MATERIAL INFORMATION SHEETS

KEROSENE

Maximum Quantity On-site: 38,100 gallons

Description: Colorless to pale straw, or red, oily liquid

Synonyms: Kerosine, Coal Fuel, Fuel Oil #1, Turbine Fuel

Potential Health Hazards

- Skin Contact: Defatting of the skin may occur with continued and prolonged contact. Irritation and burning sensation may occur on exposure to the liquid or mists, as well as the possibility of blisters. Hair loss can occur upon chronic exposure.
- Eye: Severe burning sensation with temporary irritation and swelling of lids.
- Inhalation: Irritation of the upper respiratory tract and eyes, with possible euphoria, dizziness, headache, discoordination, ringing in the ears, convulsions, coma, and respiratory arrest. May cause headache, drowsiness, irritation of lungs and nose.
- Ingestion: Irritation of the mucous membranes of throat, esophagus and stomach which may result in nausea and vomiting; central nervous system depression may occur, if absorbed (see inhalation symptoms above). If aspirated, chemical pneumonitis may occur with potentially fatal results.
- Probable carcinogen
- Not a teratogen, mutagen, or reproductive toxin

Potential Safety/Environmental Hazards

- Highly flammable as a liquid or vapor
- Use dry chemical, carbon dioxide, foam or water spray. Water may be ineffective in fighting fires of liquids with low flash points, but water should be used to keep fire exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect persons attempting to stop a leak.

Handling

- Store only in approved containers and in cool, well ventilated area of non-combustible construction away from possible sources of ignition.
- Keep separate from oxidizing materials.
- Wear proper PPE including safety glasses, impervious gloves, and standard site PPE.

First Aid

- Eyes: Flush eyes with large amount of water for 15 minutes while holding eyelids open. Seek medical attention.
- Skin: Wash contaminated area with soap and water while removing contaminated clothing and shoes. A soothing ointment may be applied to irritated skin after thoroughly cleansing. Seek medical attention.
- Ingestion: Do NOT induce vomiting. If vomiting occurs, keep airway clear. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. If breathing has stopped, apply artificial respiration and administer oxygen if necessary. Seek medical attention immediately.

KEROSENE (continued)

Containment

- Primary: 38,100 gallon high carbon steel tank
- Secondary: Tank and pump located within concrete containment. Any leakage from the tank or pump is collected in the containment and transferred to 55-gallon drums or a tanker truck for proper disposal or recycling.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Remove ignition sources. Contact contractor to collect material for proper disposal/recycling.
- Outside Containment:
  - Small Spills: Remove ignition sources. Absorb spilled material with non-combustible materials such as diatomaceous earth or petroleum sorbent pads/pillows. Do not use combustible materials. Remove contaminated materials to container for proper disposal.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Remove ignition sources. Dike spill area with sand or dirt to contain material and cover sewers/drains. Remain upwind and keep unnecessary people away. Contact contractor to collect material for proper disposal/recycling.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- Reportable quantity: 25 Gallons
- Report spills of 25 gallons or more to:
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303) 318-8547
  - Colorado Department of Public Health and Environment (after business hours)
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour line)
    (800) 424-8802
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303) 318-8547

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

ANHYDROUS AMMONIA

Maximum Quantity On-site: 12,000 gallons

Description: Colorless gas or compressed liquid with pungent, suffocating odor

Synonyms: Ammonia

Potential Health Hazards

- Skin Contact: Prolonged contact can cause tissue damage, frostbite, and chemical burns.
- Eye: Exposure to liquid or high concentrations of vapor can cause painful, instant and possibly irreversible tissue damage (conjunctiva, cornea, lens).
- Inhalation: Effects can vary from none or only mild irritation, to obstruction of breathing from laryngeal and bronchial spasm, to edema and severe damage to mucous membranes of the respiratory tract with possible fatal results. Latent edema and residual reduction in pulmonary function may occur.
- Ingestion: May cause tissue damage, chemical burns, nausea, and vomiting. Found in gas form under normal conditions so ingestion is unlikely.
- Not a carcinogen, reproductive toxin, mutagen or teratogen

Potential Safety/Environmental Hazards

- No fire hazards
- Can be explosive if tank integrity is compromised, protect from vehicular traffic and fire
- Liquid ammonia reacts violently with water creating a vapor cloud
- Few environmental hazards without persistently large concentrations. If large amounts of strong concentration occur, it can destroy most organisms.

Handling

- Wear respirator with organic vapor cartridge and standard site PPE including safety glasses and impervious gloves when handling
- Emergency situations require SCBA and fully encapsulating vapor protective clothing

First Aid

- Eyes: Flush eyes with large amount of water for 15 minutes. Seek medical attention immediately.
- Skin: Immediately flush with large amount of water for 15 minutes while removing clothing. If clothing has frozen to skin, thaw with water before removal. Seek medical attention immediately.
- Ingestion: Do not induce vomiting. Have victim drink large quantities of water if conscious. Seek medical attention immediately.
- Inhalation: Remove person to fresh air. If breathing is difficult, administer artificial respiration or oxygen. Seek medical attention immediately.

ANHYDROUS AMMONIA (continued)

Containment

- Primary: 12,000 gallon carbon steel, stationary pressure tank (horizontal cylinder)
- Secondary: Secondary: None. Material readily evaporates upon release from pressure. Contained within fenced area protecting from vehicular traffic.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Small Spills: Avoid breathing fumes. Evacuate to 100 feet (to the primary or secondary assembly area) and protect to 0.1 mi downwind (day and night). Use copious amounts of water spray or fog to absorb ammonia vapor but do not spray onto source of leak, i.e. DO NOT put water on liquid ammonia.
- Large Spills: Immediately report to Control Room to initiate Mill Incident Command System and evacuate to 500 feet in all directions (to primary assembly area) and protect to 0.5 mi (day) or 1.4 mi (night). DO NOT evacuate to secondary assembly area (within 500' of tank).

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- Reportable Quantity = 100 lbs. equivalent to 19 gallons (liquid) for 99.5% ammonia
- Report spills of 100 pounds (19 gallons) or more to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby
    (970) 252-4510

- Report spills of any quantity which enter waters of the State to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

AMMONIUM SULFATE

Synonyms: Sulfuric Acid Diammonium Salt, Diammonium Sulfate

Maximum Quantity On-site: 6,280 cubic feet (solid powder) and 11,800 gallon (solution)

Description: Brownish gray to white crystalline solid powder, odorless

Potential Health Hazards

- Skin Contact: May cause irritation
- Eye: May cause irritation
- Inhalation: May cause respiratory tract irritation. Symptoms may include coughing, shortness of breath.
- Ingestion: Can draw water from the body into the bowel, acting as a laxative. Large amounts may produce Ammonia poisoning. Symptoms may include gastrointestinal tract irritation with nausea, vomiting, hypermotility, and diarrhea.
- Not a carcinogen, mutagen, teratogen, or reproductive toxin.

Potential Safety/Environmental Hazards

- Solid: May be combustible at high temperature and is flammable/explosive in presence of oxidizing materials
- Solution: No known environmental hazards

Handling

- Solid:
  - Wear respirator with particulate cartridge and standard site PPE including safety glasses and impervious gloves
  - Keep away from heat and sources of ignition
  - Focus on dust emission control during transfer of material
- Solution:
  - Wear standard site PPE including safety glasses, impervious gloves, and chemical protection suit

First Aid

- Eyes: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical attention immediately.
- Skin: Immediately flush skin with plenty of water for 15 minutes. Cover the irritated skin with an emollient or anti-bacterial cream. Remove contaminated clothing and shoes. Wash clothing and shoes before reuse. Seek medical attention.
- Ingestion: Solid: Do NOT induce vomiting. Loosen tight clothing such as collar, tie, belt, or waistband. Seek medical attention if symptoms appear.
  Solution: Induce vomiting immediately as directed by medical personnel. Seek medical attention.
- Inhalation: Remove person to fresh air. Perform artificial respiration if necessary. Give oxygen if difficulty breathing. Seek medical attention.

AMMONIUM SULFATE (continued)

Containment

- Primary:
  - Solid: A 6,280 cubic foot steel storage hopper
  - Solution: A 11,800 gallon steel tank
- Secondary:
  - Solid: Inside concrete containment. A sump pump automatically transfers precipitation water to the solution tank.
  - Solution: Inside Precipitation and Packaging Building which drains to a sump. A sump pump transfers liquids into a vanadium precipitation tank.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Use hose to wash material into containment sump pump.
- Outside Containment:
  - Small Spills: Absorb spilled material with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spilled material with diatomaceous earth or sand and transfer to a tailings cell.

Spill Notification Requirements

- Contact Shift Foreman if maintenance or repairs are required to remedy cause of spill

- There is no Reportable Quantity
- No agency notifications required unless spill enters waters of the State
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

SODIUM HYDROXIDE

Synonyms: Caustic Soda Solution, Lye solution, Sodium Hydrate Solution, White Caustic Solution

Maximum Quantity On-site: 1,100 gallons (50% Solution) and 4,500 gallons (8% Solution)

Description: White liquid, no appreciable odor (50%) or clear, odorless solution (8%)

Potential Health Hazards

- Skin Contact: Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage.
- Eye: 50%: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur. 8%: Causes irritation to eyes, and with greater exposures, severe buns with possibly blindness resulting.
- Inhalation: Mist may cause severe irritation of upper respiratory tract (nose and throat). Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.
- Ingestion: May result in burns of the mouth, throat, and stomach. Severe scaring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appear days after exposure.
- Not a carcinogen

Potential Safety/Environmental Hazards

- No fire or explosion hazards
- May react violently with acids, flammable liquids, organic halogen compounds, nitro compounds, and amphoteric metals
- Mixing into waterways could increase pH to over 8.5 which may be lethal to algae and fish

Handling

- Wear proper PPE including safety glasses, impervious gloves, chemical resistant clothing including boots and apron and standard site PPE
- Prevent contact with skin
- Store away from heat

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes while holding eyelids open intermittently. Seek medical attention immediately.
- Skin: Immediately flush with plenty of water while removing contaminated clothing and/or shoes and thoroughly wash with soap and water. Seek medical attention immediately.
- Ingestion: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. DO NOT induce vomiting. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. Seek medical attention if breathing difficulty or discomfort occurs and persists.

SODIUM HYDROXIDE (continued)

Containment

- Primary: 50%: 275-gallon totes
  15%: 4,500 gallon steel tank
- Secondary: 50%: Concrete containment during offload and storage
  15%: Curbed, reinforced concrete floor in SX Building

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Use hose to wash material into containment sump pump.
- Outside Containment:
  - Small Spills: Absorb spilled material with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Evacuate unnecessary personnel to 150 feet. Dike spill area with sand or dirt to contain material and cover sewers/drains. Ventilate area. Absorb spilled material with diatomaceous earth or sand and transfer to a tailings cell. Spilled materials may be neutralized with dilute acid.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- Reportable quantity: 1,000 pounds equivalent to 157 gal (50%) or 1,230 gal (8%)
- Report spills of 1,000 pounds (157 gal of 50% or 1,230 gal of 8%) or more to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802

- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

SODIUM CARBONATE SOLUTION

Synonyms: Soda ash

Maximum Quantity On-site: 26,400 gallons of slurry (31% by weight)
15,200 gallons dilute solution (15% by weight)
68,000 lbs (1,100 CF) (dry, temporary while delivering only, not stored on-site as a solid)

Description: Colorless to white, odorless liquid (slurry and solution)
White, odorless, granular solid

Potential Health Hazards

- Skin Contact: Solid: May cause irritation, redness , blistering, dryness, or cracking.
  Slurry/Solution: May cause severe irritation or burns.
- Eye: Solid: May be corrosive to eyes and cause conjuctival edema and corneal destruction.
  Slurry/Solution: May cause irritation, redness, and pain.
- Inhalation: Solid: May cause irritation of mucous membranes and upper respiratory tract. Symptoms from excessive inhalation of dust may include coughing and difficult breathing.
- Ingestion: May cause irritation to the gastrointestinal tract. Large doses may be corrosive to the gastro-intestinal tract where symptoms may include severe abdominal pain, vomiting, diarrhea, collapse and death.
- Not a carcinogen

Potential Safety/Environmental Hazards

- No fire or explosion hazards
- No environmental hazards reported

Handling

- Keep away from acids
- Solid:
  - Wear respirator with particulate cartridge or dust mask if dust is uncontrolled and standard site PPE including safety glasses
  - Use air conveying/mechanical systems for bulk transfer to storage
- Slurry/Solution:
  - Wear standard site PPE including safety glasses

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes while holding eyelids open intermittently. Seek medical attention as necessary.
- Skin: Wash skin with water and soap. If irritation persists, seek medical attention.
- Ingestion: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. DO NOT induce vomiting. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. If breathing difficulty or discomfort occurs and persists, seek medical attention.

SODIUM CARBONATE SOLUTION (continued)

Containment

- Primary:
  Slurry/Solution: Steel tanks
  Solid: Tanker truck (temporary while delivering only, not stored on-site as a solid)
- Secondary:
  Slurry/Solution: Both tanks in a common concrete containment area. Leakage is pumped in solution tank.
  Solid: Concrete apron in reagent off-loading area provides containment. Spilled solid material is transferred to slurry tank.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment:
  - Slurry/Solution: Wash material into sump pump where it is transferred to the solution tank.
  - Solid: Vacuum or sweep up the material and transfer to slurry tank.
- Outside Containment:
  - Small Spills: Collect or absorb spilled material and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Dike spill area with sand or dirt to contain material and cover sewers/drains if necessary. Collect or absorb spilled material and transfer to a tailings cell.

Spill Notification Requirements

- Contact Shift Foreman if maintenance or repairs are required to remedy cause of spill

- There is no Reportable Quantity
- No agency notifications required unless spill enters waters of the State
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

SULFURIC ACID

Synonyms: Hydrogen sulfate, oil of vitriol, mattling acid, battery acid, electrolyte acid, dihydrogen sulfate, chamber acid.

Maximum Quantity On-site: 258,000 gallons

Description: Clear colorless to yellow liquid

Potential Health Hazards

- Skin Contact: Causes skin burns. The severity of injury depends on the concentration of the solution and the duration of exposure.
- Eye: Causes severe eye burns. May cause irreversible eye injury, blindness, and/or corneal opacification. The severity of injury depends on the concentration of the solution and the duration of exposure.
- Inhalation: May cause irritation of the respiratory tract with burning pain in nose and throat, coughing, wheezing, shortness of breath, and pulmonary edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.
- Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns.
- Known carcinogen
- Not a reproductive toxin, mutagen or teratogen

Potential Safety/Environmental Hazards

- Not a fire hazard
- May react vigorously, violently, or explosively with many organic and inorganic chemicals and with water
- Highly corrosive

Handling

- Wear safety glasses, face shield, and acid-resistant clothing including gloves, apron, and/or suit, and standard site PPE
- A respirator with an organic vapor/acid cartridge may be necessary in certain handling situations if sprays or mists are present or irritation or exposure symptoms are experienced
- Use with care and with adequate ventilation
- Wash thoroughly after handling

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes. Seek medical attention immediately.
- Skin: Flush with water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Seek medical attention immediately.
- Ingestion: DO NOT induce vomiting. If fully conscious, ingest cupful of water. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. Perform artificial respiration if necessary. Seek medical attention immediately.

SULFURIC ACID (continued)

Containment

- Primary: Two 129,000 gallon carbon steel tanks
- Secondary: Concrete containment with double-contained collection sump. Precipitation water and acid solution is transferred to pre-leach tanks and undiluted sulfuric acid is returned to storage tanks.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- DO NOT flush large amounts or puddles of sulfuric acid with water.
- Inside Containment: Allow sump pump to transfer majority of material to tanks. Use hose to wash residual material into containment sump pump.
- Outside Containment:
  - Small Spills: Absorb spilled material with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Evacuate unnecessary personnel to 150 feet in all directions. Provide ventilation. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spilled material with diatomaceous earth or sand and transfer to a tailings cell.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- Reportable Quantity = 1,000 lbs. equivalent to 70 gallons for 93% sulfuric acid
- Report spills of 1,000 pounds (70 gallons) or more to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby
    (970) 252-4510

- Report spills of any quantity which enter waters of the State to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

SODIUM CHLORATE

Synonym: Soda chlorate, chlorax, chloric acid, sodium salt

Maximum Quantity On-site: 98,100 gallons (39% by weight)

Description: Colorless to green or yellow liquid, odorless

Potential Health Hazards

- Skin Contact: May cause itching or mild irritation; prolonged and repeated contact may cause dermatitis.
- Eye: May cause itching or mild irritation.
- Inhalation: May cause irritation or burning in the respiratory tract; coughing and sneezing.
- Ingestion: May cause hemolysis and methemoglobinemiacarboxyhemoglobinemia. Ingesting large quantities can cause abdominal pain, nausea, and diarrhea, possibly with dark blood, cyanosis (blue lips, tongue, mucous membranes, with slate gray skin color), possibly progressing to headache, difficulty in breathing, dizziness, seizures, or coma. Large doses can cause kidney or liver damage, and may be fatal.
- Not a carcinogen, possible mutagen

Potential Safety/Environmental Hazards

- Not combustible
- Strong oxidizer, reaction with reducing agents (including sulfur compounds, ammonia, ammonium compounds, amines and acids) may cause violent ignition
- Clothing, vegetation, hydrocarbons, petroleum products, and other organic materials contaminated with sodium chlorate or its solutions are dangerously flammable
- Soil sterilant, used as a non-selective contact herbicide
- Weakly toxic to organisms

Handling

- Wear proper PPE including safety goggles, gloves and chemical resistant PPE
- A respirator with a particulate filter can be used where mists are present or symptoms of exposure are observed
- Keep in tightly closed container away from source of heat of ignition

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes while holding eyelids open intermittently. Seek medical attention immediately.
- Skin: Wash skin with water and soap for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before it dries. Soak leather shoes in water and discard as flammable, hazardous articles. Seek medical attention if irritation develops or persists.
- Ingestion: Immediately give 3-4 glasses of water and induce vomiting. Give fluids until vomitus is clear. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. Perform artificial respiration if necessary. Seek medical attention.

SODIUM CHLORATE (continued)

Containment

- Primary: 98,100 gallon FRP storage tank and 18,400 gallon FRP mix tank
- Secondary: Both tanks in a common concrete containment area with a sump. Precipitation and any leakage in the sump is transferred to the mix tank and subsequently to the storage tank.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Use hose to wash material into containment sump pump.
- Outside Containment:
  - Small Spills: Absorb spilled material with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spilled material with diatomaceous earth or sand and transfer to a tailings cell.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- There is no Reportable Quantity
- No agency notifications required unless spill enters waters of the State
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

HYDROGEN PEROXIDE

Synonyms: Dioxidane

Maximum Quantity On-site: 7,100 gallons

Description: Clear, colorless, odorless liquid

Potential Health Hazards

- Skin Contact: May cause redness, pain or severe burn
- Eye: Vapors may cause pain, redness and blurred vision. Splashes can cause permanent tissue destruction and blindness.
- Inhalation: Vapors may cause irritation to the respiratory tract. Inhalation of mist may burn the mucous membrane of the nose and throat. In severe cases, may result in pulmonary edema and death.
- Ingestion: Large doses may cause symptoms of abdominal pain, vomiting, and diarrhea as well as blistering or tissue destruction. Stomach distention (due to rapid liberation of oxygen), and risk of stomach perforation, convulsions, pulmonary edema, coma, possible cerebral edema (fluid on the brain), and death are possible.
- Possible carcinogen

Potential Safety/Environmental Hazards

- Oxidizer and corrosive
- Toxic to aquatic organisms

Handling

- Wear chemical resistant PPE including suit, shoes, gloves and splash goggles
- Utensils for handling should only be made of glass, stainless steel, aluminum, or plastic

First Aid

- Eyes: Immediately flush with water for 15 minutes, lifting upper and lower eyelids intermittently. Seek medical attention immediately.
- Skin: Immediately flush with water while removing contaminated clothing and shoes. Wash clothing and shoes before reuse. Seek medical attention immediately.
- Ingestion: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, seek medical attention.
- Inhalation: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. DO NOT induce vomiting. Seek medical attention immediately.

Containment

- Primary: 7,100 gallon stainless steel tank
- Secondary: Storage tank situated within concrete containment in the Precipitation and Packaging Building. Leakage is returned to the storage tank or transferred to a tailings cell.

HYDROGEN PEROXIDE (continued)

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed in large amounts of water to remove any hydrogen peroxide left on the material.
- Inside Containment: Use hose to wash material into containment sump pump.
- Outside Containment:
  - Small Spills: Absorb spilled material with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spilled material with diatomaceous earth or sand and transfer to a tailings cell. Alternatively, dilute with a large volume of water and hold in a diked area until hydrogen peroxide decomposes. Hydrogen peroxide may be decomposed by adding sodium metabisulfate or sodium sulfite after diluting to about 5%. Dispose of remainder in the tailings cell.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- There is no Reportable Quantity
- No agency notifications required unless spill enters waters of the State
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

ALAMINE 336

Synonyms: Amine

Maximum Quantity On-site: 1,100 gallons

Description: Pale, yellow liquid with ammonia odor

Potential Health Hazards

- Skin Contact: May cause irritation
- Eye: May cause irritation
- Inhalation: May be harmful in large amounts for prolonged periods
- Ingestion: May be harmful
- Not a carcinogen

Potential Safety/Environmental Hazards

- No fire or explosion hazards
- None reported

Handling

- Wear standard site PPE including safety glasses and gloves

First Aid

- Eyes: Immediately flush with water for at least 15 minutes. Seek medical attention.
- Skin: Immediately flush with water for at least 15 minutes while removing contaminated clothes and shoes. Seek medical attention.
- Ingestion: Immediately drink a large quantity of water. Seek medical attention.
- Inhalation: Remove to fresh air. If adverse reactions occur, seek medical attention.

Containment

- Primary: 275 gallon intermediate bulk container totes
- Secondary: Totes stored in Warehouse or SX Building, located within concrete containment.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Use a pump or absorbents to transfer material from secondary containment to a container for reuse or disposal in a tailings cell.
- Outside Containment:
  - Small Spills: Absorb spilled material with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spilled material with diatomaceous earth or sand and transfer to a tailings cell. Dilute acid (e.g. 5% acetic acid) may be used to neutralize spilled material.

ALAMINE 336 (continued)

Spill Notification Requirements

• Contact Shift Foreman if maintenance or repairs are required to remedy cause of spill
• There is no Reportable Quantity • No agency notifications required unless spill enters waters of the State • Report spills of any quantity which enter waters of the State (including dry gullies) to: o Colorado Department of Public Health and Environment Toll-Free 24-hour Environmental Spill Reporting Line (877) 518-5608
• Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification. • Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

ISODECANOL

Synonyms: Isodecyl alcohol, Alcohol, Exxal 13®

Maximum Quantity On-site: 1,100 gallons

Description: Colorless liquid with alcohol odor

Potential Health Hazards

- Skin Contact: May cause irritation
- Eye: May cause irritation
- Inhalation: May cause irritation of respiratory tract
- Ingestion: None listed

Potential Safety/Environmental Hazards

- No fire or explosion hazards
- Very toxic to aquatic organisms

Handling

- Wear proper PPE including standard site PPE as well as gloves and splash goggles
- Store away from sources of heat and ignition and out of direct sunlight

First Aid

- Eyes: Flush immediately with water for at least 15 minutes. Seek medical attention immediately.
- Skin: Wash with soap and water. Remove contaminated clothes. Wash clothes before reuse.
- Ingestion: First aid is normally not required. Seek medical attention if discomfort occurs.
- Inhalation: Remove to fresh air. Assist breathing if necessary. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek medical attention immediately.

Containment

- Primary: 275 gallon intermediate bulk container totes
- Secondary: Totes stored in Warehouse or SX Building, located within concrete containment.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

ISODECANOL (continued)

Spill Response

- Inside Containment: Use a pump or absorbents to transfer material from secondary containment to a container for reuse or disposal in a tailings cell.
- Outside Containment:
  - Small Spills: Absorb spilled material with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spilled material with diatomaceous earth or sand and transfer to a tailings cell.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- There is no Reportable Quantity
- No agency notifications required unless spill enters waters of the State
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

DIESEL FUEL, LOW SULFUR

Synonyms: Diesel Fuel #2, NA 1993, Petroleum Distillate, Diesel, #2 Fuel Oil, On-Road Diesel, Ultra Low Sulfur Diesel, Off-Road Diesel

Maximum Quantity On-site: 15,900 gallons

Description: Clear, straw-yellow or reddish liquid, mild petroleum distillate odor

Potential Health Hazards

- Skin Contact: Prolonged exposure may cause moderate irritation, cracking, redness, itching, inflammation, dermatitis, and possible secondary infection
- Eye: May cause severe irritation, redness, tearing, blurred vision, and conjunctivitis
- Inhalation: Nasal and respiratory tract infection, central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest, and sudden death could occur as a result of long term and/or high concentration exposure to vapors.
- Ingestion: Toxic if swallowed. May cause burns to mouth or stomach. May cause nausea, vomiting, diarrhea, and restlessness. May cause nervous system effects similar to those listed for inhalation.
- Mutagen and possible carcinogen

Potential Safety/Environmental Hazards

- Combustible, flammable in presence of open flames

Handling

- Wear proper PPE including standard site PPE

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes while holding eyelids open. If pain or redness persists, seek medical attention.
- Skin: Immediately flush skin with water. Remove contaminated clothing and shoes. Wash clothing and clean shoes thoroughly before reuse. Wash exposed area with water and soap. If irritation persists, seek medical attention.
- Ingestion: Do not induce vomiting. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. Perform artificial respiration if necessary. Give oxygen if breathing is difficult. Seek medical attention.

Containment

- Primary: Main Tank: 12,000 gallon fireguard double wall insulated storage tank
  Firewater Tank: 300 gallon double wall steel tank
  Back-up Generator Tank: 3,600 gallon double wall steel tank
- Secondary: Outer wall of tank provides secondary containment for all three tanks

DIESEL FUEL, LOW SULFUR (continued)

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Monthly tank inspections include secondary containment void.

Spill Response

- Inside Containment: Remove ignition sources. Contact contractor to collect material for proper disposal/recycling.
- Outside Containment:
  - Small Spills: Remove ignition sources. Absorb spilled material with diatomaceous earth or absorbent pads or pillows. Do not use combustible materials. Remove contaminated materials to container for proper disposal.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Remove ignition sources. Evacuate unnecessary personnel to 1,000 feet. Dike spill area with sand or dirt to contain material and cover sewers/drains. Remain upwind and keep unnecessary people away. Contact contractor to collect material for proper disposal/recycling.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- Reportable quantity: 25 Gallons
- Report spills of 25 gallons or more to:
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303)-318-8547
  - Colorado Department of Public Health and Environment (after business hours)
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour line)
    (800) 424-8802
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303) 318-8547

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

GASOLINE

Maximum Quantity On-site: 2,000 gallons

Description: Translucent straw-colored or light yellow liquid, strong aromatic hydrocarbon odor

Potential Health Hazards

- Skin Contact: Minimal hazard following acute exposure. Prolonged exposure may cause irritation
- Eye: May cause moderate irritation.
- Inhalation: May cause irritations to nose, throat, lungs, and respiratory tract
- Ingestion: May cause gastrointestinal disturbances, including irritation, nausea, vomiting, and diarrhea.
- Possible carcinogen

Potential Safety/Environmental Hazards

- This material is flammable as a liquid or vapor

Handling

- Wear proper PPE including safety glasses, impervious gloves, and standard site PPE
- Keep away from incompatible materials
- Remove from all sources of ignition.

First Aid

- Eyes: Flush eyes with large amount of water for 15 minutes while holding eyelids open. Seek medical attention.
- Skin: Wash contaminated area with soap and water while removing contaminated clothing and shoes. Seek medical attention.
- Ingestion: Do NOT induce vomiting. Seek medical attention immediately. If vomiting occurs, keep airway clear.
- Inhalation: Remove person to fresh air immediately. If breathing has stopped, apply artificial respiration and administer oxygen if necessary. Seek medical attention immediately.

Containment

- Primary: 2,000 gallon fireguard double wall insulated storage tank
- Secondary: Outer wall of tank provides secondary containment.

Maintenance Requirements

- Includes performing preventative maintenance on pumps and conducting visual inspections of tanks, piping, pumps, valves, gauges, and other equipment for corrosion and leakage.
- Monthly tank inspections include secondary containment void.

GASOLINE (continued)

Spill Response

- Inside Containment: Remove ignition sources. Contact contractor to collect material for proper disposal/recycling.
- Outside Containment:
  - Small Spills: Remove ignition sources. Absorb spilled material with diatomaceous earth or absorbent pads or pillows. Do not use combustible materials. Remove contaminated materials to container for proper disposal.
  - Large Spills: Contact Control Room immediately to initiate Incident Command System. Remove ignition sources. Evacuate unnecessary personnel to 1,000 feet. Dike spill area with sand or dirt to contain material and cover sewers/drains. Remain upwind and keep unnecessary people away. Contact contractor to collect material for proper disposal/recycling.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- Reportable quantity: 25 Gallons
- Report spills of 25 gallons or more to:
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303)-318-8547
  - Colorado Department of Public Health and Environment (after business hours)
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour line)
    (800) 424-8802
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303) 318-8547

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

PROPANE

Synonyms: Dimethylmethane, Liquefied Petroleum Gas (LPG)

Maximum Quantity On-site: 36,000 gallons

Description: Colorless gas, rotten egg odor (added in processing for detection)

Potential Health Hazards

- Skin Contact: Contact with liquid or cold vapor may cause freeze burns and frostbite. Signs of frostbite include a change in the color of the skin to gray or white, possibly followed by blistering. Skin may become inflamed and painful.
- Eye: Contact with liquid or cold vapor may cause permanent eye damage.
- Inhalation: High concentrations may cause central nervous system depression such as dizziness, drowsiness, headache, and similar narcotic symptoms, but no long-term effects.
- Ingestion: Ingestion is unlikely. Contact with mucous membranes with liquefied product may cause frostbite and freeze burns.
- Not a carcinogen

Potential Safety/Environmental Hazards

- Flammable as a vapor
- Material is under high pressure

Handling

- Wear proper PPE including safety glasses, impervious gloves, and standard site PPE
- Remove from all sources of ignition.
- Use in well ventilated areas.

First Aid

- Eyes: Flush eyes with large amount of water for 15 minutes while holding eyelids open. Seek medical attention.
- Skin: Wash contaminated area with soap and water while removing contaminated clothing and shoes. Seek medical attention if irritation or redness develops.
- Ingestion: Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. If breathing has stopped, apply artificial respiration and administer oxygen if necessary. Seek medical attention immediately.

Containment

- Primary: 30,000-gallon and 6,000 gallon high-pressure LPG tanks.
- Secondary: None. Material readily evaporates upon release from pressure. Tank located away from vehicular traffic areas.

Maintenance Requirements

- Includes performing preventative maintenance and conducting visual inspections of tanks, piping, valves, gauges, and other equipment for corrosion and leakage.

PROPANE (continued)

Spill Response

- Small Spills: Eliminate all ignition sources. Control leak if possible. Isolate area ton 330 feet in all directions until gas has dispersed. Consider initial downwind evacuation of 0.5 mile.
- If event of tank fire, isolate and evacuate to 1 mile in all directions.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

- No reportable quantity
- Report spills of any quantity which enter waters of the State (including dry gullies) to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
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PROCESS A – ORE HANDLING AND GRINDING

Maximum Quantity On-site: 100,000 tons

Location: Area 100 – Ore Pad, Feed Hopper, and SAG Mill

Process Description: Ore is transferred from the stockpiles on the gravel and/or concrete ore pad to a feed hopper, and then delivered by belt conveyor to a semi-autogenous grinding (SAG) Mill where it is mixed with water.

Potential Health Hazards

- Skin Contact: No hazards
- Eye: May cause irritation
- Inhalation: Large amounts of airborne dust may cause irritation to the lungs and nose
- Ingestion: No hazards
- Radiation and metals in the ore have been found to be toxic at high doses, however the concentration of these in uranium ore are relatively low

Potential Safety/Environmental Hazards

- Fugitive dust from ore handling activities represent a low environmental hazard
- Safety hazards consist of mobile equipment and moving parts on stationary equipment

Handling

- Wear PPE including safety glasses, impervious gloves, and standard site PPE
- A filter mask/respirator is recommended in some locations where dust levels are elevated.

First Aid

- Eyes: Flush eyes with large amount of water for 15 minutes while holding eyelids open. Seek medical attention if irritation persists.
- Skin: First aid is normally not required. Seek medical attention if discomfort occurs.
- Ingestion: First aid is normally not required. Seek medical attention if discomfort occurs.
- Inhalation: Remove to fresh air. Seek medical attention if discomfort occurs.

Containment

- Dumping Platform: None required. Solid materials are routinely pushed onto the ore pad.
- Gravel Ore Pad: 1-foot thick layer of Class 6 Aggregate over a 30-inch cushion layer consisting of compacted native soils over a reinforced GCL over compacted subgrade. Includes 4-foot swales on all sides and is sloped to the East Stormwater Pond for drainage.
- Concrete Ore Pad: One-acre concrete pad (one foot thick with steel reinforcement) that rests on two feet of compacted fill and is sloped to the East Stormwater Pond for drainage.
- Feed Hopper: Consists of three walls and roof and a concrete containment with curbing and a sump.
- Conveyor: Enclosed within a tunnel that drains to the feed hopper containment and sump.
- SAG Mill: Fully enclosed mill with contained within concrete containment pad and sump within the SAG Mill Building.

PROCESS A – ORE HANDLING AND GRINDING (continued)

Maintenance Requirements

- Dumping Platform: Surface is cleaned daily.
- Ore Pads: The concrete pad is inspected or cracks and the gravel pad is graded periodically.
- Feed Hopper, Conveyor Tunnel, and SAG Mill: Concrete containment areas are routinely inspected for cracks and accumulated chemicals.
- Dust controls: Consists of spraying water on the roads, ore pads and loading areas and the bag house collection system on the feed hopper. Water sprays are checked and cleaned daily.

Spill Response

- Inside Containment: Wet material and return to stockpile or feed hopper.
- Outside Containment:
  - Small Spills: Use a square shovel or skid loader to transfer material to ore pad, feed hopper or SAG Mill.
  - Large Spills: Use a loader to transfer material to ore pad, feed hopper or SAG Mill.

Spill Notification Requirements

- Contact Shift Foreman if maintenance or repairs are required to remedy cause of spill

<u>Uranium Ore</u>

- Reportable Quantities:
  - Arsenic = 1 lb. equivalent to 1.3 tons of ore at 387 mg/kg
  - Lead = 10 lb. equivalent to 3.4 tons of ore at 1,470 mg/kg
  - Uranium = 0.1 Ci equivalent to 32 tons of ore at 5,100 mg/kg (0.51%)
  - Radium-226 = 0.1 Ci equivalent to 94 tons of ore at 1,170 pCi/g
  - Selenium = 100 lb. equivalent to 122 tons of ore at 410 mg/kg
- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

<u>Spills of any chemical in any quantity which enter waters of the State (including dry gullies):</u>

- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

PROCESS B – PRE-LEACHING AND CCD THICKENERS

Maximum Quantity On-site: 1,246,000 gallons (Pre-leach); 760,000 gallons (CCD thickeners); 80,000 gallons (Uranium SX Feed Tank).

Location: Area 200-Pre-leach tanks, thickener, and clarifier; Area 300-CCD Thickeners; Tailings Cells; Evaporation Ponds

Process Description:

Pre-leaching: Slurry from SAG Mill is distributed to storage tanks and then pumped to the pre-leach tanks where it is mixed with sulfuric acid.

Thickening: Leached pulp is pumped to a series of CCD thickeners where uranium- and vanadium-bearing (pregnant) solution is separated from the remaining solids (tailings).

Uranium SX Building: Overflow solution from the Pre-leach clarifier is filtered and stored in the Uranium SX Feed Tank prior to extraction. The leach solution is also present in the extractions tanks during the extraction process.

Potential Health Hazards

- Skin Contact: Causes skin burns. The severity of injury depends on the concentration of sulfuric acid in the solution and the duration of exposure.
- Eye: Causes severe eye burns. May cause irreversible eye injury, blindness, and/or corneal opacification. The severity of injury depends on the concentration of sulfuric acid in the solution and the duration of exposure.
- Inhalation: May cause irritation of the respiratory tract with burning pain in nose and throat, coughing, wheezing, shortness of breath, and pulmonary edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.
- Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns.
- Known carcinogen

Potential Safety/Environmental Hazards

- Not a fire hazard
- May react vigorously, violently, or explosively with many organic and inorganic chemicals and with water
- Highly corrosive

Handling

- Wear safety glasses, face shield, and acid-resistant clothing including gloves, apron, and/or suit, and standard site PPE
- A respirator with an organic vapor/acid cartridge may be necessary in certain handling situations if sprays or mists are present or irritation or exposure symptoms are experienced
- Use with care and with adequate ventilation
- Wash thoroughly after handling

PROCESS B – PRE-LEACHING AND CCD THICKENERS (continued)

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes. Seek medical attention immediately.
- Skin: Flush with water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Seek medical attention immediately.
- Ingestion: DO NOT induce vomiting. If fully conscious, ingest cupful of water. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. Perform artificial respiration if necessary. Seek medical attention immediately.

Containment

- Primary:
  - Pre-leach: Two 348,000-gallon rubber-lined tanks (pulp storage), two 62,000-gallon rubber-lined tanks (pre-leach), one 250,000-gallon epoxy-coated tank (thickener), and one 176,000-gallon epoxy-coated tank (clarifier).
  - CCD Thickeners: Eight 94,000-gallon epoxy-coated steel tanks (thickeners) and one 7,200-gallon rubber-lined steel tank (tailings sump).
  - Uranium SX Feed Tank: 80,000-gallon rubber-lined steel tank.
- Secondary:
  - Pre-leach: Concrete containment pad with a 4.5 foot tall concrete containment wall and a sump. Collected liquids are pumped back into pre-leach tanks or pulp storage tanks.
  - CCD Thickeners: Concrete containment pad with an 18-inch tall concrete containment wall and three sumps. Collected liquids are pumped back to one of the thickeners.
  - Uranium SX Feed Tank: Concrete containment pad with containment wall and sump.
- Pipes are made of HDPE, connections are made of reinforced rubber hose and pumps are made of stainless steel or rubber-lined steel.

Maintenance Requirements

- Greasing motors, checking and changing hydraulic fluid in gearboxes and visually inspecting tanks, pipes, hoses and pumps for deterioration.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Allow material to drain to sump. Use mechanical means to provide drainage (i.e. cutting channels though solids), if necessary. Use water hoses to direct residual material to the closest sump.
- Outside Containment:
  - Small Spills: Cover with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Immediately report to Control Room to initiate Mill Incident Command System. Evacuate of unnecessary personnel to 150 feet in all directions. Dike spill area with sand or dirt to contain material and cover sewers/drains. Provide ventilation. Absorb spill with diatomaceous earth or sand. Transfer to tailings cell.

PROCESS B – PRE-LEACHING AND CCD THICKENERS (continued)

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

Pre-leaching and CCD Thickener Solutions

- Reportable Quantities:
  - Arsenic = 1 lb. equivalent to 820 gallons at 146 mg/L
  - Sulfuric Acid = 1,000 lb. equivalent to 2,240 gallons at 5% sulfuric acid
  - Ammonia = 100 lb. equivalent to 2,650 gallons at 4,520 mg/L
  - Uranium = 0.1 Ci equivalent to 52,000 gallons at 0.75 g/L
  - Thorium-230 = 0.01 Ci equivalent to 96,000 gallons at 27,500 ρCi/L
- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

Spills of any chemical in any quantity which enter waters of the State (including dry gullies):

- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

PROCESS C – LEACHING

Maximum Quantity On-site: 310,000 gallons

Location: Area 200 – Leach Circuit

Process Description: Additional sulfuric acid, heat (injected steam), and an oxidant (sodium chlorate) is added to the to the pulp received from the pre-leach circuit.

Potential Health Hazards

- Skin Contact: Causes acid and heat skin burns. The severity of injury depends on the concentration of sulfuric acid in the solution, temperature of the solution, and the duration of exposure.
- Eye: Causes severe eye burns. May cause irreversible eye injury, blindness, and/or corneal opacification. The severity of injury depends on the concentration of sulfuric acid in the solution and the duration of exposure.
- Inhalation: May cause irritation of the respiratory tract with burning pain in nose and throat, coughing, wheezing, shortness of breath, and pulmonary edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.
- Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns.
- Known carcinogen

Potential Safety/Environmental Hazards

- Chemicals in this area are VERY HOT
- Not a fire hazard
- May react vigorously, violently, or explosively with many organic and inorganic chemicals and with water
- Highly corrosive

Handling

- Wear safety glasses, face shield, and acid-resistant/thermal clothing including gloves, apron, and/or suit, and standard site PPE
- A respirator with an organic vapor/acid cartridge may be necessary in certain handling situations if sprays or mists are present or irritation or exposure symptoms are experienced
- Use with care and with adequate ventilation
- Wash thoroughly after handling

PROCESS C – LEACHING (continued)

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes. Seek medical attention immediately.
- Skin: Flush with water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Seek medical attention immediately.
- Ingestion: DO NOT induce vomiting. If fully conscious, ingest cupful of water. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. Perform artificial respiration if necessary. Seek medical attention immediately.

Containment

- Primary: Five 62,000-gallon rubber-lined steel tanks.
- Secondary: Concrete containment pad with concrete containment wall and two sumps. Collected liquids are pumped back into leach tanks.
- Pipes are made of HDPE, connections are made of reinforced rubber hose and pumps are made of stainless steel or rubber-lined steel.

Maintenance Requirements

- Greasing motors and visually inspecting tanks, pipes, hoses and pumps for deterioration.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Allow material to drain to sump. Use mechanical means to provide drainage (i.e. cutting channels though solids), if necessary. Use water hoses to direct residual material to the closest sump.
- Outside Containment:
  - Small Spills: Cover with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Immediately report to Control Room to initiate Mill Incident Command System. Evacuate of unnecessary personnel to 150 feet in all directions. Dike spill area with sand or dirt to contain material and cover sewers/drains. Provide ventilation. Absorb spill with diatomaceous earth or sand. Transfer to tailings cell.

PROCESS C – LEACHING (continued)

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

Acid Leaching Solution

- Reportable Quantities:
  - Sulfuric Acid = 1,000 lb. equivalent to 660 gallons at 17% sulfuric acid
  - Arsenic = 1 lb. equivalent to 820 gallons at 146 mg/L
  - Ammonia = 100 lb. equivalent to 2,650 gallons at 4,520 mg/L
  - Uranium = 0.1 Ci equivalent to 23,000 gallons at 1.67 g/L
  - Thorium-230 = 0.01 Ci equivalent to 96,000 gallons at 27,500 ρCi/L
- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

Spills of any chemical in any quantity which enter waters of the State (including dry gullies):

- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

PROCESS D – URANIUM SOLVENT EXTRACTION

Maximum Quantity On-site: 151,000 gallons organic solution; 4,000 gallons Sodium Carbonate Solution; 69,000 gallons acid solution (see Process B)

Location: Area 400-Solvent Extraction Building

Process Description: An organic solution made up of kerosene, alcohol, and amine selectively extracts uranium from the acid solution and is pumped to the uranium scrub and strip circuit where the uranium is stripped from the organic solution with a sodium carbonate solution. The stripped organic is reused and the loaded sodium carbonate solution is pumped to the uranium precipitation circuit.

FOR EXPOSURES AND SPILLS OF ACID SOLUTION OR RAFFINATE, REFER TO PROCESS B. This information sheet applies to the organic and sodium carbonate extraction solutions only.

Potential Health Hazards

- Skin Contact: Defatting of the skin may occur with continued and prolonged contact. Irritation and burning sensation may occur on exposure to the liquid or mists, as well as the possibility of blisters. Hair loss can occur upon chronic exposure.
- Eye: Severe burning sensation with temporary irritation and swelling of lids.
- Inhalation: Irritation of the upper respiratory tract and eyes, with possible euphoria, dizziness, headache, discoordination, ringing in the ears, convulsions, coma, and respiratory arrest. May cause headache, drowsiness, irritation of lungs and nose.
- Ingestion: Irritation of the mucous membranes of throat, esophagus and stomach which may result in nausea and vomiting; central nervous system depression may occur, if absorbed (see inhalation symptoms above). If aspirated, chemical pneumonitis may occur with potentially fatal results.
- Probable carcinogen (organic solution only)
- Not a teratogen, mutagen, or reproductive toxin

Potential Safety/Environmental Hazards

- Highly flammable as a liquid or vapor (organic solution only)
- Use dry chemical, carbon dioxide, foam or water spray. Water may be ineffective in fighting fires of liquids with low flash points, but water should be used to keep fire exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect persons attempting to stop a leak.

Handling

- Store only in approved containers and in cool, well ventilated area of non-combustible construction away from possible sources of ignition.
- Keep separate from oxidizing materials.
- Wear standard site PPE including safety glasses and impervious gloves.

PROCESS D – URANIUM SOLVENT EXTRACTION (continued)

First Aid

- Eyes: Flush eyes with large amount of water for 15 minutes while holding eyelids open. Seek medical attention.
- Skin: Wash contaminated area with soap and water while removing contaminated clothing and shoes. A soothing ointment may be applied to irritated skin after thoroughly cleansing. Seek medical attention.
- Ingestion: Do NOT induce vomiting. If vomiting occurs, keep airway clear. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. If breathing has stopped, apply artificial respiration and administer oxygen if necessary. Seek medical attention immediately.

Containment

- Primary: Ten 5,000-gallon stainless steel tanks (Uranium SX mixer-settlers/settler), three 2,800-gallon stainless steel tanks (Scrub/strip mixer-settlers) one 34,000-gallon FRP tank (Uranium SX raffinate), two 10,000-gallon FRP tanks (Crud Organic and Crud Aqueous), and two 64,000-gallon FRP tanks (Loaded and Barren Organic).
- Secondary: Concrete containment pad with concrete containment wall and sump. Collected liquids are pumped back to the mixer-settlers.
- Pipes are made of HDPE, connections are made of reinforced rubber hose and pumps are made of stainless steel or rubber-lined steel.

Maintenance Requirements

- Greasing motors and visually inspecting tanks, pipes, hoses and pumps for deterioration.
- Cleaning of mixer-settlers and settlers.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

Spill Response

- Inside Containment: Use water hoses to direct the material to the closest sump.
- Outside Containment:
  - Small Spills: Cover with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Immediately report to Control Room to initiate Mill Incident Command System and evacuate of unnecessary personnel to 150 feet in all directions. Provide ventilation. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spill with diatomaceous earth or sand. Transfer to a tailings cell.

PROCESS D – URANIUM SOLVENT EXTRACTION (continued)

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

Organic Solution

- Reportable quantity:
  - Kerosene - 25 gallons equivalent to 26 gallons at 96% kerosene
- Report to:
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)-(303)-318-8547
  - Colorado Department of Public Health and Environment (after business hours)
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

Loaded Solution (in addition to above)

- Reportable quantity:
  - Uranium = 0.1 Curie equivalent to 22,000 gallons loaded organic at 1.77 g/L
  - Uranium = 0.1 Curie equivalent to 540 gallons loaded sodium carbonate at 71.7 g/L
- Report to:
  - Colorado Department of Public Health and Environment (after business hours)
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

Spills of any chemical in any quantity which enter waters of the State (including dry gullies):

- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour line)
    (800) 424-8802
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303) 318-8547 (Organic Solution Only)

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

PROCESS E – VANADIUM SOLVENT EXTRACTION

Maximum Quantity On-site: 159,000 gallons organic solution; 5,000 gallons Sodium Carbonate/Sodium Hydroxide Solution; 410,000 gallons raffinate solution (see Process G)

Location: Area 600-Vanadium Oxidation and Solvent Extraction

Process Description: The raffinate solution (stripped of uranium but loaded with vanadium) is oxidized with sodium chlorate and ammonia, extracted with organic solution, and pumped to the vanadium scrub and strip circuit where the vanadium is stripped from the organic carrier with a sodium carbonate/sodium hydroxide (caustic) solution. The barren raffinate is transferred to the evaporation ponds and tailings sump, the stripped organic is reused and the loaded caustic solution is pumped to the vanadium precipitation circuit.

FOR EXPOSURES AND SPILLS OF RAFFINATE SOLUTION, REFER TO PROCESS G. This information sheet applies to the organic and caustic extraction solutions only.

Potential Health Hazards

• Skin Contact:	Organic: Defatting of the skin may occur with continued and prolonged contact. Irritation and burning sensation may occur on exposure to the liquid or mists, as well as the possibility of blisters. Hair loss can occur upon chronic exposure. Caustic: Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage.
• Eye:	Organic: Severe burning sensation with temporary irritation and swelling of lids. Caustic: Causes irritation to eyes, and with greater exposures, severe buns with possibly blindness resulting.
• Inhalation:	Organic: Irritation of the upper respiratory tract and eyes, with possible euphoria, dizziness, headache, discoordination, ringing in the ears, convulsions, coma, and respiratory arrest. May cause headache, drowsiness, irritation of lungs and nose. Caustic: Mist may cause severe irritation of upper respiratory tract (nose and throat). Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.
• Ingestion:	Organic: Irritation of the mucous membranes of throat, esophagus and stomach which may result in nausea and vomiting; central nervous system depression may occur, if absorbed (see inhalation symptoms above). If aspirated, chemical pneumonitis may occur with potentially fatal results. Caustic: May result in burns of the mouth, throat, and stomach. Severe scaring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appear days after exposure.
• Probable carcinogen (Organic)	

PROCESS E – VANADIUM SOLVENT EXTRACTION (continued)

Potential Safety/Environmental Hazards

- Highly flammable as a liquid or vapor (organic solution only)
- Use dry chemical, carbon dioxide, foam or water spray. Water may be ineffective in fighting fires of liquids with low flash points, but water should be used to keep fire exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect persons attempting to stop a leak.

Handling

- Wear proper PPE including safety glasses, impervious gloves, chemical resistant clothing including boots and apron and standard site PPE
- Prevent contact with skin

First Aid

- Eyes: Flush eyes with large amount of water for 15 minutes while holding eyelids open. Seek medical attention immediately.
- Skin: Wash contaminated area with soap and water while removing contaminated clothing and shoes. A soothing ointment may be applied to irritated skin after thoroughly cleansing (for organic solution). Seek medical attention immediately.
- Ingestion: Rinse mouth with water, dilute by giving 1 or 2 glasses of water (caustic solution). Do NOT induce vomiting. If vomiting occurs, keep airway clear. Seek medical attention immediately.
- Inhalation: Remove person to fresh air immediately. If breathing has stopped, apply artificial respiration and administer oxygen if necessary. Seek medical attention immediately.

Containment

- Primary: One 71,000-gallon FRP tank (Vanadium Polishing Filter Feed), one 79,000-gallon FRP tank (Vanadium SX Feed), three 7,100-gallon FRP tanks (Vanadium Oxidation 1-3), two 74,000-gallon FRP tanks (Vanadium Oxidation 4-5), twelve 5,600-gallon stainless steel tanks (Vanadium SX mixer-settlers/settler), one 34,000-gallon rubber-lined steel tank (Vanadium SX Raffinate), four 3,000-gallon stainless steel tanks (Vanadium SX Scrub/Strip Mixer-Settlers), and two 64,000-gallon FRP tanks (Loaded and Barren Organic).
- Secondary: Concrete containment pad with concrete containment wall and sump. Collected liquids are pumped back to the stripper mixer-settlers.
- Pipes are made of HDPE, connections are made of reinforced rubber hose and pumps are made of stainless steel or rubber-lined steel.

Maintenance Requirements

- Greasing motors and visually inspecting tanks, pipes, hoses and pumps for deterioration.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

PROCESS E – VANADIUM SOLVENT EXTRACTION (continued)

Spill Response

- Inside Containment: Use water hoses to direct the material to the closest sump.
- Outside Containment:
  - Small Spills: Cover with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Immediately report to Control Room to initiate Mill Incident Command System and evacuate of unnecessary personnel to 150 feet in all directions. Provide ventilation. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spill with diatomaceous earth or sand. Transfer to a tailings cell.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

Organic Solution

- Reportable quantity:
  - Kerosene - 25 gallons equivalent to 26 gallons organic solution at 96% kerosene
- Report to:
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)-(303)-318-8547
  - Colorado Department of Public Health and Environment (after business hours)
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

Caustic Solution

- Reportable quantity for 1% NaOH in caustic solution is more than maximum site capacity.

Spills of any chemical in any quantity which enter waters of the State (including dry gullies):

- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour line)
    (800) 424-8802
  - Division of Oil & Public Safety - Dept of Labor and Employment (during business hours)
    (303) 318-8547 (Organic Solution Only)

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

PROCESS F – URANIUM AND VANADIUM PRECIPITATION AND PACKAGING

Maximum Quantity On-site: 117,000 gallons (uranium solutions), 48,000 gallons (vanadium solutions), 110,000 lb. (yellowcake), 114,000 lb. (vanadium)

Location on Site: Areas 500 and 700-Uranium and Vanadium Precipitation Building

Process Description:

Uranium: Hydrogen Peroxide is added to the loaded uranium solution to precipitate the uranium as yellowcake. The precipitate solution is thickened, dewatered and dried. The yellowcake is then packaged in drums for temporary storage prior to shipment off site.
Vanadium: Ammonium Sulfate is added to the vanadium strip solution to precipitate vanadium and is dewatered and dried. Vanadium oxide is melted in a rotary kiln and fusion furnace and solidified into a black-flake product to be packaged.

Potential Health Hazards

Uranium Precipitation and Packaging

- Skin Contact: May cause severe irritation or burns. Chronic exposure may cause dermatitis, irritation, redness, blistering, thickening, or hyperpigmentation of the skin. The yellowcake dryer uses high temperatures and may cause heat burns.
- Eye: May cause irritation, redness, and pain.
- Inhalation: Solution: Mist may burn the mucous membrane of the nose and throat.
  Solid: May cause respiratory irritation, cough, shortness of breath, and acute arterial lesions. Chronic exposure may cause kidney damage. shortness of breath, dry or productive cough, rales, cyanosis, and clubbing of the fingers.
- Ingestion: May cause irritation to the gastrointestinal tract, nausea and vomiting. Large doses may be corrosive to the gastro-intestinal tract where symptoms may include severe abdominal pain, vomiting, diarrhea, collapse and death.
- Carcinogenic

Vanadium Precipitation and Packaging

- Skin Contact: May cause irritation, reddening and itching, or chemical burns. Steam dryer, rotary kiln, flash furnace and casting wheel involve extremely hot material and may cause severe heat burns.
- Eye: May cause irritation, and with greater exposures, severe burns and possible corneal injury.
- Inhalation: Solution: Mist may cause severe irritation of respiratory tract, sneezing, sore throat or runny nose. Severe pneumonitis may occur.
  Solid: May cause irritation of respiratory tract, chest tightness, wheezing, dry throat, bloody nose, and coughing. Heavy exposure may cause headache, tremors and a harmless greenish-black discoloration of the tongue.
- Ingestion: May result in burns of the mouth, throat, stomach, nausea, vomiting, diarrhea, cramps, paralysis or convulsions. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Also may causes harmless greenish-black discoloration of the tongue.
- Not a carcinogen

PROCESS F – URANIUM AND VANADIUM PRECIPITATION AND PACKAGING (continued)

Potential Safety/Environmental Hazards

- Materials in this area may be EXTREMELY HOT
- Not a fire hazard

Handling

- Wear proper PPE including safety goggles gloves and standard site PPE.
- Air purifying respirator with particulate filter required in packaging rooms.
- Heat resistant gloves and apron are required during processes involving extreme heat.

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes while holding eyelids open intermittently. Seek medical attention immediately.
- Skin: Immediately flush with plenty of water while removing contaminated clothing and/or shoes and thoroughly wash with soap and water. Seek medical attention immediately.
- Ingestion: Solution: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. DO NOT induce vomiting. Seek medical attention immediately.
  Solid: Give 1-2 glasses of milk or water and induce vomiting. Never induce vomiting or give anything by mouth to an unconscious person. Seek medical attention.
- Inhalation: Remove person to fresh air immediately. Seek medical attention immediately.

Containment

Uranium Precipitation and Packaging

- Primary: One 3,800-gallon rubber-lined steel tank (Feed Tank), two 880-gallon rubber-lined steel tanks (Precipitation Tanks 2-3), three 3,000-gallon rubber-lined steel tanks (Precipitation Tanks 4-6), and one 102,000-gallon rubber-lined steel tank (Thickener).
- Secondary: Concrete containment pad with concrete containment wall and sump. Collected liquids are pumped back to the precipitation tanks or yellowcake dryer/packaging system as appropriate.

Vanadium Precipitation and Packaging

- Primary: One 4,500-gallon FRP tank (Feed Tank), one 3,800-gallon FRP tank (Precipitation Tank 1), and four 10,000-gallon FRP tanks (Precipitation Tanks 2-5).
- Secondary: Concrete containment pad with concrete containment wall and sump. Collected liquids are pumped back to Precipitation Tank 5.

Maintenance Requirements

- Greasing motors, checking and changing hydraulic fluid in gearboxes and visually inspecting tanks, pipes, hoses, pumps, belt filters, and screw conveyors for deterioration.
- Concrete containment areas are routinely inspected for cracks and accumulated chemicals.

PROCESS F – URANIUM AND VANADIUM PRECIPITATION AND PACKAGING (continued)

Spill Response

- Inside Containment: Lightly wet dry material and transfer to appropriate tank. Use water hoses to direct the remaining material to the closest sump.
- Outside Containment:
  - Small Spills: Lightly wet dry material or absorb wet materials and transfer to a tailings cell.
  - Large Spills: Immediately report to Control Room to initiate Mill Incident Command System. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spill with diatomaceous earth or sand. Transfer to a tailings cell.
- Uncontaminated material may be transferred to the precipitation and packaging system as necessary.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

<u>Uranium Precipitation and Packaging</u>

- Reportable Quantities:
  - Uranium = 0.1 Ci equivalent to 540 gallons loaded Sodium Carbonate Solution
  - Uranium = 0.1 Ci equivalent to 500 lb. wet yellowcake (35% by wt)
  - Uranium = 0.1 Ci equivalent to 325 lb. dry yellowcake (100% by wt)
- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

<u>Vanadium Precipitation and Packaging</u>

- No reportable quantities

<u>Spills of any chemical in any quantity which enter waters of the State (including dry gullies):</u>

- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour line)
    (800) 424-8802

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.

PROCESS G –TAILINGS CELLS AND EVAPORATION POND

Maximum Quantity On-site: 150 acre-feet (tailings liquor), 256 acre-feet (raffinate)

Location: Tailings Cells; Evaporation Ponds

Process Description:

Tailings Cells: The remaining solids from the CCD Thickeners are mixed with raffinate and pumped to the tailings cells. The tailings liquor and solids separate and the liquor is recycled.
Evaporation Ponds: Wastewater (raffinate) from the vanadium extraction circuit is transferred to the evaporation ponds. A portion of this solution is also transferred to the tailings sump to create a pumpable slurry with the tailings solids.

Potential Health Hazards

- Skin Contact: May cause irritation.
- Eye: May cause irritation.
- Inhalation: May cause irritation.
- Ingestion: May cause irritation.
- Known carcinogen

Potential Safety/Environmental Hazards

- Not a fire hazard
- Tailings and raffinate solution are toxic to wildlife

Handling

- Wear safety glasses, gloves and standard site PPE
- A respirator with an organic vapor/acid cartridge may be necessary in certain handling situations if sprays or mists are present or irritation or exposure symptoms are experienced
- Wash thoroughly after handling

First Aid

- Eyes: Flush eyes with large volumes of water for at least 15 minutes. Seek medical attention.
- Skin: Flush with water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Seek medical attention.
- Ingestion: DO NOT induce vomiting. If fully conscious, ingest cupful of water. Seek medical attention.
- Inhalation: Remove person to fresh air immediately. Perform artificial respiration if necessary. Seek medical attention.

Containment

- Primary: 60-mil HDPE upper geomembrane liner.
- Secondary: 60-mil HDPE lower geomembrane liner, with leak collection and recovery system between upper and lower liners, and a reinforced GCL underliner.
- Pipes are made of HDPE, connections are made of reinforced rubber hose and pumps are made of stainless steel or rubber-lined steel.

PROCESS G –TAILINGS CELLS AND EVAPORATION POND (continued)

Maintenance Requirements

- Visually inspecting pipes, hoses, pumps, and bird netting for deterioration.

Spill Response

- Inside Containment: Use water hoses to direct the material to the closest sump.
- Outside Containment:
  - Small Spills: Cover with diatomaceous earth or absorbent pads or pillows and transfer to a tailings cell.
  - Large Spills: Immediately report to Control Room to initiate Mill Incident Command System and evacuate of unnecessary personnel to 150 feet in all directions. Provide ventilation. Dike spill area with sand or dirt to contain material and cover sewers/drains. Absorb spill with diatomaceous earth or sand. Transfer to tailings cell.

Spill Notification Requirements

- Immediately contact the Mill Incident Commander (Shift Foreman)
- If not available contact Plant Manager at (970) 864-7775

Tailings and Raffinate Solutions

- Reportable Quantities:
  - Arsenic = 1 lb. equivalent to 820 gallons at 146 mg/L
  - Ammonia = 100 lbs. equivalent to 2,650 gallons at 4,520 mg/L
  - Thorium-230 = 0.01 Ci equivalent to 96,000 gallons at 27,500 ρCi/L
- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608
  - National Response Center (24-hour)
    (800) 424-8802
  - Montrose County Local Emergency Planning Committee (LEPC)
    Joe Kerby (970) 252-4510

Spills of any chemical in any quantity which enter waters of the State (including dry gullies):

- Report to:
  - Colorado Department of Public Health and Environment
    Toll-Free 24-hour Environmental Spill Reporting Line
    (877) 518-5608

- Refer to the Spill Notification Form in Appendix E for information to be provided to the above agencies during oral notification.
- Instructions for submittal of the written notification will be provided by the agencies during or following oral notification.