address asimilar spill on my farm?
- Do I have an emergency action plan if a spill occurs?

...learn from prior "mishaps" to avoid making them in the future.

Case Study 1. **Equipment Failure**

Location: Ontario, Canada

Operation: Swine

Background
- To apply swine lagoon effluent to a field, a portable irrigation system was laid over a stream.
- When the pump was turned on, a section of pipe over a bridge became disconnected.
- The farmer wired the pipes back together and then continued the manure application.
- No attempt was made to collect the effluent released into the stream.
- The farmer did not notify regulators of the incident for two days.

Result
- Lagoon effluent leaked from the separated pipes and flowed directly into the stream below.
- Fish were killed in the creek downstream of the spill.

Response
- Ontario investigators confirmed the spill had caused the fish kill in the stream.
- Charges were brought against the farmer, citing a lack of "due diligence" and "failure to notify" regulatory authorities in a timely manner.

Action
- The farmer took no further action.
- He was convicted and fined.

How could this spill have been avoided?
- Use a section of flexible pipe to carry manure over streams and bridges.
- Monitor the pipeline during application.
- Be prepared to shut down immediately. If a problem develops, have manpower and radios on hand.
- Notify the appropriate state and local authorities as soon as possible.

Case Study 2. **Improper Modification of Storage Structure**

Location: Southeastern North Carolina

Operation: Swine

Background
- A lagoon exceeded its temporary liquid storage.
- Irrigation equipment was not onsite, and neither was sufficient land cleared for application if a pump and equipment had been available.
- Approximately a week before the spill, farm workers had improperly installed a pipe in the lagoon embankment.
- Rainwater from a tropical storm ponded above and then scoured out the embankment near where the pipe was installed.
- The lagoon breached, releasing lagoon effluent and sludge.

Result
- Over 20 million gallons of effluent and sludge were discharged into a nearby river.
- Fish were killed in the river downstream of the spill.

Response
- Television and print media reported the lagoon spill throughout the state and country. In fact, the spill was reported in newspapers as far away as De Hague, Netherlands.

- State water quality investigators confirmed the spill had caused the fish kill in the creek.
- The farmer was charged with violating state water quality standards.
- The farmer was also required to depopulate until repairs were made to the lagoon, irrigation equipment was purchased, and sufficient land application fields were cleared and planted.

Action

- The farmer was required to depopulate and make repairs.
- The farmer was also convicted and fined.
- Repairs and land clearing were completed approximately one and a half years after the lagoon breach.

How could this spill have been avoided?

- Consult and follow plans provided by NRCS or a professional engineer before installing any pipe or electrical line on a lagoon embankment.
- Ensure that trenches on an embankment are dug in a "V" shape and backfill soil is mechanically tamped. Excess soil should be placed over the backfilled trench, allowing for any settling.
- Ensure that land application fields are cleared and planted prior to populating a new farm or delivering manure to a new storage basin or lagoon.

Case Study 3. **Overapplication of Manure**

Location: Southern Ohio

Operation: Dairy

Background

- The gasoline-powered drive engine on a traveling gun irrigation system ran out of fuel while the irrigation pump was still running.
- Excessive amounts of liquid manure were applied to a level, untilled field.

Result

- Manure leached down to the field tile system and drained into an open drainage ditch.
- The water quality was impaired by low dissolved oxygen levels downstream in the drainage ditch and adjoining stream.
- The farmer observed discolored water and foam discharging from the field tile into the open drain.

Response

- State water quality officials responded to an anonymous call.
- Water samples were taken to identify the contamination source.
- Discolored water and foam were found discharging from a field tile outlet into the drainage ditch.
- The farmer was charged with applying manure at a rate that exceeded his manure utilization plan and with violating the state's water quality standards.

Action

- The farmer took no further action.
- He was convicted and fined.

How could this spill have been avoided?

- Check engine fuel and oil levels before each "pull" on a traveling gun irrigation system.
- Delay manure application until field tiles stop flowing.
- Inspect irrigation systems during application events. Ensure that drive engines and turbines are operating.
- Before selecting application rates and pumping duration, check soils for their "antecedent" moisture condition.
- Postpone irrigation of manure and wastewater until drainage from tile drains stops.

Case Study 4. **Lack of Storage Capacity**

Location: Southern Pennsylvania

Operation: Dairy

Background

- The farm's manure storage basin was overflowing into a field.
- An irrigation gun and a tank wagon were used to apply manure onto a bottomland field of wheat stubble.
- The application occurred in the evening and throughout the night in November, following several days of rain and snow.
- Application rates of 7,200 gal/acre were reported, but investigators believed the rate was higher.

Result

- Manure from the overflowing storage basin first entered a nearby field tile system that drained into a community drain system crossing the property and then entered a stream on the neighbor's property.
- Liquid manure entered the community drain via a tile blowout and open catch basins, eventually contaminating two, in-stream ponds on the neighbor's property.

Response

- The producer informed state water quality officials who investigated the following day.
- Water samples were taken, identifying the source of the contamination.
- The producer was charged with violating state water quality standards by failing to provide adequate storage and discharging manure into surface waters.

Action

- The stream was temporarily dammed to prevent further movement of manure-laden water downstream.
- The producer pumped contaminated water from the stream and applied it onto adjacent fields under the supervision of state investigators.
- The farmer was required to depopulate until repairs were made to the lagoon, irrigation equipment was purchased, and sufficient land application fields were cleared and planted.
- The producer paid a fine with no contest.

How could this spill have been avoided?

- Ensure that adequate storage is available to allow application flexibility during bad weather.
- Do not apply manure when soil is nearly saturated from snow or rain.
- Inspect fields regularly, especially before a manure application, to ensure that tile blowouts are repaired.
- Monitor tiles during and after manure application.
- If a problem occurs, notify your state water quality agency as soon as possible.

Case Study 5. **Transport Accident**

Location: SE Virginia

Operation: Poultry layer sludge

Background
- Contractor tanker driver failed to check for oncoming train.
- Slow-moving train severed tanker, releasing 8,500 gallons of lagoon sludge.
- Startled but unharmed driver immediately contacted supervisors and fire department.

Result
- Lagoon sludge released from the tanker flowed directly into a nearby stream.
- Fish were killed in the stream downstream of the spill.

Response
- Contractor contacted state water quality agents.
- Stream was dammed to contain the spilled sludge and contaminated water. Vacuum tanker, already on site, pumped and applied the material to an application field.
- Due to the company's quick response, which mitigated the spill, the contractor received only a warning.

How Could this Spill have been Avoided?
- Be especially careful when transporting manure and sludge on public roads.
- Minimize transport of manure in areas of high traffic, high speeds, or railroad crossings.

Case Study 6. **Manure Gas Emergency**

Location: Northern Iowa

Operation: Dairy

Background
- 28-year-old dairy farmer entered a 10-foot-deep manure pit to replace a shear pin on an agitator shaft.
- While he was climbing out, he was overcome by gas and fell onto the pit floor. The man's 15-year-old nephew observed the event, climbed into the pit, and also collapsed.
- One by one, others entered the pit to help—the boy's father, his cousin, and his grandfather, who owned the farm—and all were overcome.
- An owner of a local farm implement business and two workers rescued victims with a rope; they did not go into the pit.
- The emergency rescue squad arrived 20 minutes after the tragedy began.

Result
All five family members died.

How could these deaths have been avoided?
- Never enter a manure pit without proper ventilation.
- When you must enter a pit, wear an air-supplied respirator or a self-contained breathing apparatus. Cartridge-type masks are NOT safe.
- Rescuers entering the pit area should wear a safety harness attached to a rope attended by two people at the pit's entrance. Another recommendation—attach the safety rope to a winch or hoist.

General recommendation for working in a space over a manure pit
Keep the manure agitator below the liquid surface because gas is released in greater volumes with vigorous surface agitation.

Confined Spaces and Manure Pits

Working in a confined space

A confined space is defined as a space that has limited means of entry and exit, has an adequate size and configuration for employee entry, and is not designed for continuous worker occupancy. Most states classify the tanks designed for waste storage, transport, and application as confined spaces. Under new Occupational Safety and Health Act (OSHA) regulations, certain confined spaces require a permit for entry. A permit-required confined space is defined as a confined space that has one or more of the following characteristics:

- It contains or potentially contains a hazardous atmosphere.
- It contains a material that can potentially engulf an entrant.
- Its integral configuration, inwardly-converging walls or a floor that slopes downward and tapers to a smaller cross-section, could trap or asphyxiate an entrant.
- It contains any other recognized serious safety or health hazard.

Confined spaces on farms may include

- Manure pits.
- Silos.
- Tank spreaders.
- Below-ground storage pits.
- Grain bins and dryers.

Do not enter a permit-required confined space without proper training, equipment, and support personnel.

To be in compliance with the new OSHA regulations, a facility with permit-required confined spaces, must develop and implement a written confined space entry program. Enclosed facilities used to handle wastewater or wastewater solids, such as tanks and/or tanker trucks, fall under the permit-required confined space regulations. Do not enter a permit-required confined space without proper training, equipment, and support personnel. (The confined space regulations can be found in the Code of Federal Regulations 29 CFR 1910.147.)

When working in a space that does not require a confined space permit, the following safety actions should still be taken:

- Always assign a standby person to remain outside of the confined space. It is this person's responsibility to be in constant contact (visually, verbally, or both) with the workers inside the confined space as long as anyone is in the space.
- Wear ear protection as needed. Noise within a confined space can be amplified because of the space's design and acoustic properties.
- Use only an air-supplying respirator, such as a self-contained breathing apparatus (SCBA) or a supplied-air respirator with an auxiliary escape-only SCBA in confined spaces where there is insufficient oxygen.

Recommendations for farms with manure pits

- Never enter a pit without proper ventilation. Before entering the pit, evaluate its atmosphere by testing for sufficient oxygen and the presence of toxic gases. Continue to test the atmosphere while workers are in the pit. When going in, wear an air-supplied respirator or a SCBA, as well as a safety harness attached to a rope attended by two