28.0 CYANIDE EMERGENCY RESPONSE

CJK MILLING COMPANY, LLC
33084 BERGEN MOUNTAIN ROAD
EVERGREEN, CO 80439

CYANIDE & HAZARDOUS MATERIALS MANAGEMENT & EMERGENCY RESPONSE PLAN

LEADVILLE MILL, LEADVILLE
LAKE COUNTY, COLORADO

January 2023

Prepared by

Union Milling Contractors, LLC
P.O. Box 620490
Littleton, CO 80162-0490

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1.0 INTRODUCTION

This Cyanide Response Plan (CRP) describes CJK Milling Company, LLC (CJK) standard procedures in the event of an unplanned release of cyanide from its operations. The CRP procedure, specific to cyanide related emergencies and is in addition to the Emergency Response Plan (ERP).

The Mill is designed to minimize the potential for release and exposure to cyanide, and the Standard Operating Practices (SOPs) are developed to ensure worker and environmental health & safety. Nevertheless, given the toxicity of cyanide, it is prudent to prepare for releases and exposures so that if a release or exposure does occur, adverse environmental, health and safety impacts can be prevented or appropriately mitigated. The Safety Inspection form is shown in **Table 1-1**.

Table 1-1: Cyanide Health and Safety Equipment Monthly Inspection Form

Date:	**Inspected by:**					
	Equipment (note if present and in working order)					
Locations	**Antidote (Confirm date)**	**Medical oxygen (If bottle under 50%, replace)**	**Resuscitator**	**Safety Shower/Eye Wash Station**	**Full Face Respirator Canister**	**Fire Extinguisher Dry Chemical**
Loading, Dissolution, & Storage Area						
Process Plant						
Detox Plant						
Corrective/Preventive Action Necessary? (If so, summarize and record)						
Note: When completed, this form shall be retained in the Project records.						

The CRP identifies potential release scenarios and specific response actions to stop or contain cyanide release. Emergency response coordinators and responders are identified, spill notifications and follow-up actions are also discussed.

In general terms, CJK's plan for emergency response to cyanide releases and exposures includes the following elements:

- Upon discovery of a cyanide release or exposure, personnel are to immediately notify the Mill Manager or his designated representative.
- Personnel will attempt to stop or contain a release if this can be accomplished safely.
- The Mill Manager, or his designated responsible representative will direct the Emergency Response, as necessary, to stop the release and contain any released cyanide.
- The Mill Manager will notify regulatory agencies, outside responders, and other stakeholders, as necessary.
- Released cyanide will be recovered, treated, and cleaned up, and contaminated material properly disposed of in accordance with regulations.
- CJK will investigate the cause of the release and implement measures designed to prevent its re-occurrence.
- CJK will evaluate its response to the release and modify the (CRP) and/or its response training, as necessary, to ensure an effective response to any future releases.

2.0 PLAN DEVELOPMENT

CJK will communicate with its employees periodically to assure that the CRP addresses current conditions and risks.

2.1 RISK MANAGEMENT

Risk assessments have been conducted in developing the following cyanide management guidelines.

2.1.1 Risk Assessment

Cyanide management guidelines will depend on:

- The level of workplace risk, and
- The location of the nearest medical facility

2.1.2 Procedures

UMC Employees and contractors working at the site will:

- Be provided with Personal Protective Equipment (PPE) appropriate for their work assignment.
- Be provided sufficient information, cyanide safety training, and supervision.
- Not work alone or outside normal working hours when using cyanide.
- Be provided Safety Data Sheets (SDS). The emergency response team will also be provided with SDS.
- Ensure containers containing cyanide are correctly labelled and stored.
- Ensure the contents of any pipework or process vessels containing cyanide are identified.
- Assess the risk of injury or harm to people resulting from the use of cyanide.
- Prevent exposure by means other than PPE to the greatest extent possible.
- Where it is not practicable to reduce the risk without personal protective clothing or equipment, clothing and equipment will be provided to ensure there are systems in place for its safe use and maintenance.
- Plan and train for workplace emergencies.

Engineering controls will be operational and functioning to the required standard.

Working procedures will be monitored and safety drills will be run regularly to ensure their effectiveness, and changed, if required.

2.1.3 Training and Competency

Personnel are required to complete mandatory general health and safety requirements, and fire safety training. Employees working in laboratories with hazardous chemical are required to complete additional laboratory training modules.

In addition to these modules, laboratory employees working with hazardous compounds will be given appropriate training in:

- safe handling of cyanide,
- safe storage procedures,
- spill clean-up and releases and
- safe disposal.

All workers will receive specific training in its safe use and emergency procedures including the use of a positive pressure self-contained breathing apparatus.

2.2 SPILLS & CONTAMINATION

The category (minor or major) of a cyanide or hazardous chemical spill likely to occur have been considered. Factors determining the category of spill include the quantity and physical form (solid, gas, solution) of the spill, the location and potential for exposure to workers and damage to the environment. Spill kits will be available in the immediate work area where cyanide and hazardous chemicals are being used.

The risk assessment, based on information in the SDS, provides information on spills and disposal options.

2.2.1 Major Spill

Do not attempt to clean up any large cyanide spills beyond the capacity of the available spill kits. If workers have been contaminated with cyanide, the cyanide source will be immediately removed including, contaminated clothing. The individual will be moved to a safety shower/eyewash and wash off the contaminants thoroughly (not less than 20 minutes).

2.2.2 Minor spill

Minor spills will be cleaned up immediately using appropriate PPE and a certified respirator where dust/vapor is present. Cyanide spills, absorbent, and contaminated material will be disposed in suitable containers labelled "Cyanide Contaminated Waste".

2.3 EXPOSURE SYMPTOMS

2.3.1 Local Health Effects

Vapor or liquid cyanide will cause irritation of the mucous membranes in the eye, nose and throat and may cause skin irritation.

2.3.2 General Health Effects

Symptoms of mild or early cyanide poisoning are general weakness, heaviness of the arms and legs, difficulty breathing, headaches, giddiness, and rashes.

2.3.3 Severe Cyanide Poisoning

- Shortness of/ gasping for breath
- Loss of consciousness
- Convulsions Cardiac Arrest

2.4 FIRST AID/MEDICAL EMERGENCY

2.4.1 Employee Rescue Actions:

1. Request immediate paramedic assistance, and supply location details.
2. Using a positive pressure self-contained breathing apparatus[1], wearing appropriate PPE (PVC apron and gloves, safety glasses with a face shield, and enclosed rubber or leather shoes).
3. Remove the casualty from the contaminated area and into fresh air.
4. Remove contaminated clothing and wash/wipe any parts of the body that have been splashed with cyanide or cyanide dust using a first aid kit.
5. Production of aerosols containing cyanide during the washing off the milling equipment must be avoided.
6. Waste cloths will be placed into sealed plastic bags and labelled as "**Cyanide Contaminated Waste.**"
7. Install barricades to Prevent further access to designated contaminated area.

[1] *Specialist training is required to use positive pressure self-contained breathing apparatus (BA)*

2.4.2 Managing Suspected Cyanide Poisoning

First Aid Personnel (trained to advanced level) and key workers in cyanide handling and storage areas will be trained to:

- Carry out rescue in a hazardous environment.
- Implement cyanide poisoning first aid.
- If breathing has stopped, begin first aid and cardiopulmonary resuscitation using oxygen (at 15L/min) and bag and mask resuscitation equipment.
- Continue resuscitation until medical assistance arrives.
- Determine if other cyanide poisoning sources are present.
- Send an emergency Cyano-kit to the health care facility with the patient.
- Identify the specific compound containing cyanide and arrange for a hard copy of the appropriate SDS which is to be transferred with the patient to attending medical staff.

2.4.3 First Aid Equipment Checklist

Where there is a risk of cyanide poisoning, the following items will be made available.

- Rescuer PPE.
- A first aid kit.
- AED.
- A positive pressure resuscitation bag, valve[2], and mask.
- A source (cylinder) of oxygen, and oxygen flow delivery system.
- Cyanide antidote kit.

2.4.4 Cyanide Antidote Kit[3]

- The Cyano-kit is used for cyanide exposure.

[2] *Bag/valve mask and oxygen needs to be taught by a qualified instructor.*
[3] *Cyanide antidote will ONLY be administered by a qualified individual who is certain cyanide poisoning has occurred.*

- The kit will be contained in a clearly labeled box. If there is a cyanide incident, the kit will be sent with the casualty along with a copy of the SDS to a health care facility.
- Expiration dates will be regularly checked, and supply updated accordingly.

2.5 ROLES, RESPONSIBILITIES AND ACCOUNTABILITIES

2.5.1 Supervisors Will:

- Ensure that risks are identified and eliminated or minimized as safely as possible through the risk assessment process.
- Provide supervision and training in the safe use of cyanide and its compounds.
- Aid with the risk assessment process to ensure the assessment is comprehensive and accurate, including any emergency equipment or first aid equipment that may be required. The completed risk assessment report will be placed in the Mill's file.
- Review and approve the risk assessment to ensure all controls outlined in the assessment are followed by employees.
- Ensure that all appropriate safety systems and equipment are in place, fully operational and used correctly.
- Ensure that all incidents involving these materials are investigated as soon as possible and corrective actions (including review and modification of risk assessment and SOPs) are implemented to prevent recurrences.
- **All incidents, near misses or hazards will be recorded and filed in the Mill's file.**

2.5.2 Employees Will:

- Aid with the risk assessment process, help ensure the assessment is comprehensive and accurate.
- Follow safe operating procedures and use the controls outlined in the risk assessment and guidelines.
- Immediately notify supervisors if there are any changes to procedures or deficiencies in equipment or work process.
- Report any incident, near misses or hazards to the supervisor.

2.5.3 Monitoring, Review, and Assurance

As part of normal assurance monitoring, the Mill Manager or his designated representative may periodically assess:

- compliance with local procedures in the workplace; and
- awareness of compliance obligations associated with company guidelines.

2.5.4 Recording and Reporting

Employees will report any incidents, hazards or near misses to the Mill Manager or the designated representative.

3.0 CYANIDE HANDLING & STORAGE

Cyanides are poisonous compounds, whether solid, gas or in solution. Careful attention to the following principles will avoid most of the hazards connected with the storage and handling of cyanides.

3.1 HANDLING

1. All employees handling cyanide compounds will be instructed with proper handling procedures and be informed as to the potential dangers and hazards involved.

2. Wearing protective clothing (PPE) appropriate for the job. Boots, gloves, aprons, and face masks where splash is possible; using respirators approved by the National Institute for Occupational Safety and Health (NIOSH).

3. Berms or other arrangements will be provided to prevent the possibility of intermixing of cyanide and acid in the event of tank rupture in open surface tanks.

4. In case of fire directly involving cyanide, do not attempt to fight the fire unless self-contained breathing apparatuses (SCBAs) are available. Water, carbon dioxide and soda-acid extinguishers will all result in the discharge of hydrogen cyanide gas which may under some circumstances be explosive. Be sure the responsible fire department officer knows cyanides are present.

5. Handle and transfer cyanide with dry tools and containers. Permitted exceptions would be items wet with solutions already containing cyanide, for example, a wet bucket with a cyanide solution.

6. Disposal of cyanide waste will be done in accordance with State and federal environmental laws.

7. First aid can be lifesaving on moderate cyanide over exposure. Detailed suggestions and specialized first-aid kits will be selected. (See MSDS)

3.2 STORAGE

1. Do not store cyanide in unlabeled containers.

2. Storage area will be well ventilated (wire screen or mesh cage.)

3. Storage area is separate from heavily frequented work areas.

4. Storage area will be above ground level to prevent possibility of flooding, either from natural waters or from plumbing failures. Containers will be placed on blocks or racks to hold them above the floor. Handle containers carefully to avoid breaks and spills.

5. Containers will be shielded from overhead water sources, such as fire sprinkler systems or plumbing.

6. Cyanides will not be stored near liquid acids, acid anhydrides, dry acid salts, sulfur dioxide, chlorine or compressed acid gases as CO_2. Do not store near chemicals labeled "oxidant."

7. Cyanide storage or use areas will not have sewer drains, except drains designed specifically to hold or destroy cyanide compounds.

8. Partially used, open containers of cyanide will be returned immediately to the storage area.

9. Storage room will be labeled and locked as a cyanide storage area, with warnings.

10. In case of emergency, employees will know who to contact and the appropriate first aid procedures.

11. Cyanide containers will be regularly checked for damage or deterioration.

12. Arrange cyanide supply so that the oldest is used first.

13. Before taking cyanide from a drum, first remove the lid, then move away to let the accumulated gas out of the container before returning to handle the cyanide.

14. A notice of action to be taken in case of suspected poisoning will be displayed in a prominent place in the storage and work areas including the first-aid station.

15. Instruct all employees of safety procedures associated with storing cyanide. Include these procedures in the safety and hazard communications training programs.

3.3 DISPOSAL

Thoroughly rinse empty cyanide containers with large amounts of water. The rinse will be used in the cyanide gold leaching process. Puncture or crush empty containers (label "**Cyanide Contaminated Waste**") and dispose of them at approved hazardous waste disposal sites or recycle as appropriate.

3.3.1 Destruction[4] & Disposal

Water-quality data were used to evaluate hydraulic interactions between groundwater and surface water. The purpose of the evaluation was to identify “gaining” and “losing” reaches where mass loading of metals from waste sources may affect water quality. The data were obtained from mini-piezometers, spring/tunnel portal discharges, monitoring wells, and surface water sampling points.

Unused cyanide and cyanide-containing residues will either be destroyed or disposed of as soon as possible:

[4] *Cyanides are highly toxic and will be destroyed or removed from wastewaters prior to discharge.*

- Bulk cyanide waste including obsolete or unused supply will be disposed of by an approved chemical waste contractor. Care will be taken to ensure that the risk to the contractor(s) removing cyanide are minimized.

- Large amounts of waste products contaminated with cyanides will be clearly labelled "**Cyanide Contaminated Waste**" and stored. The designated storage area will be designed to be secure. Secondary containment will be used to contain any spills or leaks.

- **Under no circumstances will cyanide waste be mixed with any other kind of waste**.

- Thoroughly rinse empty containers with large amounts of water. The rinse will be used in the cyanide process.

- Puncture or crush empty containers and label "**Cyanide Contaminated Waste**" and dispose of them at an approved hazardous waste disposal site or recycle as appropriate.

4.0 LABORATORY SAFETY GUIDELINE

Cyanide / Cyanide Anion [CAS No. 57-12-5]

All individuals who use compounds that contain cyanide or that can generate cyanide will review this section prior to using these substances. Cyanide-containing compounds can exist in various forms, such as a colorless gas (e.g., hydrogen cyanide or cyanogen chloride) or a crystalline substance (e.g., sodium cyanide, or potassium cyanide). Cyanide is sometimes described as having a "bitter almond" smell, but it does not always give off an odor and not everyone can detect this odor.

4.1 HAZARDS

	Cyanide compounds are toxic if swallowed, inhaled, or absorbed through the skin. They can cause severe and irreversible health effects, including death. Certain cyanide containing compounds like cyanogen bromide, when exposed to moisture results in formation of hydrogen cyanide (HCN) gas which is highly toxic.
	People exposed to smaller amounts of cyanide compounds (by swallowing, inhaling, or absorbing them through skin) may have some or all the following signs and symptoms within minutes: dizziness, headache, nausea/vomiting, rapid breathing, rapid heart rate, restlessness, and muscle weakness. People exposed to larger amounts of cyanide compounds may experience the above health effects along with convulsions, loss of consciousness, low blood pressure, lung injury, slow heart rate, and respiratory failure leading to death. Survivors of severe cyanide poisoning may develop heart, brain, and nerve damage over time.
	Cyanide compounds may be corrosive to metals.
	Cyanide compounds can be very toxic to aquatic life.

4.2 PRECAUTIONS

Never work alone when using cyanide. Always use the buddy system. Another co-worker "buddy" will always be present and available to assist in the event of a cyanide emergency. Both the user and "buddy" will have a thorough understanding of these guidelines, cyanide hazards, and their protocols prior to beginning work.

4.2.1 Training

Each employee that handles cyanide will receive site-specific instruction on the dangers of cyanides and be trained on:

- Exposure routes (e.g., ingestion, inhalation, and skin absorption) and the associated short- and long-term adverse health effects.
- Prevention of exposure (e.g., proper protocol); apparatus and chemical fume hoods, personal protective equipment).
- Emergency evacuation procedures.
- Recognizing cyanide exposure and poisoning.
- Medical response procedures for a suspected cyanide exposure, and
- Buddy System requirements for work with cyanide.

4.2.2 Before Starting Work

- Order only the quantity that is needed.
- Review specific cyanide compound manufacturer's Safety Data Sheets.
- Ensure that a written protocol including safety information is available.
- Identify the location of the nearest eyewash and shower and verify that they are accessible.
- Always remove cyanide from its secondary container in a chemical fume hood to safely vent any accumulated vapor.
- Locate and verify that appropriate cyanide spill cleanup materials are available. The cleanup materials include:
    - For liquids
        - polypropylene absorbent pads or equivalent; and
        - polypropylene containers that can hold the pads and be sealed tightly.

- For solids
  - disposable dustpan and brush; and
  - polypropylene containers or bags that can hold the waste material and dustpan/brush and be sealed tightly with a cover or zip ties.

- Post a sign in the work area (fume hood): "**Danger: Cyanide used in this Area**."

4.2.3 During Work

AVOID INHALATION!

- Perform all operations in a certified chemical fume hood. Sash lowered as much as possible. Always work at least 6 inches into the fume hood;

AVOID CONTACT!

- Use appropriate personal protective equipment (PPE):
- Wear a lab coat, long pants, shirt and closed-toed shoes.
- Wear double-gloved 4-mil thick nitrile gloves.
- Gloves will be thoroughly inspected prior to each use. Do not use damaged gloves.
- Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with cyanide.
- Change gloves (outer and inner) at least once an hour and immediately whenever cyanide is believed to have contacted gloves.
- Wash hands and forearms thoroughly with soap and water each time gloves are removed.
- Always work behind the fume hood sash.
- Wear chemically protective goggles or safety glasses.
- Use materials and containers appropriate for cyanide use and remain aware of potential incompatibilities. Polypropylene works well with most cyanide compounds.
- Keep all containers tightly closed when not in use and during transport.

4.2.4 After Completing the Work

- Return container to storage area.

- Store in original containers or other appropriate containers.
- Store primary container in designated, sealable plastic (ideally polypropylene) secondary containers.
- Store cyanide compounds in a secured area, separated from all acids, nitrites, nitrates, water, steam, heat, chlorates, and strong bases.
- Amount in storage will be monitored by person in control of the cyanide compound.
- Wash hands and forearms thoroughly with soap and water before leaving the site.
- **Dispose and Label** – "**Cyanide Contaminated Waste**"." **also label any empty containers that once contained cyanide compounds.**

4.3 EMERGENCY PROCEDURES

4.3.1 Contact 911

Call 911 – Specify that there was a cyanide exposure

- Seek immediate medical attention in the event of a cyanide exposure.
- If possible, send a bystander to meet EMS at the Mill door
- When EMS arrives, notify them what actions have been taken.

Early or Mild Cyanide Poisoning may be indicated by general weakness, heaviness of the arms and legs; difficulty breathing; headache; giddiness; nausea; vomiting; irritation of the nose, mouth, and throat.

Severe Cyanide Poisoning may be indicated by nausea, cyanosis; gasping for breath; unconsciousness or convulsions.

4.3.2 First Aid

If anyone is seriously exposed to cyanide call 911 immediately.

Skin Contact

- Wash with plenty of soap and water for at least 15 minutes. Cyanide will pass through unbroken skin. Exposures can be fatal.
- Remove any exposed clothing as well as any jewelry that may be trapping cyanide.

Eye Contact

- Using eyewash, flush eyes while holding eyelids open.

- Continue flushing eyes with water until emergency medical personnel arrive.

Inhalation

- If cyanide is inhaled, immediately move to get fresh air.

Ingestion

- Do not induce vomiting.
- Never give anything by mouth to an unconscious person.

4.3.3 Spill Response

IMPORTANT!
DO NOT USE PLAIN WATER TO CLEAN UP A CYANIDE SPILL.
WATER CAN REACT WITH CYANIDE COMPOUNDS TO FORM HIGHLY TOXIC HYDROGEN CYANIDE GAS.

OUTSIDE FUME HOOD OR VENTILATED ENCLOSURE

- Alert others and evacuate to a safe distance and prevent entry.
- Remain in a safe location until response personnel arrive.

FUME HOOD OR VENTILATED ENCLOSURE

- If trained and confident, assist in minor clean-up efforts; wearing personal protective equipment (PPE) described above and using appropriate spill supplies.
- If solid, use dustpan and brush to collect materials. If solution, apply polypropylene absorbent pads as described above.
- Double bag ALL spill cleanup materials and leave inside the fume hood
- Wipe area with dilute bleach or hydroxide solution and place this cleanup material into the debris bag and close tightly.
- Close the fume hood sash and the area evacuated; an assessment of further actions can then be undertaken but it is likely that specialist assistance may be required. Adjacent areas will be evacuated.

5.0 RESPONSE AND CORRECTIVE ACTIONS & SCENARIOS

5.1 POTENTIAL CYANIDE RELEASE

Unlikely potential for cyanide releases and exposures was considered. Based on this assessment, it is determined that some potential, may exist for the following release and exposure scenarios to occur under site upset conditions.

- Release of hydrogen cyanide from the laboratory.
- Release of hydrogen cyanide gas from cyanide storage or processing.
- On-site Transportation accidents.
- Releases during unloading cyanide.
- Releases during mixing of cyanide.
- Releases due to fires and/or explosions in the mill building.
- Ruptures or leaks in pipes, valves, and/or tanks containing cyanide solution.
- Overtopping of the internal cyanide solution tanks.
- Power outages.
- Pump failures.
- Containment berm structural failure.
- Fires involving cyanide.
- Solution release potential flow paths.

Each of these potential releases is addressed below:

5.1.1 Hydrogen cyanide from the laboratory

Small, contained solid material spills in controlled areas such as fume hoods or cyanide storage area can be swept up and disposed in accordance with the criteria outlined in this guidance document.

Small liquid spills and contaminated equipment can usually be cleaned up using an alkaline solution or sodium hypochlorite ensuring that the pH of the solution never becomes acidic.

Remember that appropriate personal protective equipment (PPE) must be worn during cleaning operations.

5.1.2 Hydrogen cyanide gas from cyanide storage or process plant

Hydrogen cyanide gas release could result from mixing cyanide reagent or process solution with acidic solution.

Such a release is unlikely, as the mill is designed to ensure process operates under high pH conditions, the physical separation of acids and cyanide solution, and all personnel are trained to operate the mill to avoid mixing.

Procedures for cyanide management includes regular inspections, preventative maintenance, employee training and inspection. Training includes operating procedures for off-loading and the use of acids and cyanide. In addition, separate secondary containment is provided for acid and cyanide storage.

5.1.3 Transportation accidents occurring on-site

Transportation accidents on-site could occur but are minimized by the short distance from the gate to the cyanide off-load containment pad. Cyanide is shipped as dry product and in specially designed high strength trailers designed to withstand highway level impacts. Any on-site accident, should one occur, would be at low speed given the small area of the cyanide delivery truck operation. Since product is shipped dry; should a release occur, dry cleanup procedures will be used.

5.1.4 During unloading cyanide

Potential releases during cyanide unloading are possible but are minimized through design of the off-loading storage area. The off-loading area includes a curbed concrete containment pad provided for unloading, containment for the off-load piping and tankage. The mill design also includes appropriate interlocks for valves and piping. Specific off-loading procedures are written and to be followed. Should a release occur, it would be within secondary containment or if it exceeded containment; the surrounding area is flat, and there are additional pond structures downgradient of the off-loading storage area that would function as containment structures that will minimize or eliminate a release to streams or offsite.

5.1.5 During mixing of cyanide

Potential cyanide releases during mixing are possible but minimized because of mill design and operating procedures. Written procedures are in place for cyanide mixing. Controls are in place to assure that the mixing solution is of appropriate alkaline pH (pH of 10 or greater). Mixing occurs within containment areas.

5.1.6 Ruptures or leaks in pipes, valves, and/or tanks containing cyanide solution

Rupture or leaks in pipes, valves, and/or tanks containing cyanide solution is possible but would be contained by mill design. The mill is designed for solution containment through floor-gradients, curbing, and passive overflow outlets to the ECS. Overflows that could occur due to ruptures, or leaks in tanks and piping within the Mill are handled passively through gravity drainage to sumps.

Procedures are in place for restarting the plant after a cyanide spill event.

5.1.7 Overtopping of the internal solution tanks

The pregnant solution storage tanks are installed with airborne cyanide gas alarms as are other locations within the mill.

5.1.8 Power outages including failure of backup generator[5] power

If the power goes out, the pumps moving slurry into the leach tanks, along with the pumps moving anything anywhere will stop.

The only diesel storage at the site is a 100-gallon diesel tank permanently mounted on the Mill service truck. The generator will have a 20-gallon fuel tank. The plant will go on emergency shut down if the power outage exceeds 6-hours, or less than 80% of available fuel.

5.1.9 Pump failures

Each tank is fitted with multiple pumps and excess pumping capacity to facilitate proper solution movement in the event of a pump failure.

5.1.10 Uncontrolled seepage from Tanks, Pipes and Containment structures

Seepages from containment structures are checked for daily. If seepage should occur, sufficient warning time will exist through this inspection for early identification and implementation of a corrective action.

5.1.11 Major Structural failure

Major tank structural failure could occur but is highly unlikely. Should failure occur, all solution will report via gravity to the tank containment structure and, if required the Emergency Containment Sump (ECS). In either case, the plant will shut down until all released cyanide solution is detoxified in the plant detox circuit.

5.1.12 Cyanide releases due to fires and/or explosions in the Mill building

The Mill is equipped with portable fire extinguishers which will be placed throughout the mill in ' appropriate locations. Extinguishers will be inspected as mandated by MSHA, thus assuring properly functioning should a fire occur. If a fire and release of cyanide gas were to occur, it is unlikely that it would be catastrophic, but would be confined to a particular section of the Mill. The Mill has a concrete floor, metal exterior sides, and contains primarily piping and vessels. The presence of combustible materials is minimal. In addition to on-site fire suppression capabilities, an emergency 10,000 gallon tanks is available

if needed. Moreover, the Mill building is connected to the ECS which will contain any flow from fire suppression.

5.1.13 Fires involving cyanide

Cyanide pellets or solutions are not combustible, but may generate highly toxic, flammable, corrosive, and explosive hydrogen cyanide gas if in contact with water, carbon dioxide fire extinguishers, or some foam fire extinguishers if these contain acidic agents.
If a fire occurs in the vicinity of cyanide:

- Evacuate the area immediately and call 911

Fire Station
816 Harrison Avenue
Leadville, Co 80461
719.486-2990

- Use air supplied breathing apparatus and full body protective clothing to rescue anyone overcome by poisonous gases or trapped by the fire.
- Fire-fighters must wear breathing apparatus and full body protective clothing.
- Use an extinguishing agent suited to the fire[6],

Remember - cyanides can react with water or acids to produce the highly poisonous and flammable cyanide gas which presents an extremely high risk of explosion.

5.1.14 Solution Release-Potential Flow Paths

The mill and supporting facilities handling cyanide solution are located on concrete pads where secondary cyanide contaminated water will be contained. If necessary, cyanide can be pumped to sumps or flows will be directed passively to the ECS.

Any potential flows that may be seen at the ECS leak detection well would be of low volume given that the foundation materials of the ECS are lined. Should failure occur, all solution will report via gravity to the tank containment structure and, if required the Emergency Containment Sump (ECS). In either case, the plant will shut down until all released cyanide solution is detoxified in the plant detox circuit.

5.2 IMMEDIATE SIGNS & SYMPTOMS OF EXPOSURE TO CYANIDE

People exposed to a small amount of cyanide by breathing it, absorbing it through their skin, or eating cyanide containing foods may have some or all the following signs and symptoms within minutes:

[6] *Avoid incompatible extinguishing agents (water, carbon dioxide) encountering cyanide*

- Dizziness.
- Headache.
- Nausea and vomiting.
- Rapid breathing Rapid heart rate.
- Restlessness.
- Weakness.

Exposure to a large amount of cyanide, by any route, may cause the following other health effects as well:

- Convulsions.
- Loss of consciousness.
- Low blood pressure.
- Lung injury.
- Slow heart rate.
- Respiratory failure leading to death.

Since breathing is likely to be the primary route of cyanide exposure, quickly evacuate from the area into fresh air.

- If the cyanide gas was released outdoors, move away from the area where it was released. If you are not sure where cyanide was released head directly to the Muster Area.
- If evacuating from the cyanide gas area, stay as low as possible to the ground.
- If the release of cyanide gas was indoors, get out of the building.

If individuals have been exposed to cyanide, immediately remove clothing, and wash entire body with soap and water for 20 minutes.

If anyone is believed to have encounter cyanide an ambulance should be called.

Saint Vincent Hospital
822 West 4th Street
Leadville, Colorado
80461
719.486-1249
Ambulance Dispatcher: 719.745-7144

5.2.1 Personnel Washing

- As quickly as possible, wash any cyanide from skin with large amounts of soap and water.
- If eyes are burning or vision is blurred, rinse eyes with plain water for 10 to 15 minutes. If contacts are worn, remove them, and put them with the contaminated clothing. Worn eyeglasses and jewelry must be washed with soap and water. Eyeglasses and jewelry can be used after they are washed. If glasses or jewelry cannot be washed, they should be discarded with the contaminated clothing.

Disposing of Contaminated Clothes:

- After washing, place clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If contact cannot be avoided, wear rubber gloves or turn the bag inside out and use it to pick up the clothes, inverting the bag over the clothes when picking up contaminated clothes. An alternative method is to put the clothes in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches the contaminated clothing should also be placed in the bag.
- Seal the bag, and then seal that bag inside another plastic bag.
- When the local or state health department or emergency personnel arrive, tell them where contaminated materials are located. The health department or emergency personnel will arrange disposal.

Note: Emergency responders MUST be made aware of the risks of entering an area where a release of hydrogen cyanide may have occurred and should only intervene where it is safe to do so. If it is deemed safe to help, casualties should be removed to fresh air for treatment.

Note: Under no circumstances should mouth-to-mouth resuscitation be attempted on a casualty who is believed to have inhaled or ingested a cyanide compound.

5.3 RESPONSE ACTIONS

5.3.1 Initial Notification

Any employee identifying a cyanide release outside of containment will immediately notify the Mill manager or the designated representative.

5.3.2 Survey the Scene

The individual will **STOP**, survey the scene, and determine the potential risks prior to proceeding with any response actions.

5.3.3 Measures to Stop Release

All reasonable steps will be taken to stop the source of the release as far as such actions can be done safely.

5.3.4 Measures to Contain Release

All reasonable steps will be taken to contain the release as far as such actions can be done safely.

5.3.5 Worker Health & Safety

Worker health and safety is paramount when responding to incidents involving cyanide. If in doubt about safe conditions, err on the safe side. The mill rescue team has appropriate equipment to respond to cyanide incidents including self-contained breathing apparatus, vinyl rain gear, face gear, monitoring equipment[7], and antidotes.

To avoid breathing in cyanide gas, smoke or dust:

- Do not smoke or keep cigarettes in areas where cyanide is used or stored.
- Use the appropriate respirator.
- Wash and dry the respirator after each use and seal it in a clean plastic bag.
- Do not store the respirator in areas where cyanide is used or stored.

To avoid the accidental swallowing of cyanide:

- Always wash before eating, drinking, or smoking.
- Do not eat or store food/drinks or cigarettes where cyanide is used or stored.
- Store cyanide in original labelled containers until the time of use.
- To prevent cyanide from being absorbed through the skin, wear nitrile gloves when handling cyanide.
- ;
- Wear a protective apron and face shield whenever there is the slightest chance cyanide will be splashed.

[7] *Includes Maintenance, Inspection and Testing*

- Do not rub nose or eyes or pick teeth when handling cyanide. If areas are itchy, think before scratching it! Do not bite nails.
- Do not mop up perspiration with overall sleeve or materials kept in the area where cyanide is used or stored.
- Handle gloves, overalls, and other protective equipment carefully and safely - wash immediately after use and store clean items away from cyanide.
- Where cyanide is used, or stored, wash hands and face before leaving the area.

5.3.6 Antidotes

Antidotes are also available in the lab, and the Mill.

5.3.7 Emergency Response Coordinator

The Primary Response Coordinator is Steve Craig or his designated representative.

5.3.8 Alternate Emergency Response Coordinators

Employees will immediately contact the Mill Manager in the event of a cyanide-related emergency. If the Mill manager cannot be reached, his designated representative will authorize the call-out of the Lake County EMS. The Mine manager or the designated representative will be responsible for coordinating all on-site response activities. Procedures for cyanide first aid treatment and transporting patients for follow-up treatment is summarized in the ERP. During off-site response time, employees are to provide first aid treatment.

The Mill manager and the designated representative will be thoroughly familiar with all aspects of the CRP involving cyanide, the locations and characteristics of cyanide, cyanide solutions and cyanide holding equipment, the location of pertinent records, and the mill layout.

The mill manager or the designated representative has the authority to commit necessary resources and implement the cyanide emergency response plan.

5.3.9 Notification to Emergency Agencies or Outside Responders

The mill manager or the designated representative is responsible for determining if outside emergency assistance is required and responsible for resolving the cyanide emergency.

5.3.10 Evacuation of Mill or Laboratory Areas'

Evacuation of the Mill, or laboratory, would only be done in the event of catastrophic failure, fire, or a release of cyanide gas. Evacuation will be accomplished through personal contact, radio, telephone, or loudspeaker.

5.3.11 Evacuation of Off-Site Affected Parties

This plan does not anticipate a scenario that would require evacuation of off-site parties.

If a catastrophic fire occurred at the Mill, and there is a potential for a smoke/gaseous plume to impact private residences, such areas will be notified by local emergency personnel to evacuate. The appropriate law enforcement, fire departments, and emergency response offices will also be notified. Contact information for these agencies and adjacent landowners is presented in the ERP.

5.3.12 Notification of Affected Parties Off site

In the unlikely event of a catastrophic release of solution. Downstream water users will be notified by Lake County emergency response agencies. Contact information for these agencies is in the ERP.

5.3.13 Notification of Outside Agencies.

Regulatory agencies will be contacted by the Mill Manager or his designated representative.

CYANIDE SOLUTIONS

CLEAN UP PROCEDURES

Do not use the following procedure for high concentration cyanide such as at the bulk delivery area.

Sodium Hypochlorite use is NOT to be used with high concentrations cyanide solutions.

Begin detoxification activities if solution is released outside of the mill. Excavate and, as necessary, detoxify the affected soil. If sodium hypochlorite[8] detoxification is used, the affected area pH must be at levels ranging 8-10 for the reaction to occur. In addition, cyanogen chloride gas can be generated. This gas is highly toxic, and the area will be well ventilated. Alkaline chlorination detoxification can be accomplished using beads or by making an aqueous solution. Monitoring of chlorine levels will occur during use of this method to ensure that solutions with potentially toxic chlorine levels are not released. Procedures for use of sodium hypochlorite are presented in the SDS.

5.3.14 Laboratory

The proper procedures for responding to a cyanide spill in the lab:

- If water is present, a self-containing breathing apparatus may be necessary.
- For a dry spill, shovel the contents into a sealable bucket and label "Cyanide Contaminated Waste". Remove the contents to the Mill for disposal in overpack drums.
- For liquid spills, contain the area with the absorbent socks and flush the spill area with sodium hypochlorite and large amounts of water. Used absorbent socks will be disposed of in a labeled sealable bucket and the mop and bucket used in the cleanup.

5.3.15 Response Equipment

The equipment necessary to implement this Cyanide Response Plan, exists at the site.

5.4 MONITORING & REMEDIATION

5.4.1 Releases to the Land

All releases of cyanide or cyanide solution to the land will be cleaned up as soon as practicable. Spills of solid cyanide will be picked up by shovel such that all visible cyanide is recovered.

[8] *The Reportable Quantity for Sodium Hypochlorite is 10 pounds as released to the ground in any 24-hour period.*

Releases of cyanide solution will be recovered, if practicable, treated in place and contaminated soil will be excavated. Remaining contamination on the soil surface will be treated with sodium hypochlorite solution to oxidize the cyanide to less toxic cyanate.

Where ground conditions allow, the extent of contamination resulting from a release of cyanide solution will be determined visually. After treatment, solution spills will be over-excavated to remove all wet soil.

Where soil was wet prior to the release or in other situations where the extent of potential contamination cannot be determined visually, UMC will immediately excavate soil believed to be contaminated.

Contaminated soil to be placed in 55-gallon drums for recovery/use of any remaining reagent values or disposed of in compliance with applicable hazardous waste regulations,

A spill and its remediation report will be retained in the Mill files.

5.4.2 Releases to Surface Water

In the unlikely event that cyanide solution is released to the dry tributary adjacent to the mill, UMC will sample the solution released (if possible), at established surface water sampling locations. Standard sampling, preservation, handling, and analytical methods will be used and coordinated by the Mill Manager or his designated representative.

In no case will UMC attempt to oxidize, neutralize, or otherwise treat cyanide once it has entered a running drainage channel. Since all cyanide treatment chemicals are themselves toxic to aquatic life, and in-situ treatment is only marginally effective at best, all efforts will focus on preventive containment measures.

5.4.3 Releases to Ground Water

CJK maintains sentinel and ground water monitoring wells to determine if releases are occurring or have occurred. Releases to ground water, should they occur, are not rapid or instantaneous, thus providing adequate time for evaluation and remediation.

5.4.4 Spill Path Monitoring

If a spill or leak has the potential to migrate from the point of occurrence, spill monitoring and remediation will be implemented. Development of the monitoring plan will be determined by the nature and extent of the spill and the potential environmental effects created by the spill. All, monitoring and sampling will be completed under the direction of the Mill manager or his designated representative.

The potential for spills to migrate from the point of occurrence is minimal. Spills will be quickly absorbed into soil material. If a spill has the potential to migrate to surface water, a berm(s) will be placed upgradient of the potential point of entry to the water and surface water monitoring will be implemented downstream, if necessary. Monitoring and sampling will be completed under the direction of Mill manager or his designated representative.

Site spill monitoring equipment and trained personnel are on site to respond to cyanide related accidents. If there is potential for the spill to migrate off site, samples will be obtained expeditiously down-gradient,

existing surface and groundwater sampling stations and any additional water monitoring points deemed appropriate to monitor the potential migration pathways. The spilled material also may be tested to evaluate mitigation effectiveness.

Incident and accident investigations will be initiated to identify their cause and determine the measures to be implemented designed to prevent their reoccurrence. Such measures may include equipment changes, revised standard operating procedures, or new or enhanced worker training.

CJK will review and evaluate the response plan annually and after any incident requiring its implementation. Based on these reviews, the response plan will be revised, as necessary, to ensure that the plan remains current and effective. The date of the most recent review will be noted in the response plan.

CJK will conduct mock emergency drills annually to test its response procedures and capabilities. Some of these drills may be specific to cyanide releases while others may simulate fires, explosions, releases of other hazardous chemicals, or other emergency situations. Documentation of these mock drills will be retained in CJK files.

6.0 CORRECTIVE ACTION PLAN COMPLETION REPORT

The Mill Manager or his designated representative will verify full implementation of the Corrective Action Plan (CAP) and report the results to CDRMS no later than 30 days after completion of corrective actions. This Corrective Action Plan Completion Report will provide a summary of the evidence that resulted in the conclusion of full compliance for each deficiency that was noted in the Summary Inspection Report and is included in the Corrective Action Plan. This Corrective Action Plan Completion Report will be submitted to responsible agencies and signed by the Mill Manager.

6.1 INSPECTION

6.1.1 Introduction

The following section provides the framework for the information that a Mill Manager or his designated representative will include in the Summary Inspection Report.

6.1.2 Instructions

1. The basis for the finding and/or statement of deficiencies will be summarized in the Summary Inspection Report. The Summary Inspection Report is intended to provide a summary of the information included in the Detailed Inspection Findings Report.

2. The Mill name, the Mill Manager's signature, and the submittal date of the final report will be included at the bottom of each page of the Summary Inspection Report.

3. Inspection report will include a description of the operation, identifying the facilities included within the scope of the Inspection and any new facilities or facilities that have undergone substantial changes since the previous Inspection (in the case of a re-inspection) and indicating key operational components such as cyanide form(s) produced, packaging and storage, and other site-specific operational features that provide context to the reader ahead of the Inspection Findings. The description of the operation will include sufficient information to describe the scope and complexity of operation being inspected.

CJK Milling Company
Operation General Information

Mill Name:	Leadville Mill
Name of Mill Owner:	Gary Knippa
Name of Mill Operator:	Union Milling Contractors, LLC
Name of Responsible Manager:	Steve Craig
Address:	P.O. Box 620490, Littleton
State/Zip:	Colorado, 80162-0490
Country:	United States
Telephone:	303-877-9701
Email:	scraig@unionmilling.com

Mill Manager or his designated representative's

Name: _____

Signature: _____

Mill Weekly Inspection Form

This Operation is:

☐ In Compliance

☐ In Substantial Compliance *(See Below)

☐ Not In Compliance

Compliance Statement

The Summary Inspection Report for a re-inspection will include that the operation is found to follow the Colorado Division of Mined Land Reclamation Division (CDRMS) and Mine Safety Health Administration (MSHA) regulations The report will indicate whether the operation had any compliance issues or significant cyanide incidents since its previous inspection and identify where in the report such information can be found. If the mill is found "in compliance" or "non-compliance," the report will identify the basis for the report findings.

One of the following two statements will be included directly following the overall compliance finding for an operation found in full compliance during a re-inspection

☐ "This operation has not experienced any compliance issues or significant cyanide incidents during the annual inspection cycle."

OR

☐ "This operation has experienced compliance issues or significant cyanide incidents during annual inspection cycle which are discussed in this report under the following:

One of the following statements will also be included:

☐ "This operation is in substantial compliance discussed in this report":

OR

☐ "This operation is in non-compliance during a reinspection"

Mill Manager or his Designated Representative Information

Mill Manager or his Designated Representative(s):

Email:

Names and Signature of Mill Manager and/or his designated representatives:

Representative 1

Name (Print) Signature

Representative 2

Name (Print) Signature

Representative 3

Name (Print) Signature

Date of Inspection:

Mill Manager or his designated representative

I attest that this Summary Inspection Report accurately describes the findings of the Inspection. I further attest that the inspection was conducted in a professional manner using standard and accepted practices for health, safety, and environmental inspections.

Signature of Mill Manager or Designated Representative

Date

Compliance Summary

1.0 OPERATIONS

Design, construct and operate cyanide production facilities to prevent release of cyanide.

1.1 Design and construct cyanide production facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

1.2 Develop and implement plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

1.3 Inspect cyanide production facilities to ensure their integrity and prevent accidental releases.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

2.0 WORKER SAFETY

Protect workers' health and safety from exposure to cyanide.

2.1 Develop and implement procedures to protect Mill Personnel from exposure to cyanide.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

2.2 Develop and implement plans and procedures for rapid and effective response to cyanide to cyanide exposure.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

3.0 ENSURE THAT PROCESS CONTROLS ARE PROTECTIVE OF THE ENVIRONMENT

3.1 Conduct environmental monitoring to confirm that planned or unplanned releases of cyanide do not result in adverse impacts.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

_____

4.0 TRAINING

Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.

4.1 Train employees to operate the mill in a manner that minimizes the potential for cyanide exposures and releases.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

4.2 Train employees to respond to cyanide exposures and releases.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

5.0 EMERGENCY RESPONSE

Protect communities and the environment through the development of emergency response strategies and capabilities.

5.1 Prepare detailed emergency response plans for potential cyanide releases.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

5.2 Involve site personnel and stakeholders in the planning process.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

5.3 Designate appropriate personnel and commit necessary equipment and resources for emergency response.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

5.4 Develop procedures for internal and external emergency notification and reporting.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

5.5 Incorporate remediation measures and monitoring elements into response plans and account for the additional hazards of using cyanide treatment chemicals.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

5.6 Periodically evaluate response procedures and capabilities and revise them as needed.

The Operation is:

☐ In Compliance

☐ In Substantial Compliance

☐ Not In Compliance

Summarize the basis for this Finding/Deficiencies Identified:

Table 6-1: Cyanide Health and Safety Equipment Monthly Inspection Form

Date:	**Inspected by:**					
	Equipment (note if present and in working order)					
Locations	**Antidote (Confirm date)**	**Medical oxygen (If bottle under 50%, replace)**	**Resuscitator**	**Safety Shower/Eye Wash Station**	**Full Face Respirator Canister**	**Fire Extinguisher Dry Chemical**
Loading, Dissolution, & Storage Area						
Process Plant						
Detox Plant						
Corrective/Preventive Action Necessary? (if so, summarize and record)						
Note: When completed, this form shall be retained in the Project records.						

Table 6-2: Mill Weekly Inspection Form

Mill Weekly Inspection Form

Date:		**Inspected by:**				
OBSERVATION		**Leach Tanks**				
		Y/N	**Y/N**	**Y/N**	**Y/N**	**Y/N**
1.	Are all tanks and piping clearly labelled?					
2.	Is the direction of flow indicated on all piping?					
3.	Are HCN monitors/alarms in working condition					
4.	Is personal protective equipment available and in good condition?					
5.	Are fire extinguishers charged and in good working order?					
6.	Are there signs of corrosion or deterioration of any tanks?					
7.	Are there signs of cracking or deterioration of any tank supports?					
8.	Are there signs of corrosion or deterioration of any valves, pumps, or pipelines?					
9.	Is there evidence of leakage or spillage from any tans, valves, pumps, or pipelines?					
10.	Is any water or cyanide solution present in cyanide secondary containments					
11.	Are secondary containment walls and floors separated, cracked, or deteriorated?					
Comments:						
Corrective/Preventive Action Necessary?						
Note: When completed, this form shall be retained in the Mill Records						

Figure G-1: For Figure Reference if needed.

APPENDIX 6-1

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