

Appendix 13.7-E Draft Spill Response Procedures for Select Substances

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1. AMMONIUM NITRATE

The first step to prevent potential spills and associated hazards is the application of proper storage procedures for bulk ammonium nitrate, including the following:

- ▶ Ensure good housekeeping of the Explosive Facility such as keeping the area clear of obstructions that can cause potential incidents, or spilling and/or cross-contamination of materials;
- ▶ Store ammonium nitrate away from combustible materials, fuels, and other blasting accessories (i.e., boosters, delays, detonating cords, and detonators);
- ▶ Post proper signage restricting the use/exposure of ammonium nitrate to ignition sources (e.g., no hot work, smoking or vehicle maintenance);
- ▶ Ensure the Explosive Facility is well ventilated; and
- ▶ Ensure the Explosive Facility is locked with access restricted to only authorized personnel.

The following is a general spill response procedure for ammonium nitrate. Consult the MSDS to determine whether deviations from the general guidance are required.

1. Isolate and evacuate the spill area.
2. Contact your Supervisor who will then contact the relevant superintendent and coordinate appropriate spill response (assemble ERT members and the appropriate spill response materials).
3. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
4. Put on appropriate PPE. For an ammonium nitrate spill, this includes:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ protective eyeglasses, chemical safety goggles, or face shield as recommended by the MSDS;
 - ▶ lab coat, coveralls or Tyvek™ coveralls as recommended by the MSDS; and
 - ▶ half mask air-purifying respirator with cartridges and/filters as recommended by the MSDS or respirator manufacturer.
5. Ventilate (open windows/doors to outdoor) closed spaces before entering.
6. Remove all sources of heat and ignition (no smoking, flares, sparks, or flames in immediate area) and remove uncontaminated combustible materials and organic compounds (wood, paper, oil, etc.) from spill area.
7. For spills on land, protect the spill area from water runoff by constructing a ditch or dyke using suitable absorbent materials, soil or another appropriate barrier.
8. Vacuum or sweep the spill residue using non-metal, non-sparking tools and place the residue in a labelled plastic container (plastic pail with lid or double heavy-duty plastic bags) for reuse or offsite disposal at a licensed disposal facility.
9. Remove and bag PPE for cleaning or disposal at a licensed facility. Thoroughly wash potential skin contact locations after handling.

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Notes:

- ▶ Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid and clearly label the container per WHMIS Guidelines.
- ▶ Minimize dust generation during the operation.

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2. AMMONIUM NITRATE FUEL OIL (ANFO)

Proper storage, handling and disposal of ammonium nitrate fuel oil (ANFO) are an important first step in preventing spills and associated hazards.

The proper storage procedures are as follows:

- ▶ Use ANFO under the supervision of authorized trained personnel;
- ▶ Keep ANFO away from heat, sparks, and flames, as well as initiating explosives, oxidizing agents, combustibles, and other sources of heat; and
- ▶ Protect containers from physical damage and store them in dry, well ventilated conditions.

Explosives that have been identified as deteriorated and/or damaged by Telkwa Coal Limited's Blaster on shift or Orica personnel will need to be disposed of or destroyed. The appropriate method of disposal or destruction and subsequent course of action will be determined by authorized personnel or the explosive supplier.

Transportation of explosives-related compounds and materials will be in accordance with the *Explosives Act*, RSC 1985, c E-17 and associated regulations, and the *Transportation of Dangerous Goods Act*, SC 1992, c 34 and associated regulations. Transport vehicles will be in sound mechanical condition and equipped with proper safety equipment. Loaded vehicles will not be left unattended, and only authorized personnel will be responsible for the security of the explosives under their control.

The following is a general spill response procedure for ANFO. The following procedure does not apply to emulsions or other explosives. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For an ANFO spill (solid):

1. Isolate and evacuate the spill area.
2. IF SAFE TO DO SO, immediately extinguish any open flames and remove ignition sources (no smoking, flares, sparks in immediate area). Fires involving large quantities of ANFO should not be fought.
3. Contact the Incident Commander who will assemble ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
4. Put on appropriate PPE. For an ANFO spill this includes:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ protective eyeglasses or chemical safety goggles or face shield as recommended by the MSDS;
 - ▶ lab coat, coveralls or Tyvek™ coveralls as recommended by the MSDS;
 - ▶ shoe covers or rubber boots; and
 - ▶ half mask air-purifying respirator with cartridges and/filters as recommended by the MSDS or respirator manufacturer.

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5. If the spill occurred outdoors, stay upwind and avoid low lying areas. Ventilate (open windows and doors to outdoors) closed spaces before entering. Ensure adequate explosion proof ventilation for cleanup.
6. Remove all sources of heat and ignition (no smoking, flares, sparks or flames in immediate area) and remove uncontaminated combustible materials and organic compounds (wood, paper, oil, etc.) from spill area.
7. Do not operate radio transmitters within 100 m of electric detonators.
8. For a spill on land, protect the spill area from water runoff by constructing a ditch or dyke using suitable absorbent materials, soil or another appropriate barrier. For a spill to water, utilize damming, and/or water diversion to minimize the spread of contamination.
9. Collect, sweep or shovel spilled material and the other contaminated material and/or soil using non-metallic, spark-proof tools and place residue into a labeled plastic waste container (plastic pail with lid or double heavy-duty plastic bags) for offsite disposal at a licensed disposal facility.
10. Remove and bag PPE for cleaning or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.

Notes:

- ▶ Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and clearly label the container per WHMIS guidelines.
- ▶ The drums, containers and/ or residues are to be stored in ventilated areas away from incompatible materials for eventual offsite disposal at a licensed disposal facility.

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3. EMULSIONS (AMMONIUM NITRATE FUEL AND EMULSION) (ANE)

The first step to prevent potential spills and associated hazards is the application of proper use for bulk ANE, including the following:

- ▶ Ensure good operating practices when dispensing into blast holes to prevent spilling and/or cross-contamination of materials;
- ▶ Mix emulsions away from combustible materials, fuels, and other blasting accessories (i.e., boosters, delays, detonating cords, and detonators); and
- ▶ Post proper signage restricting the use/exposure of emulsions to ignition sources (e.g., no hot work, smoking or vehicle maintenance).

The following is a general spill response procedure for emulsions (ANE) if the spill is major at the blast site. Consult the MSDS to determine whether deviations from the general guidance are required.

1. Isolate and evacuate the spill area.
2. Contact your Supervisor who will then contact the Incident Commander and coordinate appropriate spill response (assemble ERT members and the appropriate spill response materials).
3. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
4. Put on appropriate PPE for an ANE spill. This includes:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ protective eyeglasses or chemical safety goggles or face shield as recommended by the MSDS;
 - ▶ lab coat, coveralls or Tyvek™ coveralls as recommended by the MSDS; and
 - ▶ half mask air-purifying respirator with cartridges and/filters as recommended by the MSDS or respirator manufacturer.
5. As emulsion is mixed in the field on the blast pattern there should be no need to ventilate.
6. Remove all sources of heat and ignition (no smoking, flares, sparks, or flames in immediate area) and remove uncontaminated combustible materials and organic compounds (wood, paper, oil, etc.) from spill area.
7. For spills on land, protect the spill area from water runoff by constructing a ditch or dyke using suitable absorbent materials, soil or another appropriate barrier.
8. Clean up spill using non-metal, non-sparking tools and place the residue in a labelled plastic container (plastic pail with lid or double heavy-duty plastic bags) for re-use or offsite disposal at a licensed disposal facility.
9. Remove and bag PPE for cleaning or disposal at a licensed facility. Thoroughly wash potential skin contact locations after handling.

Note:

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- ▶ Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid and clearly label the container per WHMIS guidelines.

4. COMPRESSED GAS

The following is a general spill response procedure for compressed gases. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a compressed (inert and flammable) gas leak:

1. IF SAFE TO DO SO and if it will stop the gas leak, turn off cylinder valve.
2. If the leak cannot be stopped by closing the cylinder valve and it is an inert atmospheric gas (e.g., nitrogen, carbon dioxide, etc.), isolate and evacuate the affected area. If the leak is a flammable gas immediately activate the fire alarm system and evacuate the area/building.
3. Contact the Incident Commander who will assemble ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
4. If possible and if safety permits, adjust leaking cylinder so that gas escapes rather than liquid.
5. If possible and if safety permits, eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area) and turn off electrical equipment.
6. If a spill has occurred outdoors, stay upwind and avoid low lying areas. If the spill has occurred inside a building, prevent spread of vapours throughout the building by closing doors to other rooms and hallways. If the room's heating, ventilation, and air conditioning system distributes air throughout the building, it may also be necessary to have it shut down. Allow vapours to ventilate outdoors by opening windows and doors to the exterior.
7. Isolate area until gas has dispersed.
8. Incident Commander to verify safe conditions.

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5. FLAMMABLE LIQUIDS

The following is a general spill response procedure for flammable or combustible liquids, particularly petroleum hydrocarbon products. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a spill of flammable or combustible petroleum hydrocarbon product (liquid):

1. Isolate and evacuate the spill area.
 2. IF SAFE TO DO SO, immediately extinguish any open flames and remove ignition sources (no smoking, flares, sparks in immediate area).
 3. IF SAFE TO DO SO, stop leak and contain spill (see Step 9).
 4. Contact the Incident Commander who will assemble ERT members if required and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
 5. Put on appropriate PPE. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ splash goggles or face shield;
 - ▶ shoe covers or rubber boots;
 - ▶ lab coat or Tyvek™ coveralls; and
 - ▶ half mask air-purifying respirator with organic vapour or combination cartridges, or as otherwise recommended by the MSDS or respirator manufacturer.
 6. If the spill has occurred outdoors, stay upwind and avoid low lying areas. If the spill has occurred inside a building, prevent spread of vapour throughout the building by closing doors to other rooms and hallways. If the room's heating and ventilation and air conditioning system distributes air throughout the building, it may also be necessary to have it shutdown.
 7. Ventilate (open windows and doors to outdoors) closed spaces before entering. Ensure adequate explosion-proof ventilation for cleanup. A vapour suppressing foam or water spray may be used to reduce vapours.
 8. Remove all sources of ignition (no smoking, flares, sparks or flames in immediate area) and combustible materials (wood, paper, oil, etc.) from within the spill area.
 9. Contain spill by using spill absorbent, spill pads or pillows, soil or snow by constructing a dyke that will limit flow and prevent entry to sewer, waterways or onto ice. For spills to land, excavation of trenches or pits to capture spill flow may also be appropriate. If possible, compact soil or snow dikes, and place plastic tarps over the dike and at its foot to allow the product to pool on the plastic for easy recovery.
- ▶ **Notes:**
- Do not use paper towels to absorb spill. This increases the rate of evaporation and vapour concentration in the air.
 - Do not flush with water into drainage areas or ditches as this will spread spill.

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- Snow works well as a natural absorbent to collect and contain spilled petroleum hydrocarbons. However, its use in containing a spill will result in a water-contaminant mixture that may be more difficult to manage. It is important to scrape up the contaminated snow and ice as soon as possible.
- 10. Carefully cover the spill area with spill absorbent, spill pads, soil or snow, starting at the outside and working inward. Do not touch or walk through spilled material.
- 11. Sweep up or shovel the residue using non-metallic, spark-proof tools and place the residue into a labelled plastic waste container (plastic pail with lid or double heavy-duty plastic bags). For larger spills to land, excavate impacted absorbent material and soil, place in lined and bermed, temporary storage area or directly into sealed drums or containers.
 - ▶ **Notes:**
 - If a spill is The drums, containers, and/or residues are to be stored in ventilated areas away from incompatible materials for eventual treatment at the onsite Soil Treatment Facility or offsite disposal at a licensed disposal facility. Electrically ground all containers and transporting equipment.
 - Larger pools of product may be pumped into empty storage tanks or drums.
- 12. Indoors, mop the affected area using detergent and water. Dispose of this water to drums for eventual offsite disposal at a licensed disposal facility. Spills to land may require further excavation or remediation of contaminated soil until acceptable soil quality is achieved. The Incident Commander and/or Environmental Coordinator will assess this requirement.
- 13. For spills to water, immediately limit the area of the spill on water using absorbent pads and booms and similar materials to capture small spills on water. Deploy and slowly draw in absorbent booms to encircle and absorb the spilled product. Recover larger spills on water with floating skimmers and pumps, as required, and discharge recovered product to drums or tanks.

Notes:

- ▶ Petroleum Hydrocarbons are generally hydrophobic, and as such, do not readily dissolve in water. They typically tend to float on the water's surface. Absorbent booms are often relied on to recover hydrocarbons that escape land containment and enter water.
- ▶ Antifreeze sinks and mixes with water. If released to water, attempt to isolate or confine the spill by damming or diverting the spill. Pump contaminated water to tanks or drums.
- ▶ Remove and bag PPE for cleaning, inform laundry personnel of contaminant hazards, or dispose at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated leather articles (including boots and shoes) that cannot be decontaminated.

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6. LIQUID OXIDIZER

The following is a general spill response procedure for liquid oxidizer compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

1. For a liquid oxidizer spill:
2. Isolate and evacuate the spill area.
3. IF SAFE TO DO SO, stop leak and contain spill (see Step 8).
4. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
5. Put on the appropriate PPE. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ splash goggles or face shield;
 - ▶ shoe covers or rubber boots;
 - ▶ lab coat, coveralls or Tyvek™ coveralls as recommended by the MSDS; and
 - ▶ half mask air-purifying respirator with cartridges and/or filters as recommended by the MSDS or respirator manufacturer.
6. Ventilate closed spaces before entering. Ensure adequate explosion-proof ventilation for cleanup.
7. Remove and/or moisten with water any combustible material (wood, paper, oil, etc.) affected by the spill.
8. Use water spray to reduce vapours or divert vapour cloud drift, if required.
9. Contain spill by using non-combustible spill absorbent, soil or snow to construct a dyke that limits flow and prevents entry to sewer, waterways or onto ice. For spills to land, excavation of trenches and/or pits to capture spill flow may also be appropriate.
 - ▶ **Note:**
 - Flushing area with flooding quantities of water may also be appropriate assuming this does not make cleanup and waste management more difficult – refer to the MSDS.
10. Carefully cover the spill area with spill absorbent, soil or snow, starting at the outside and working inward. Use non-combustible absorbent. Do not touch or walk through spilled material.
11. Sweep up or shovel the spill residue using non-metal, non-sparking tools and place the residue into a labelled plastic waste container (plastic pail with lid or double heavy-duty plastic bags) for offsite disposal at a licensed disposal facility.
12. For indoor spills, mop the affected area using detergent and water. Flushing area with flooding quantities of water may also be appropriate. Refer to the MSDS. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate. Spills to land may require further excavation or remediation of contaminated soil until acceptable soil quality is achieved. The Incident Commander and/or Mine Superintendent will assess this requirement.

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13. Remove and bag PPE for cleaning, inform laundry personnel of contaminant hazards, or dispose at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

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7. SOLID OXIDIZER

The following is a general spill response procedure for solid oxidizer compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a solid oxidizer spill:

1. Isolate and evacuate the spill area.
2. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
3. Put on the appropriate PPE. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ safety glasses or goggles;
 - ▶ lab coat; and
 - ▶ half mask air-purifying respirator with N95 or greater protection particulate filter or as recommended by the MSDS or respirator manufacturer.
4. Remove all sources of heat and ignition (no smoking, flares, sparks or flames in immediate area) and remove uncontaminated combustible materials and organic compounds (wood, paper, oil, etc.) from spill area.
5. For spills to land, protect the spill area from water runoff by constructing a ditch or dyke using suitable non-combustible absorbent materials, soil or another appropriate barrier. For spills to water, utilize damming and/or water diversion to minimize the spread of contamination.
6. Vacuum, sweep, or shovel the spill residue using non-metal, non-sparking tools, and place the residue into a labelled plastic container (plastic pail with lid or double heavy-duty plastic bags) for re-use or offsite disposal at a licensed disposal facility.
 - ▶ **Notes:**
 - Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and clearly label the container per WHMIS guidelines.
 - Minimize dust generation.
7. If there is still oxidizer residue left in the spill area, neutralize with appropriate agent as recommended by the MSDS, or for spills to land, continue to excavate until no visible spilled solid remains. Use non-combustible spill absorbent or soil to absorb the neutralized residue. Place in suitable drums and/or containers for disposal at a licensed facility.
8. For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.
9. Remove and bag PPE for cleaning, inform laundry personnel of contaminant hazards, or dispose at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

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8. LIQUID ACIDIC SUBSTANCE

The following is a general spill response procedure for liquid acid compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a liquid acid spill:

1. Isolate and evacuate the spill area.
2. IF SAFE TO DO SO, stop leak and contain spill (see Step 8).
3. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
4. Put on appropriate PPE. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ splash goggles or face shield;
 - ▶ shoe covers or rubber boots;
 - ▶ lab coat or Tyvek™ coveralls; and
 - ▶ half mask air-purifying respirator with acid gas or combination cartridges, or as otherwise recommended by the MSDS or respirator manufacturer.
5. If the spill has occurred outdoors, stay upwind and stay out of low areas. If the spill has occurred inside a building, prevent spread of vapour throughout the building by closing doors to other rooms and hallways. If the room's air exchange system distributes air throughout the building, it may also be necessary to have it shut-down.
6. Ventilate (open windows and doors to outdoors) closed spaces before entering.
7. Remove all sources of ignition (no smoking, flares, sparks or flames in immediate area).
8. Contain spill by using spill absorbent, spill pads or pillows, or dry soil to construct a dike that limits flow and prevents entry to sewer, waterways or onto ice. For spills to land, excavation of trenches/pits to capture spill flow may also be appropriate. Ideally, use spill absorbent that contains a mild neutralizing agent as recommended by the MSDS.
 - ▶ **Notes:**
 - Many acids, particularly concentrated acids, react violently in the presence of water. Do not flush spill area with water unless the MSDS indicates acceptable.
 - Nitric acid reacts violently and explosively with organic chemicals and organic material such as wood, cotton and paper; therefore, do not use organic absorbent material on nitric acid.
 - Hydrofluoric acid will fume during neutralization. Provide adequate ventilation and approach from upwind. Neutralize carefully with sodium bicarbonate, soda ash or lime. Use water spray to disperse the gas or vapour if required. Remove all sources of ignition.
9. Carefully cover the spill area with spill absorbent, spill pads or dry soil, starting at the outside and working inward. If practical, neutralize spill using MSDS-recommended or commercially available neutralizers. Use pH indicator paper to determine if spill is neutralized (pH 7).

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► **Note:**

- Use caution as neutralization reactions generate heat.
10. Sweep or shovel the neutralized spill residue using non-metal, non-sparking tools and place the residue into a labelled plastic waste container (plastic pail with lid or double heavy-duty plastic bags) for offsite disposal at a licensed disposal facility.
 11. Check the pH of the spill area. If it is less than pH 6, then further neutralize with a dilute solution of a suitable reagent as identified on the MSDS, or for spills to land, continue to excavate contaminated soil.
 12. For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.
 13. Remove and bag PPE for cleaning, inform laundry personnel of contaminant hazards, or dispose at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

Note:

- After the spill has been cleaned up, the area should be free of vapours. However, if personnel note odours or irritation, isolate the spill area; re-clean the area or wait at least 1 hour before re-entering or until considered safe by the Incident Commander or Mine Superintendent.

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9. SOLID ACIDIC SUBSTANCE

The following is a general spill response procedure for solid acid compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a solid acid spill:

1. Isolate and evacuate the spill area.
2. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
3. Put on the appropriate PPE. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ safety glasses or goggles;
 - ▶ lab coat; and
 - ▶ half mask air-purifying respirator with N95 or greater protection particulate filter, or as otherwise recommended by the MSDS or respirator manufacturer.
4. Contain spill to prevent release to sewer, waterway or onto ice. For spills to land, protect the spill area from water runoff by constructing a ditch or dike using absorbent materials, dry soil or other appropriate barrier. If raining, cover spill area with tarp or plastic to minimize contact with water and prevent reaction and/or subsequent runoff. For spills to water, utilize damming, and/or water diversion to minimize the spread of contamination.
5. If necessary, to minimize dust production, slightly moisten the solid. Use water, or if the material is water reactive, another inert liquid as recommended by the MSDS.
6. Sweep up or shovel the residue using non-metallic, spark-proof tools and place the residue into a labelled plastic waste container (plastic pail with lid or double heavy-duty plastic bags) for reuse or offsite disposal at a licensed disposal facility.
 - ▶ **Note:**
 - Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid and clearly label the container per WHMIS guidelines.
7. Remaining solid acid residue may be neutralized using a dilute solution of appropriate agent as recommended by the MSDS (e.g., sodium bicarbonate [baking soda]) or, for spills to land, continue to excavate until no visible spilled solid remains. Check the pH of the spill area; the final pH should be between pH 6 and 10. Use spill absorbent, spill pads or dry soil to absorb the neutralized residue.
 - ▶ **Note:**
 - Use caution as neutralization reactions generate heat.
8. For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.

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9. Remove and bag PPE for cleaning, inform laundry personnel of contaminant hazards, or dispose at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

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10. LIQUID ALKALI SUBSTANCE

The following is a general spill response procedure for liquid alkali or base compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a liquid alkali or base spill:

1. Isolate and evacuate the spill area.
2. IF SAFE TO DO SO, stop leak and contain spill (see Step 8).
3. Contact the Incident Commander who will assemble ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
4. Put on the appropriate PPE. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ splash goggles or face shield;
 - ▶ shoe covers or rubber boots;
 - ▶ lab coat or Tyvek™ coveralls; and
 - ▶ half mask air-purifying respirator with cartridges/filters as recommended by the MSDS or respirator manufacturer.
5. If the spill has occurred outdoors, stay upwind and stay out of low areas. If the spill has occurred inside a building, prevent spread of vapour throughout the building by closing doors to other rooms and hallways. If the room's air exchange system distributes air throughout the building, it may also be necessary to have it shut-down.
6. Ventilate (open doors and windows to outdoors) closed spaces before entering.
7. Remove all sources of ignition (no smoking, flares, sparks or flames in immediate area) and combustible materials (wood, paper, oil, etc.).
8. Contain spill by using spill absorbent, spill pads or pillows, or dry soil to construct a dyke that limits flow and prevents entry to sewer, waterways or onto ice. For spills to land, excavation of trenches and/or pits to capture spill flow may also be appropriate. Ideally, use spill absorbent that contains a mild neutralizing agent as recommended by MSDS.
 - ▶ **Note:**
 - Use caution as neutralization reactions generate heat.
9. Carefully cover the spill area with spill absorbent, spill pads or dry soil, starting at the outside and working inward. If practical, neutralize spill using MSDS-recommended or commercially available neutralizers. Use pH indicator paper to determine if spill is neutralized (pH 7).
 - ▶ **Note:**
 - Use caution as neutralization reactions generate heat.
10. Sweep or shovel the neutralized spill residue using non-metal, non-sparking tools and place the residue into a labelled plastic waste container (plastic pail with lid or double heavy-duty plastic bags) for offsite disposal at a licensed disposal facility.

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11. Check the pH of the spill area. If it is greater than pH 10, then further neutralize with a dilute solution of a suitable reagent as identified on the MSDS, or for spills to land, continue to excavate contaminated soil.
12. For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.
13. Remove and bag PPE for cleaning, inform laundry personnel of contaminant hazards, or dispose at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.
14. After the spill has been cleaned up, the area should be free of vapours. However, if personnel note odours or irritation, isolate the spill area; re-clean or wait at least 1 hour before re-entering or until it is considered to be safe by the Incident Commander or Mine Superintendent.

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11. SOLID ALKALI SUBSTANCE

The following is a general spill response procedure for solid alkali or base compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a solid alkali or base spill:

1. Isolate and evacuate the spill area.
2. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
3. Put on the appropriate PPE. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - ▶ gloves as recommended by the MSDS or glove manufacturer;
 - ▶ safety glasses or goggles;
 - ▶ lab coat; and
 - ▶ half mask air-purifying respirator with N95 or greater protection particulate filter or as recommended by the MSDS or respirator manufacturer.
4. Contain spill to prevent release to sewer, waterway or onto ice. For spills to land, protect the spill area from water runoff by constructing a ditch or dyke using absorbent materials, dry soil or another appropriate barrier. If raining, cover spill area with tarp or plastic to minimize contact with water and prevent reaction and/or subsequent runoff. For spills to water, utilize damming, and/or water diversion to minimize the spread of contamination.
5. If necessary, to minimize dust production, slightly moisten the solid. Use water or, if the material is water reactive, another inert liquid as recommended by the MSDS.
 - ▶ **Note:**
 - Do not use water to flush bases in powdered form, such as calcium oxide (lime), as this material is not very soluble.
6. Sweep or shovel the residue using non-metallic, spark-proof tools and place the residue into a labelled plastic waste container (plastic pail with lid or double heavy-duty plastic bags) for off- site disposal at a licensed disposal facility.
 - ▶ **Note:**
 - Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid and clearly label the container per WHMIS guidelines.
7. Remaining solid alkali or base residue may be neutralized using a dilute solution of appropriate acid. Check the pH of the spill area; the final pH should be between pH 6 and 10. Use spill absorbent, spill pads or dry soil to absorb the neutralized residue.
8. For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.

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9. Remove and bag PPE for cleaning, inform laundry personnel of contaminant hazards, or dispose at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

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12. PESTICIDES AND POISONOUS SUBSTANCE

The following is a general spill response procedure for pesticide and poisonous compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a pesticide or poisonous substance spill:

1. Isolate and evacuate the spill area.
2. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
3. Put on the appropriate PPE such as positive pressure self-contained breathing apparatus (SCBA) and full protective clothing. This is a minimum level of protective clothing and will not provide adequate protection for all incidents.
4. Due to the construction and materials used for firefighter turnout clothing, the clothing may actually absorb and hold the pesticide or poison if contact with the smoke, fumes, dust, vapors, or material occurs. The firefighter would be re-exposed each time the clothing was worn if proper decontamination operations were not performed.
5. In most incidents involving pesticides or poisons, the chemical protective clothing carried on the Hazmat Team will be required for safe handling of the incident.
6. Stay upwind and keep out of low area. If you can smell pesticide, you are too close and not sufficiently protected.
7. Avoid exposure to smoke, fumes, vapors, dust or direct contact.
8. Determine signs and symptoms of exposure and advise all personnel operating at the site. Some symptoms may not become present for up to 48 hours following exposure.
9. Ventilate confined areas before entering. It is not advisable for fire personnel to enter tanks or other confined spaces that contain or have contained pesticides and/or poisons.
10. If spilled material has entered storm, sewer, or water systems, notify the proper authority. Maps should be used to determine the direction of flow and destination (outflow) of the system. Consideration should be given to constructing a berm ahead of the flow.
11. Determine and implement appropriate decontamination procedures for personnel and equipment.
12. Flush any contacted material from skin or clothing immediately.
13. Remove and isolate any contaminated clothing at the site and avoid spreading contamination to non-contaminated areas.
14. Consult MSDS for product information and assistance.
15. For a liquid pesticide spill, extinguish or eliminate all sources of ignition in the vicinity as many pesticides have flammable liquids as the carrier of the poison. Use combustible gas detectors to determine the boundary of the vapors if the pesticide is a flammable.

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16. Do not allow vehicles or other sources of ignition in the area as long as the combustible gas detector indicates the presence of flammable vapors.
17. If it can be done safely, attempt to close valves, plug, or otherwise reduce the amount of leakage.
18. Water spray can be used to absorb water miscible vapors, and water spray or explosion-proof fans can be used to disperse vapors. Do not get water inside containers. Runoff must be contained for later analysis and possible disposal. Do not permit the runoff to enter storm, sewer or water systems.
19. Keep material out of storm, sewer, and water systems.
20. Dig trenches or build dykes ahead of the flow to confine the spill for later disposal or recovery.

Note:

- ▶ Powder spills can be covered with a plastic sheet or tarp to minimize spreading.

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13. INFECTIOUS SUBSTANCES (BIOLOGICAL SUBSTANCES)

The following is a general spill response procedure for infectious compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For an infectious substance spill:

1. Isolate and evacuate the spill area.
2. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
3. Put on the appropriate PPE such as SCBA and chemical protective clothing. Firefighter protective clothing will not provide adequate protection for all incidents involving infectious substances. The chemical protective clothing carried on the Hazmat team may be required for safe handling of the incident.
4. Stay upwind and keep out of low areas.
5. Avoid exposure to smoke, fumes, vapors, or dust. Do not contact damaged containers or spilled material. Virus and disease-bearing substances are often present.
6. If leakage is discovered in transit, the vehicle must not be moved and the area must be isolated.
7. If spilled material has entered storm or sewer systems, notify the proper authority.
8. Implement appropriate decontamination procedures. A freshly mixed 10% or stronger bleach to water solution is an effective decontamination solution for most infectious substance exposures.
9. Cover damaged containers or spill area with dampened towel or rag that is wet with liquid bleach.
10. To decontaminate the area and equipment, a garden sprayer with a 10% bleach to water solution can be used to spray exposed surfaces.
11. Recently mixed bleach and water solutions should be used, as premixed solutions lose their strength after a few days.
12. Dyke spills for later disposal.

Note:

- ▶ Keep materials out of storm drains, sewer system and potable water systems.

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14. RADIOACTIVE SUBSTANCES

The following is a general spill response procedure for radioactive compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

For a radioactive substance spill:

1. Isolate and evacuate the spill area.
2. Contact the Incident Commander who will assemble, if required, ERT members and the appropriate spill response materials outside the spill area. Obtain and read the MSDS for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.
3. Put on the appropriate PPE such as SCBA and chemical protective clothing. Firefighter protective clothing will not provide adequate protection for all incidents involving infectious substances. The chemical protective clothing carried on the Hazmat Team may be required for safe handling of the incident.
4. Avoid exposure to smoke, fumes, vapors, dusts or direct contact.
5. All personnel should utilize dosimeters. Zero dosimeters prior to use.
6. Entry should not be made until appropriate radiological personnel are on scene and the degree of radiation is known.
7. Enter Exclusion Zone only to save a life, and limit entry into the Exclusion Zone to the shortest possible time.
8. If spilled material has entered storm, sewer, or water systems, notify the proper authority.
9. Implement appropriate decontamination procedures for personnel and equipment.
10. Delay clean up until arrival or instructions of qualified radiation personnel.
11. Equipment used in the Exclusion Zone shall not be removed until appropriate decontamination procedures have been performed and the equipment has been monitored and declared clean.
12. Contact a radiological team for assistance and equipment.
13. Consult MSDS for product information and assistance.
14. Do not touch damaged containers or contact the spilled material.
15. Prevent spread of spilled material and keep it out of water systems and sewers. Dyke far ahead of large spills to confine the material for later disposal.