Florida, Louisiana and Carlsbad Concentrates and Minerals Quality Control Laboratories

CHEMICAL HYGIENE PLAN

Reference 29 CFR 1910.1450
Occupational Exposure to
Hazardous Chemicals in Laboratories

March 1, 2024
Revision includes all Mosaic Florida, Louisiana and New Mexico Concentrates and Minerals Laboratories

CHANGES HISTORY

Date	By	Changes apply to:	Page(s)
08/28/2012	**Rey Marsella**	**New Wales Lab**	**81-118**
08/28/2012	**Paul McAfee**	**Bartow Lab**	**35-56**
08/28/2012	**Priscilla Williams**	**Four Corners Lab**	**32, 57-75**
08/28/2012	**Priscilla Williams**	**South Fort Meade Lab**	**32, 143-160**
08/28/2012	**Cynthia Gonzalez**	**All Labs**	**20-21**
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05/28/2013	**Priscilla Williams**	**South Fort Meade Lab**	**148-166**
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03/28/2019	**Art Espinosa**	**Added Phosphate labs appendix with common TRAs**	**125-152**
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FOREWORD

On January 31, 1990, the Occupational Safety and Health Administration (OSHA) promulgated a final rule for occupational exposure to hazardous chemicals in laboratories. Included in the standard, which became effective on May 1, 1990, is a requirement for all employers covered by the standard to develop and carry out the provisions of a Chemical Hygiene Plan (CHP). The standard required that the CHP must be developed and implemented by January 31, 1991.

A CHP is defined as a written program which sets forth procedures, equipment, personal protective equipment, and work practices that can protect employees from the health hazards presented by hazardous chemicals used in that particular workplace. Components of the CHP must include standard operating procedures for safety and health, criteria for the implementation of control measures, measures to ensure proper operation of engineering controls, provisions for training and information dissemination, permitting requirements, provisions for medical consultation, designation of responsible personnel, and identification of particularly hazardous substances.

This plan is the Chemical Hygiene Plan developed for Mosaic's Concentrates and Minerals Quality Control Laboratories located at the Bartow Concentrates Facility, Bartow, FL, the New Wales Concentrates Facility, Mulberry, FL, Four Corners Mine in Bradley, Florida, the Riverview Concentrates Facility, Riverview, FL, the Faustina Concentrates Facility in St. James, Louisiana, and the Carlsbad Potash Facility in Carlsbad, New Mexico. Copies of this CHP are maintained readily available to laboratory employees at all of the Quality Control laboratories aforementioned at http://doculink.mosaicco.com/livelink/llisapi.dll/open/42587221**.**

All laboratory personnel must know and follow the procedures outlined in this plan. All operations performed in the laboratory must be planned and executed in accordance with the enclosed procedures. In addition, each employee is expected to develop safe personal chemical hygiene habits aimed at the reduction of chemical exposures to themselves and coworkers.

This document was developed to comply with paragraph (e) of the referenced OSHA 1910.1450 standard. Mosaic's laboratories will maintain the facilities and procedures employed in the laboratories compatible with current knowledge and regulations in laboratory safety. This CHP will be reviewed, evaluated, and updated at least annually and is readily available to employees, their representatives, and any representative of the Assistant Secretary of Labor for OSHA.

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Manager Laboratories

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PURPOSE

The Chemical Hygiene Plan has been developed to protect employees from health hazards associated with hazardous chemicals and to provide the necessary information to work safely in the laboratory.

SCOPE

~~This~~ program applies to all Mosaic employees working in the Carlsbad, Florida, and Louisiana Concentrates and Minerals laboratories.

CHEMICAL HYGIENE RESPONSIBILITIES

- **Chief Executive Officer**

The Laboratory Supervisor has the ultimate responsibility for chemical hygiene throughout the laboratory and with the assistance of other program administrators will provide continued support for chemical hygiene.

- **The Laboratory Supervisor**

Works with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices. Help project directors develop precautions and adequate facilities.

- **Chemical Hygiene Officer**

Monitor procurement and use of chemicals in the lab, including determining that facilities and training levels are adequate for the chemicals in use. Perform regular, formal chemical hygiene and housekeeping inspections including inspections of emergency equipment. Ensure that workers know and follow the chemical hygiene rules. These rules shall be discussed at monthly safety meetings, as necessary, and clearly explained. Determine the proper level of personal protective equipment; ensure that such protective equipment is available and in working order. Ensure that appropriate training has been provided to employees.

- **Laboratory Supervisor and Chemical Hygiene Officer**

Maintain current knowledge concerning the legal requirements of regulated substances in the laboratory. Review and improve the Chemical Hygiene Plan on an annual basis.

- **Laboratory Workers**

Planning and conducting each laboratory operation in accordance with the Chemical Hygiene Plan. Developing good personal chemical hygiene habits.

COMPONENTS OF THE CHEMICAL HYGIENE PLAN

Basic Rules and Procedures

Every laboratory worker should observe the following rules:

- Know the safety rules and procedures that apply to the work that is being done. Review the potential hazards (e.g. physical, chemical, biological) and appropriate safety precautions before beginning any new operation.

- Know the location of and how to use the emergency equipment in your area, as well as how to obtain additional help in an emergency. Familiarize yourself with emergency response procedures, facility alarm systems, the location of emergency equipment (e.g. fire extinguishers, safety showers and eye wash fountains), and building evacuation routes.

- Know the types of protective equipment available and use the proper type for each job.

- Be alert to unsafe conditions and actions and bring them to the attention of your supervisor immediately so that corrections can be made as soon as possible. Someone else's accident can be as dangerous to you as any you might have.

- Do not consume food or beverages in areas where chemicals are being used or stored.

- Avoid hazards to the environment by following accepted waste disposal procedures. Chemical reactions may require traps or scrubbing dev`ices to prevent the escape of toxic substances to the laboratory and the environment.

- Be certain all chemicals are correctly and clearly labeled. Post warnings signs when unusual hazards, such as radiation, laser operations, flammable materials, biological hazards, or other special problems exist.

- Remain out of the area of a fire or personal injury unless it is your responsibility to help meet the emergency. Curious bystanders interfere with rescue and emergency personnel and endanger themselves.

- Avoid distracting or startling any other worker. Practical jokes or horseplay cannot be tolerated at any time.

- Use equipment only for its designed purpose.

- Position and clamp reaction apparatus thoughtfully, in order to permit manipulation without the need to move the apparatus until the entire reaction is completed. Combine reagents in the appropriate order and avoid adding solids to hot liquids.

- Think, act, and encourage safety until it becomes a habit.

Health and Hygiene

Laboratory workers should observe the following health practices:

- Wear appropriate eye and face protection at all times.
- Use protective apparel, including face shields, gloves, and other special clothing or footwear as needed.
- Confine long hair and loose clothing when in the laboratory. Wear shoes at all times in buildings where chemicals are stored or used. Open toe shoes or sandals are not acceptable.
- Do not use mouth suction to pipet chemicals or to start a siphon; a pipet bulb or an aspirator should be used to provide vacuum.
- Avoid exposure to gases, vapors, and aerosols. Use appropriate safety equipment and work in fume hood whenever such exposure is likely.
- Wash well before leaving the laboratory area. However, avoid use of solvents for washing the skin. They remove the natural protective oils from the skin and can cause irritation and inflammation. In some cases, washing with a solvent may facilitate absorption of a toxic chemical.

Food Handling

Contamination of food, drink, and smoking materials is a potential route for exposure to toxic substances. Food should be stored, handled, and consumed in an area free of hazardous substances.

Well-defined areas should be established for storage and consumption of food and beverages. No food should be stored or consumed outside of this area.

Areas where food is permitted should be prominently marked. No chemicals or chemical equipment should be allowed in such areas.

Consumption of food or beverages is not permitted in areas where laboratory operations are performed.

Smoking is prohibited in the laboratory and inside all buildings. Handling of tobacco products is not permitted in lab operating areas.

Lab glassware shall never be used to prepare or to consume food or beverages. Laboratory refrigerators, freezers, ice chests, or cold rooms, shall not be used for food storage. Separate equipment should be dedicated to that use and should be prominently labeled.

Chemical Procurement, Distribution, and Storage

Procurement

The decision to purchase a chemical shall be a commitment to handle and use the chemical properly from initial receipt to ultimate disposal. Procurement of chemicals not normally used in day-to-day operations of the lab shall be discouraged. When such procurement is necessary, only the amount required for immediate use will be purchased. For purchases of chemicals not previously approved, a new request must be initiated through the Mosaic Homepage/ Tools and Applications/ SDS- Material Request and Approval Process (MRAP). Following this path, one will be redirected to the "MRAP Active Livelink Workflow" page. Select "Intiate MRAP Workflow" and fill out form respectively for the new chemical. Upon completion one will be prompted to attach the current SDS for the chemical being submitted for approval. Select "Submit Request" and if the Corporate Administrator issues final approval, an email will go back to the originator advising them whether or not the product is approved for purchase. See the Material Request and Approval Process for Controlled Products, Approval Process Manual for more information.

All chemicals shall be received in a central location. Personnel who receive chemical shipments shall be knowledgeable of the proper procedures for receipt.

Storage

All chemicals shall be kept in the storage area or cabinet designated for that chemical.

The storage areas shall be well-illuminated and shall be accessible during normal working hours. The storage area shall not be used as a preparation or repackaging area.

If available, bottles of concentrated acids and bases will be purchased in plastic-coated glass bottles.

Flammable liquids will be stored in vented cabinets or outside areas designed for that purpose.

The amounts of chemicals at the various workstations should be kept as small as possible.

Chemical inventory will be examined annually for deterioration and container integrity. The CHO at each laboratory will perform this task.

Fume hoods should not be used for storage of chemicals or equipment.

Handling

Avoid routine exposure to all reagents and samples. Assume all chemicals are hazardous and minimize your exposure by using proper PPE and follow safety guidelines.

Eating and drinking are not permitted in areas where laboratory chemicals are present.

Smoking areas are located outside of the building.

Do not use mouth suction to pipet chemicals or to start a siphon. A pipet bulb or an aspirator shall be used to provide vacuum.

All employees should wash all areas of exposed skin prior to leaving the laboratory and prior to eating, drinking, or smoking.

Food or beverages shall not be stored in storage areas or refrigerators that are used for the storage of chemicals.

Laboratory personnel should know how to locate SDSs through the Mosaic Homepage for all chemicals used in the laboratory. They should be familiar with the symptoms of exposure for the chemicals they work with and with the precautions necessary to prevent exposure.

Environmental Monitoring

Regular instrumental monitoring of airborne concentrations is not usually justified or practical in laboratories but may be appropriate when testing or redesigning hoods or other ventilation devices or when a highly toxic substance is stored or used regularly (e.g. 3 times/week). Fume hoods are inspected annually.

Housekeeping, Maintenance, and Inspections

Work areas should be kept clean and free from obstructions. Cleanup should follow the completion of any operation or at the end of each day.

Wastes should be deposited in appropriate receptacles.

Spilled chemicals should be cleaned up immediately and disposed of properly. Disposal procedures should be established, and all laboratory personnel should be informed of them. The effects of other laboratory accidents should also be cleaned up promptly.

Unlabeled containers, unused reagents, and hazardous chemical wastes should be disposed of promptly by contacting the Environmental Department. Such materials, as well as chemicals that are no longer needed, shall not accumulate in the laboratory.

Floors should be cleaned regularly. Accumulated dust and other assorted chemicals pose respiratory hazards.

Hallways should not be used as storage areas.

Access to exits, emergency equipment, controls, and such should be clear and unobstructed.

Medical Program

Medical Consultation and Medical Examinations.

The employer shall provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:

- Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory, the employee shall be

provided an opportunity to receive an appropriate medical examination, coordinated through the company nurse, and an event report must be filled out within 24 hours.

- Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA-regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employee as prescribed by the particular standard.

- Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.

- All medical examinations and consultations shall be coordinated through the company nurse and shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.

It is Mosaic's policy to provide laboratory employees the opportunity for medical attention when:

- The employee exhibits signs and symptoms associated with chemicals to which they have been exposed.

- The employee is subjected to events such as spills, leaks, and explosion.

- Rather unexpected occurrence where there is likelihood of a significant exposure to hazardous chemicals.

Routine Exposures over PEL's for Substance Specific Standard

If air monitoring results indicate that laboratory employee exposures are above the limits prescribed in the substance specific standards, the safety department must be notified right away, and medical monitoring is provided as required in the applicable standard for the regulated substance.

The persons responsible for establishing the need for employee medical monitoring is the company's:

- Occupational Health Doctor or

- Occupational Health Nurse

Exposure Evaluation Following an Incident

The initial evaluation of an incident for possible overexposure shall be conducted by the company's:

- Occupational Health Doctor or
- Occupational Health Nurse

The person responsible for establishing the need for a medical consultation / examination is the company's:

- Occupational Health Doctor or
- Occupational Health Nurse

Information Provided to the Physician

The employer shall provide the following information to the physician:

- The identity of the hazardous chemical(s) to which the employee may have been exposed;
- A description of the conditions under which the exposure occurred including quantitative exposure data, if available;
- And a description of the signs and symptoms of exposure that the employee is experiencing, if any.

Physician's Written Opinion

For examination or consultation required under this standard, which is coordinated by the company nurse, the employer shall obtain a written opinion from the examining physician which shall include the following:

- Any recommendation for further medical follow-up;
- The results of the medical examination and any associated tests;
- Any medical condition which may be revealed in the course of the examination which may place the employee at increased risk as a result of exposure to a hazardous workplace;
- A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.
- The physician shall inform the employee of the results of the examination and shall provide Mosaic with a written opinion.
- The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.

All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place

Personal Protective Apparel and Equipment

A face shield, lab coat, and acid proof gloves are required when preparing aqua-regia or handling of any mineral acids, 98% sulfuric acid and strong bases.

A dust mask will be supplied as needed for rock or product grinding operations.

The use of a lab coat is required during normal laboratory testing. Lab coats are provided to all lab employees.

A full coverage leather shoe is required for working in the laboratory. Steel-toed safety boots are required for any trips into the plant.

Where the use of respirators is necessary to maintain exposure below permissible exposure limits, the employer shall provide, at no cost to the employee, the proper respiratory equipment, after the employee has been fit-tested. Respirators shall be selected and used in accordance with the requirements of 29 CFR 1910.134.

Safety glasses meeting ANSI Z87.1 are required for employees and visitors and will be worn at all times when in the laboratory (except in office areas). The safety glasses must have side shields. Contact lenses are prohibited in the laboratory.

Gloves, goggles or glasses, and lab coats or aprons shall be available for use when handling samples containing acids and toxic substances around the laboratory. When quantities of a gallon or more of dangerous chemicals are handled, employee shall wear personal protective equipment – gloves, which are insoluble in the chemical, plastic face shield, goggles and/or safety glasses and an apron to protect the body parts from contact. The container must be carried in a rubber boot, unless it is plastic-coated.

Sandals, perforated shoes, canvas shoes and bare feet are prohibited. Steel-toed safety shoes, per ANSI 47, are required where employee routinely lifts or moves heavy objects and when in the plant.

Appropriate chemical resistant gloves shall be worn when there may be skin contact with chemicals. Used gloves shall be inspected and washed prior to re-use. Damaged or deteriorated gloves will be immediately replaced. Gloves shall be washed prior to removal from the hands.

Thermal resistant gloves shall be worn for operations involving the handling of heated materials and exothermic reaction vessels. Thermal resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.

Only a utility or cutting knife that has been approved by the Mosaic EHS department may be used. A cut resistant glove is required on the non-cutting hand when using an approved utility knife.

Armor or leather gloves shall be worn when breaking glass tubing. The tubing should be scored with a file, glass cutter, or hot wire before breaking and the edges should be fire-polished before use.

Armor or leather gloves and several paper towels shall be worn when inserting glass tubing or thermometers into stoppers or rubber tubing. Objects to be inserted should be wet with water or glycerin.

Hearing protection is required in the laboratory when working with loud equipment such as large sample grinders

Lab personnel going into plant areas shall wear/carry required safety equipment (high visibility Class 2 Level 2 apparel, hard hat, safety glasses, safety shoes, hearing protection, respirator, plant approved gloves, etc.).

Records

The employer shall establish and maintain for each employee an accurate record of any measurements taken to monitor employee exposures and any medical consultation and examinations including tests or written opinions required by this standard.

The employer shall assure that such records are kept, transferred, and made available in accordance with 29 CFR 1910.1020.

Accident records shall be written and retained in the Incident Reporting Program's Database.

Report NEAR MISS incidents to the supervisor immediately. A NEAR MISS is an incident with no personal injury or equipment/property damage which did have the potential for serious personal injury or equipment/property damage. Reporting these NEAR MISS incidents will result in actions taken to prevent potential injuries and losses of a similar nature.

It shall be the responsibility of the supervisor to conduct promptly an investigation of the accident or near miss and complete a Supervisor's Accident Investigation Report. A copy of the investigation report must be in the dispensary within 48 hours following the accident or near miss. These reports are retained indefinitely.

Exposure records for hazardous chemicals and harmful physical agents will be maintained for 30 years per 29 CFR 1910.1020.

Medical records for employees exposed to hazardous chemicals and harmful physical agents will be maintained for the duration of employment plus 30 years per 29 CFR 1910.1020.

Records of inspections of emergency equipment will be maintained for 3 years.

Records of employee training will be maintained for 3 years.

Records are maintained by Human Resources, the Safety Department, and the Training Department, as appropriate.

Signs and Labels

Prominent signs and labels of the following types should be posted:

- Emergency telephone numbers of emergency personnel/facilities.
- Identity labels, showing contents of containers (including waste receptacles) and associated hazards.
- Location signs for safety showers, eyewash stations, other safety and first aid equipment, exits and areas where food and beverage consumption and storage are permitted.

Warnings at areas or equipment where special or unusual hazards exist.

All containers in the laboratory shall be labeled. This includes chemical containers and waste containers. The label shall be informative and durable, and at a minimum, will identify contents, manufacturer, and indication of hazards.

Portable containers shall be labeled by the individual using the container. Exemptions for labeling requirements shall be made for chemical transfers from a labeled container into a container which is intended only for the immediate use of the employee who performed the transfer.

The labeling program shall be periodically inspected by the Chemical Hygiene Officer to ensure that labels have not been defaced or removed. Any deviations from prescribed labeling procedure shall be corrected immediately.

Spills

In the event of a major fire or a major chemical release or spill inside the laboratory, refer to the Standard Operating Procedure in the Emergency Action Plan.

In the event of a major spill or accident in the production area, laboratory personnel will monitor the "Code Red/Code Blue" channel (New Wales, Bartow, Faustina and Riverview) and follow instructions of the incident commander.

All minor and incidental spills will be cleaned up at the time of the spill. Spill kits are available for minor spills.

Information and Training

The employer shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area.

Such information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. The employer shall determine the frequency of refresher information and training.

Information

Employees shall be informed of:

- The contents of this standard and its appendices, which shall be made available to employees;
- The location and availability of the employer's Chemical Hygiene Plan;
- The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, Safety Data Sheets received from the chemical supplier.

The company maintains SDSs in "SDS- North America – Sphera General Access" which is available to all laboratory employees through the Mosaic Homepage "Tools & Applications" tab.

Training

Employee training shall include:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).
- The physical and health hazards of chemicals in the work area.
- The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
- The employee shall be trained on the applicable details of the employer's written Chemical Hygiene Plan.
- All employees receive annual refresher training in the OSHA Lab Standard.

Waste Disposal

It is the policy of this laboratory to comply with all environmental regulations regarding disposal of laboratory wastes including any which may be hazardous.

GLOSSARY

Action level means a concentration designated in 29 CFR part 1910 for a specific substance, calculated as an eight (8)-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Carcinogen (***see select carcinogen***).

Chemical Hygiene Officer means an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.

Chemical Hygiene Plan means a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace and meets the requirements of paragraph (e) of this section.

Combustible liquid means any liquid having a flashpoint at or above 100 deg. F (37.8 deg. C), but below 200 deg. F (93.3 deg. C), except any mixture having components with flashpoints of 200 deg. F (93.3 deg. C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

Compressed *gas* means**:**

A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F (21.1 deg. C); or

A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg. C) regardless of the pressure at 70 deg. F (21.1 deg. C); or

A liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 C) as determined by ASTM D-323-72.

Designated area means an area which may be used for work with "select carcinogens," reproductive toxins or substances which have a high degree of acute toxicity. A designated area may be the entire laboratory, an area of a laboratory or a device such as a laboratory hood.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.

Employee means an individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignments.

Explosive means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Flammable and inflammable are synonyms that mean a chemical that falls into one of the following categories:

Aerosol, flammable means:

An aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame protection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening.

Gas, flammable means:

A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less; or

A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit.

Liquid, flammable means any liquid having a flashpoint below 10 deg. F (37.8 deg. C), except any mixture having components with flashpoints of 100 deg. C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

Solid, flammable means a solid, other than a blasting agent or explosive as defined in § 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

Flashpoint means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested as follows:

Tagliabue Closed Tester (See American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24 - 1979 (ASTM D 56-79)) - for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100 deg. F (37.8 deg C), that do not contain suspended solids and do not tend to form a surface film under test; or

Pensky-Martens Closed Tester (See American National Standard Method of Test for Flashpoint by Pensky-Martens Closed Tester, Z11.7 -1979 (ASTM D 93-79)) - for liquids with a viscosity equal to or greater than 45 SUS at 100 deg. F (37.8 deg. C), or that contain suspended solids, or that have a tendency to form a surface film under test; or

Setaflash Closed Tester (see American National Standard Method of test for Flash Point by Setaflash Closed Tester (ASTM D 3278-78)).

Organic peroxides, which undergo auto-accelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.

Hazardous chemical means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems and agents which damage the lungs, skin, eyes, or mucous membranes.

Appendices A and B of the Hazard Communication Standard (29 CFR 1910.1200) provide further guidance in defining the scope of health hazards and determining whether or not a chemical is to be considered hazardous for purposes of this standard.

Laboratory means a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory scale means work with substances in which the containers used for reactions, transfers, and other handlings of substances are designed to be easily and safety manipulated by one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

Laboratory-type hood means a device located in a laboratory, enclosure on five sides with a movable sash or fixed partial enclosed on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

Walk-in hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne hazardous chemicals.

Laboratory use of hazardous chemicals means handling or use of such chemicals in which all of the following conditions are met:

Chemical manipulations are carried out on a "laboratory scale;"

Multiple chemical procedures or chemicals are used;

The procedures involved are not part of a production process, nor in any way simulates a production process;

"Protective laboratory practices and equipment" are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Medical consultation means a consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

Organic peroxide means an organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical.

Oxidizer means a chemical other than a blasting agent or explosive as defined in § 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer pyrophoric, unstable (reactive) or water-reactive.

Protective laboratory practices and equipment means those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Reproductive toxins mean chemicals which affect the reproductive chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

Select carcinogen means any substance which meets one of the following criteria:

It is regulated by OSHA as a carcinogen; or it is listed under the category, "known to be carcinogens," in the Annual Report on Carcinogens published by the National Toxicology

Program (NTP)(latest edition); or

It is listed under Group 1 ("carcinogenic to humans") by the International Agency for research on Cancer Monographs (IARC)(latest editions); or

It is listed in either Group 2A or 2B by IARC or under the category, reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:

(A) After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m(3);

(B) After repeated skin application of less than 300 (mg/kg of body weight) per week; or

(C) After oral dosages of less than 50 mg/kg of body weight per day.

Unstable (reactive) means a chemical which is the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

Water-reactive means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

APPENDICES

APPENDIX A – Specifics by Laboratory

Bartow Lab

The plant emergency is Code Red Alert on the radio.

The designated storage area for acids in Bartow is the "outside storeroom". Acid brought into the lab shall be carried in a rubber transfer bucket.

Inspection of emergency equipment is performed monthly.

Four Corners Lab

Inspection of emergency equipment is performed by two lab technicians within a 30-day period.

No food or drink is allowed in rooms designated by yellow tape at entrance.

In case of emergency contact: IOC/ERT (813) 500-6685

New Wales Lab

The plant emergency phone number is **863-844-5252** or Extension **5252**.

Channel 1 on the two-way radio is the **Safety** channel. The **Code Red** call is used for emergencies and the **Code Blue** call is used for non-emergency notifications.

The plant emergency and SO2 siren are tested every Wednesday at noon.

Wearing a lab coat, safety glasses with shields and closed-toes shoes of substantial construction is mandatory when working in the lab. TRAs must be observed when performing tests.

No food or drinks are allowed in the operating areas of the main lab.

Contractors inspect and maintain the fire extinguishers once a year. In addition, an inspection of the fire extinguishers is performed monthly by lab personnel.

Lab personnel maintains cleanliness and performs operating inspection of eyewash and safety showers monthly.

New Wales Facility's Emergency Action Plan (EAP) meets the requirements for the specific hazards and configuration of our lab. In case of emergency, lab personnel will follow the plant's EAP and will seek (and follow) instructions from the incident commander.

Riverview Lab

Riverview Plant emergency siren tests every Wednesday at noon.

Inspection of emergency equipment is performed by the plant monthly.

Plant personnel inspects fire extinguishers. Emergency showers and Eyewashes are inspected by lab personnel.

Main Gate **813-775-2995 (o)**, **813-781-2169 (m)**

Radio Channels**: #13 is ERT; #16 is "All Call emergency"**

The Code Red call is used for emergencies and the Code Blue call is used for non-emergency notifications.

Faustina Lab

Lab safety equipment is inspected monthly.

Plant PPE requirements include reflective vest or uniform top, 6" lace-up steel-toe shoes, escape respirator, goggles (carried or worn), safety glasses, hard hat, plant safety approved gloves and hearing protection. All PPE must be worn in the plant, on golfcart, or available in a close cab truck.

Full-face respirators are kept in the lab for each employee and a fit test is performed yearly for plant personnel.

The emergency phone number is 225-474-9888.

Carlsbad Lab

Security is available 24/7 at 575-628-6238 and the plant emergency number is extension 6411. The QC Laboratory supervisor is available at ext. 6281. The emergency siren is tested every Monday at noon.

Lab safety equipment is checked daily and inspected every two weeks.

Lab PPE requirements include flame resistant uniform or lab coat, safety glasses, close-toed shoes. Gloves, hearing protection and face shields are required in certain areas, or while performing certain tasks. Full-face respirators are available in the lab in case of emergency.

Plant PPE requirements include reflective vest or uniform, 8" lace-up steel-toe, metatarsal boots shoes, safety glasses, hard hat, gloves and hearing protection.

APPENDIX B – Bartow Laboratory Task Risk Analysis

In addition to the TRAs in this appendix, the TRAs listed below are common to most Mosaic labs and apply to the Bartow Facility. **The common TRAs are in Appendix "H".**		
TRA Number	**Title**	**Common to:**
Common TRA 001	**Operating BICO Rock Grinding Mill (Pulverizer)**	**Concentrates and Minerals QC Labs**
Common TRA 002	**Compressed Gas Cylinders**	**Concentrates and Minerals QC Labs**
Common TRA 003	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 004	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 005	**Glassware Usage**	**Concentrates and Minerals QC Labs**
Common TRA 006	**Sample digestion / Hotplate safety**	**Concentrates and Minerals QC Labs**
Common TRA 007	**Pipetting**	**Concentrates and Minerals QC Labs**
Common TRA 008	**Chittick Gasometric Apparatus for CO_2 Analysis**	**Concentrates and Minerals QC Labs**
Common TRA 009	**Working with Sulfuric Acid**	**Concentrates QC Labs Only**
Common TRA 010	**Phosphoric Acid Sample Handling**	**Concentrates QC Labs Only**
Common TRA 011	**Oven and Muffle Furnace Safety**	**Concentrates and Minerals QC Labs**
Common TRA 012	**ICP Routine Operation and Maintenance**	**Concentrates and Minerals QC Labs**

Changing LECO Reagents

Phosphates Business Unit
Environmental, Health, and Safety (EHS) Department

The Mosaic Company
101 East Kennedy Blvd., Suite 2500
Tampa, FL 33602 USA

TASK RISK ASSESSMENT FORM

Location/Applicability: Bartow		Document Identifier**:**	
Document Owner (Name/Title): Kevin Sapp, QC Laboratory Supervisor – Bartow			
Effective Date:	April 10, 2012	Review Due Date:	January 5, 2023

Dept/Area: Bartow QC Laboratory	**Written by: Paul McAfee**
Task: Changing LECO Reagents	**Reviewed by: Trish Walsh**

Step	Task Steps	Potential Hazards	Controls
1	Remove Spent reagent tubes	Exposure to reagents	Use caution, do not apply excessive force when removing and place reagent tubes into a container that maintains them in an upright position.
2	Disposing of spent reagents	Exposure to reagents	Work in the reagent fume hood. Place the waste receptacle, 5 gallon bucket, in the fume hood and turn on the hood blower. Wear disposable gloves. Replace bucket lid once transfer is complete.
3	Washing the glass reagent tube	Exposure to reagents. Cut from reagent tube.	Use caution. Inspect tube for cracks or defects. Dispose of any damaged tubes in the appropriate waste container.
4	Refilling Reagent tube	Exposure to reagents	Work in the reagent fume hood, with hood blower on. Wear disposable gloves. Use a powder funnel to minimize spillage.
5	Re-attach reagent tubes	Exposure to reagents. Cut from reagent tube.	Use caution; do not apply excessive force when re-attaching the tube.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

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Environmental, Health, and Safety (EHS) Department

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TASK RISK ASSESSMENT FORM

Location/Applicability: Bartow		Document Identifier:	
Document Owner (Name/Title): Kevin Sapp, QC Laboratory Supervisor - Bartow			
Effective Date:	April 10, 2012	Review Due Date:	January 5, 2023

Dept/Area: Bartow QC Laboratory	**Written by: Paul McAfee**
Task: Methanol transfer / Handling	**Reviewed by: Trish Walsh**

Step	Task Steps	Potential Hazards	Controls
1	Filling small containers with methyl alcohol	Chance of fire if exposed to spark or flame. Exposure to reagent	No smoking or open flame permitted in any part of the laboratory. Use only approved safety containers that are clearly labeled. Clean up any spills. Use disposable gloves. Store partial or Un-opened containers in approved Flammable Storage Cabinet.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

Phosphates Business Unit
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TASK RISK ASSESSMENT FORM

Location/Applicability: Bartow		Document Identifier:	
Document Owner (Name/Title): Kevin Sapp, QC Laboratory Supervisor - Bartow			
Effective Date:	April 10, 2012	Review Due Date:	January 5, 2023

Dept/Area: Bartow QC Laboratory — **Written by: Paul McAfee**

Task: Muffle Furnace / LECO Safety — **Reviewed by: Trish Walsh**

Step	Task Steps	Potential Hazards	Controls
1	Inserting or removing crucibles from the muffle furnace	Burns can occur if contact is made with hot parts of the furnace, hot crucibles or the hot crucible handling tools.	Use only long tongs or the crucible handling tool for inserting and removing crucibles from the furnace. Place hot crucibles on the cooling rack. Be aware that the crucibles remain very hot for several minutes. Allow to cool completely before handling. Always assume crucibles are hot until you determine otherwise.
2	Inserting or removing combustion boats from the LECO S-144DR combustion chamber	Burns can occur if contact is made with hot parts of the furnace, hot crucibles or the hot crucible handling tools.	Use only the designated boat insertion tool for inserting and removing boats from the combustion chamber Place hot crucibles on the cooling rack.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

Screen Analysis Safety

Phosphates Business Unit
Environmental, Health, and Safety (EHS) Department

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TASK RISK ASSESSMENT FORM

Location/Applicability: Bartow		Document Identifier:	
Document Owner (Name/Title): Kevin Sapp, QC Laboratory Supervisor - Bartow			
Effective Date:	April 10, 2012	Review Due Date:	January 5, 2023

Dept/Area: Bartow QC Laboratory	**Written by: Paul McAfee**
Task: Screen Analysis Safety	**Reviewed by: Trish Walsh**

Step	Task Steps	Potential Hazards	Controls
1	Opening and closing the sound enclosure lid.	Bodily injury. Lid may close with a minimum of applied force when gas springs are not fully extended.	Use caution when raising and lowering the sound enclosure lid. Keep hands, head and rest of body out of line of fire.
2	Placing and removing screens from the shakers	Lacerations to fingers from damaged screens	Inspect screens for damage before using. Replace damaged screens, or screens that do not fit correctly.
		Pinched fingers	Avoid placing fingers in potential pinch points (between the screens and the screen holder).
		Injury from loose top plate	Adjust height of bottom holder or use additional "spacer" sieves to allow for proper fit of the top plate. Secure shaker arm.
		Wrist and arm strains	Use proper tool for separating screens.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

Solids Crucible Safety

Phosphates Business Unit
Environmental, Health, and Safety (EHS) Department

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TASK RISK ASSESSMENT FORM

Location/Applicability: Bartow		Document Identifier:	
Document Owner (Name/Title): Kevin Sapp, QC Laboratory Supervisor – Bartow			
Effective Date:	April 10, 2012	Review Due Date:	January 5, 2023

Dept/Area: Bartow QC Laboratory	**Written by: Paul McAfee**
Task: Solids Crucible Safety	**Reviewed by: Trish Walsh**

Step	Task Steps	Potential Hazards	Controls
1	Placing or removing suspended solids crucibles on the manifold	Cracked crucibles can break and cause hand injury Excessive force can cause crucible to break	Inspect all crucibles prior to use. Discard immediately any that are cracked. When placing crucibles on the manifold, use gentle (but firm) pressure. A slight twist can help achieve a secure fit. Before removing crucibles from the manifold, release the vacuum on the crucible. Turn off the vacuum and remove a rubber stopper from a position not being used, or open the drain valve. Kevlar gloves are available, but they are not required.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

Handling / Dumping Product Waste Containers

Phosphates Business Unit
Environmental, Health, and Safety (EHS) Department

The Mosaic Company
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TASK RISK ASSESSMENT FORM

Location/Applicability: Bartow		Document Identifier:	
Document Owner (Name/Title): Kevin Sapp, QC Laboratory Supervisor - Bartow			
Effective Date:	April 10, 2012	Review Due Date:	January 5, 2023

Dept/Area: Bartow QC Laboratory	**Written by: Paul McAfee**
Task: Handling / Dumping Product Waste Containers	**Reviewed by: Trish Walsh**

Step	Task Steps	Potential Hazards	Controls
1	Lifting or moving waste containers (5-gallon buckets) with waste product	Chance of a back injury	Do not fill waste product containers all the way. Empty them when half full, or less. When lifting use your legs for lifting, not your back. Get help if container is too heavy to lift and carry comfortably and safely.
2	Putting product in dumpsters	Chance of a back injury Tripping on uneven ground or stairs Slipping on slippery floor, or grounds	Get help if container is too heavy to lift. Be aware of surroundings. Be alert to slipping hazards.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

APPENDIX C – Four Corners Analytical Laboratory Task Risk Analysis

In addition to the TRAs in this appendix, the TRAs listed below are common to most Mosaic labs and apply to the Four Corners Facility. **The common TRAs are in Appendix "H".**		
TRA Number	**Title**	**Common to:**
Common TRA 001	**Operating BICO Rock Grinding Mill (Pulverizer)**	**Concentrates and Minerals QC Labs**
Common TRA 002	**Compressed Gas Cylinders**	**Concentrates and Minerals QC Labs**
Common TRA 003	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 004	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 005	**Glassware Usage**	**Concentrates and Minerals QC Labs**
Common TRA 006	**Sample digestion / Hotplate safety**	**Concentrates and Minerals QC Labs**
Common TRA 007	**Pipetting**	**Concentrates and Minerals QC Labs**
Common TRA 011	**Oven and Muffle Furnace Safety**	**Concentrates and Minerals QC Labs**
Common TRA 012	**ICP Routine Operation and Maintenance**	**Concentrates and Minerals QC Labs**

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FC Lab Task Risk Assessment Appendix C

Dry Screening (RO-TAP)

Dept/Area: Four Corners Quality Control Lab	**Written by:** W. Priscilla Williams
TRA No: FC04	**Reviewed by:** Lindsay Karashay **Date: 01/09/2023**
Task: Dry Screening (RO-TAP)	**Approved by:** W. Priscilla Williams **Date: 01/09/2023**

Step	Task Steps	Potential Hazards	Controls
1	Determining which screens to be used.	Possible pinch points. Lacerations to fingers from damaged screens.	Visually inspect screens prior to use. Replace/repair damaged screens. Grip the screens with both hands from the center of the sides rather than from the edges. Avoid pressing down on the screen when stacking.
2	Opening and closing the sound enclosure lid.	Bodily injury. Lid may close with a minimum of applied force when gas springs are not fully extended.	Use the attached handle when raising and lowering the sound enclosure lid. Keep hands, head, and rest of body out of the line of fire.
3	Adjust RO-Tap for screen stack size.	Possible pinch points. Securing bar may fall.	When adjusting the RO-Tap, make sure securing bar is in a resting position before putting hands in the line of fire. Raise and lower securing bar carefully.
4	Place sample in screen stack.	Possible laceration/scratch to skin. Wrist and arm strains.	Slowly pour sample onto screen to minimize bouncing/spillage of sample. Use 2 hands to pour heavy loads and/or a stool to reduce overextending arms.
5	Placing and removing screens from the shakers.	Possible pinch points. Hearing loss/ ear damage.	Avoid placing fingers in potential pinch points between screens and screen holder. Stay alert when working with RO-Taps. Close noise reduction box while shaking.
6	Separating screens.	Wrist and arm strain.	Use the designated tool to separate screens that do not easily come apart.

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FC Lab Task Risk Assessment Appendix C
SiO2 Analyses

Dept/Area: Four Corners Quality Control Lab	**Written by:** W. Priscilla Williams
TRA No: FC07	**Reviewed by:** Lindsay Karashay **Date: 01/09/2023**
Task: SiO2 Analyses	**Approved by:** W. Priscilla Williams **Date: 01/09/2023**

Step	Task Steps	Potential Hazards	Controls
1	Dispensing of Nitric or Hydrofluoric acid from dispenser or bottle.	Chemical burns from splash back or spattering. (Calcium gluconate gel/slurry should be close at hand.)	Dispense only in fume hood. Fume hood must be on. Wear nitrile gloves, lab coat, apron, disposable sleeves, (double) nitrile gloves, safety glasses and face shield. Confirm that calcium gluconate gel or slurry is readily available prior to handling HF. If unavailable, do not continue. Pour solutions slowly to reduce splashing. Point dispenser away from you while dispensing, and make sure tip is on side of vessel. Inspect and clean dirty and faulty dispenser. Be aware of remaining droplets on dispenser.
2	Placing and removing sample bottles from 105° drying oven.	Thermal burns Noxious fumes	Use heat resistant gloves to place and remove bottles from oven. Oven must be located under exhaust fan and fan must remain on during sample digestion.

3	Transferring digested sample from digestion vessel/ Teflon bottle to Nalgene volumetric flasks.	Chemical burns from samples	Transfer only in fume hood. Use caution when transferring digested sample to Nalgene volumetric flask. Wear required PPE and make sure 5% boric acid is in volumetric flask prior transferring sample.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber

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FC Lab Task Risk Assessment Appendix C

Waste Disposal

Dept/Area: Four Corners Quality Control Lab			**Written by:** W. Priscilla Williams
TRA No: FC012			**Reviewed by:** Lindsay Karashay **Date: 01/09/2023**
Task: Waste Disposal			**Approved by:** W. Priscilla Williams **Date: 01/09/2023**
Step	**Task Steps**	**Potential Hazards**	**Controls**
1	Dumping ground and unground samples down drain into sump.	Slip hazard if drain or sump backs up.	Do not put too much feed down drain at one time. Do not put too large pebbles down drain. Have sump dug out once a week with a Bobcat by the plant.
2	Dumping sample test tubes after analysis.	Laceration from broken tubes. Skin irritation Back strain	Wear cut resistant gloves. Don't let the bag rub against your body when carrying. Wear nitrile gloves. Wash hands after handling waste. Dispose of waste daily to decrease the load. Ask for help or use a cart for heavy loads.
3	Dumping liquid samples into flask washer	Eye irritation Skin irritation Cuts to hand	Slowly pour flasks onto jets to reduce splashing. Make sure all jets are covered prior to turning on washer. Wear safety glasses or goggles. Wear nitrile gloves and lab coat. Do not spin flasks once placed on jet. Spinning flasks could cause damage.

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FC Lab Task Risk Assessment Appendix C

Truck Use

Dept/Area: Four Corners Quality Control Lab			**Written by:** W. Priscilla Williams
TRA No: FC015			**Reviewed by:** Lindsay Karashay **Date: 01/09/2023**
Task: Truck Use			**Approved by:** W. Priscilla Williams **Date: 01/09/2023**
Step	**Task Steps**	**Potential Hazards**	**Controls**
1	Perform and complete vehicle inspection form. Driving	Faulty or inoperable parts Roadway hazards	If any item fails, do not operate vehicle. Inform supervisor for vehicle to be repaired. Obey all speed limits and highway safety rules and regulations. Seat belts shall be worn and properly adjusted at all times
2	Park vehicle/ getting in and out of vehicle.	Slips, trips and falls. Runaway vehicle Failure of brakes	Survey walking area for all hazards. Use caution. Shut off engine if you exit the vehicle. Use emergency brakes and chocks on tires.
3	Place items in truck.	Possible back/arm strain.	Lift by bending at the knees and hips. Keep a straight back while lifting/ carrying load. Ask for help if needed.
4	Fueling vehicle	Static-sparked fires	Vehicle must be shut off while being fueled. No smoking permitted while fueling vehicles. All gas cans must be removed from vehicle before being filled. No use of cell phones while fueling.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.

APPENDIX D – Four Corners Metallurgical Laboratory Task Risk Analysis

In addition to the TRAs in this appendix, the TRAs listed below are common to most Mosaic labs and apply to the Four Corners Facility. **The common TRAs are in Appendix "H".**		
TRA Number	**Title**	**Common to:**
Common TRA 001	**Operating BICO Rock Grinding Mill (Pulverizer)**	**Concentrates and Minerals QC Labs**
Common TRA 002	**Compressed Gas Cylinders**	**Concentrates and Minerals QC Labs**
Common TRA 003	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 004	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 005	**Glassware Usage**	**Concentrates and Minerals QC Labs**
Common TRA 006	**Sample digestion / Hotplate safety**	**Concentrates and Minerals QC Labs**
Common TRA 007	**Pipetting**	**Concentrates and Minerals QC Labs**
Common TRA 011	**Oven and Muffle Furnace Safety**	**Concentrates and Minerals QC Labs**
Common TRA 012	**ICP Routine Operation and Maintenance**	**Concentrates and Minerals QC Labs**

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Earnest Terry**
TRA No: MET Lab 01	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Chopping Core Samples	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Load battery operated cart with core samples.	Cart not secure or rolling; Back injuries.	Before exiting the cart, set the parking brake, take the cart out of gear and turn off. Use proper lifting techniques when loading. Use your legs, not your back, keep elbows tucked inwards and don't twist your body.
2	Unloading core samples from battery operated cart onto floor scale.	Cart not secure or rolling; Back injuries; Slips and falls.	Before exiting the cart, set the parking brake, take the cart out of gear and turn off. Use proper lifting techniques (as stated above). PPE required. Wear non-skid steel toed boots. This remains in effect for the rest of the process. Walkway needs to be free from tripping hazards (hoses, cylinders and tools). A "Slippery When Wet" sign needs to be placed outside Chopping area.
3	Remove zip ties from bags.	Cuts on hands or fingers.	Be sure hands or fingers are out of the cutting zone of the wire cutters. Leather gloves can offer increased protection.

4	Transferring sample bags from scale to chopping mat.	Chance of back injuries, slipping, tripping.	Use proper lifting techniques (as stated above). Be alert and aware of surroundings.
5	Chopping and mixing core samples (shovel used during mixing).	Striking feet with chopping tool, repetitive motion, heat stress and back injuries.	Be aware of location of feet. Take breaks and drink water as needed. When shoveling, don't overextend arms and lock elbows. Keep elbows tucked inward. When mixing, bend at the knees, not your back.
6	Shovel sample material into density cylinder and wheelbarrow.	Repetitive motion, heat stress, back injuries, slipping and tripping.	Take breaks and drink plenty of water. When shoveling, bend knees, not back so your legs take most of the load. Core material can get imbedded in grooves of boots; clean out/rinse off as needed. Be aware of uneven surfaces
7	Dump material from cylinder into washing tubs and transfer to washing station.	Back injuries, slips and trips.	Bend knees when dumping cylinder. Check tubs for damaged handles before moving. Use tub puller to transfer material to wash station. Two people are required to lift tubs onto washing platform. Use proper lifting techniques (as stated above).

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Robert Walker**
TRA No: MET Lab 02	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Cushman Cart Battery Charging	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Before servicing the cart, turn main switch off and forward/reverse switch to neutral. Set park brake.	None.	None.
2	Obtain the charger's electrical cord from its housing in the back of the cart.	Possibility of pinch points.	Remove cord carefully.
3	Make sure batteries have sufficient electrolyte.	Possibility of chemical burn.	Wear gloves and eye protection as electrolite is acidic. Do not use or charge cart if electrolyte level is low.
4	Plug in charger with your back to the batteries.	Possibility of battery explosion.	If battery is faulty, an electrical arc can ignite hydrogen gas in battery.
5	After charging, unplug and stow charger's electrical cord.	None.	None.

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Robert Walker**
TRA No: MET Lab 03	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Core Washer Operation	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
5	Inspect equipment daily • Hoist – grating – controls • Visually check mixer blades • Grease all fittings	Load could fall, mixer blades could break off, possibly fly out of tank (rare), fall through grating.	Inspect hoist often. Always reinstall grating.
6	Load dock with core to be washed.	Back strain, slippery floors	Use proper lifting procedures. Watch out for slippery floors, grating.
7	Check split cards.	None.	None.
8	Load splits on mixer platforms.	Use caution when hooking up tubs to hoist. Tubs could come loose. Too many tubs create trip hazard.	Double check hooks. Get help when needed. Keep walk path on dock open.
9	Fill mixer with H_20 above blade level.	None.	None.
10	Turn mixer on.	Possible shock. Report faulty equipment.	Inspect electrical boxes. Report any faulty equipment.

11	Put split into mixer slowly.	Rocks could hit mixer blade and jump out causing injury.	Check splits for large rocks before loading into mixer.
12	Discharge slurry into slurry sump.	None.	None.
13	Turn pebble pump on.	Possible shock. Report faulty equipment.	Inspect electrical switch box before using.
14	Operating equipment from platform.	Unexpected startup of equipment could cause injury.	Watch out for others and make sure they are clear of equipment.

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Earnest Terry**
TRA No: MET Lab 04	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Dry Screening Samples (RO-Tap) Met Lab Samples	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Determine required screens to be used.	Possible pinch points. Lacerations to fingers from damaged screens.	Use caution when stacking screens. Repair or replace damaged screens.
2	Opening and closing the sound enclosure lid.	Bodily injury. Lid may close with a minimum of applied force when gas springs are not fully extended.	Use the attached handle when raising and lowering the sound enclosure lid. Keep hands, head, and rest of body out from under the enclosure lid.
3	Adjust RO-Tap for screen stack size.	Possible pinch points. May hit others when raising lid.	Use caution when adjusting RO-Tap. Open and close lid carefully.
4	Place sample in screen stack.	None.	None.
5	Put screen stack in RO-Tap. Put top on and secure. RO-Tap for 6-12 minutes.	Possible pinch points; hearing damage.	Grip screens from sides only. Close sound enclosure while shaking samples.
6	Remove screen stack from RO-Tap.	Possible pinch points. Could drop on foot.	Use caution.

7	Separate screens, clean screens thoroughly. Obtain weight on individual screens.	Possible laceration/scratch to skin; wrist strain.	Use caution when separating screens; use separating tool when necessary.

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Robert Walker**
TRA No: MET Lab 05	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Diluting Sulfuric Acid, 98% to 10%	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Transport acid to Met lab.	Spillage or breaking bottle.	Use rubber carrier; cap tight.
2	Warn others in vicinity that you will be working with acid.	Contact with acid. Exposure to acid fumes.	In case of accident or spill, co-workers need to be aware of the hazards of the material you are working with.
3	Know location of nearest safety shower and eyewash. Check operation.	Foreign body in eye.	Check for flow of clean water in eyewash station.
4	Put on lab apron or acid-resistant jacket, face shield and safety glasses or goggles, and rubber gloves.	Contact with acid.	Check P.P.E. Examine gloves for leaks.
5	Put 16.5 L of water into a 20 L baritainer.	Possible breakage of glass.	Handle glass carefully. Inspect for chips or cracks.

6	Measure out 910 mL of acid into a Nalgene graduated cylinder.	Contact with acid. Exposure to acid fumes.	Use extreme caution. Avoid distractions.
7	Using plastic funnel, slowly add acid to the water in flask.	Contact with acid. Exposure to acid fumes.	Always add acid to water. Adding acid too fast will generate heat and fumes and might cause a boiling reaction.
8	Gently mix flask with magnetic stir bar on hot plate (no heat).	Contact with acid.	DO NOT splash. Immediately rinse stirring rod.

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Robert Walker**
TRA No: MET Lab 06	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Rougher Bench Flotation	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Take a 1250 gram wet feed sample. Record all information from split card to flot note sheet.	None.	Transfer information correctly.
2	Transfer feed sample into metal beaker using H_20 to rinse clean.	Sample could splash into eyes.	Use caution, do not spill.
3	Place metal beaker on conditioning machine, lower blade, lock down.	Possible pinch point.	Keep hands clear.
4	Add reagents to sample (fuel oil, fatty acid and soda ash).	Possible reagent fumes	Add reagents carefully and accurately.
5	Hold on to metal beaker and turn machine on. Mix for 90 seconds. Check pH at 1 minute.	Possible hand laceration from metal beaker spinning out of control.	Make sure metal beaker is wedged in tight to avoid spinning.

6	While sample is conditioning, prepare flot machine cell and lower flot machine agitator into cell.	Hand could slip off flot machine handle causing lacerations.	Use caution when lowering flot machine agitator into cell.
7	After conditioning, raise mixer blade out of metal beaker, rinse blade thoroughly.	Possible pinch point. Hands could come into contact with mixer blade.	Keep hands clear of blade.
8	Turn flot machine on. Transfer sample into flot cell, turn air valve on. Allow cell to fill to top, skim off conc. with flot paddle for 60 seconds. Raise flot shaft, rinse off. Wash conc. sample into plastic jar for scrubbing. Wash tailings into pan.	None.	Be careful not spill any solids.

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Robert Walker**
TRA No: MET Lab 07	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Acid Scrub	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Put flot charge under amine flotation machine.	None.	Be careful, do not spill any solids.
2	Turn flotation machine on.	Acid contact – body/eyes.	Avoid splashing.
3	Add acid using metal cup.	Acid contact – body/eyes.	Avoid splashing.
4	Acid scrub for 3 minutes.	Acid contact – body/eyes.	Stand clear while sample being scrubbed.
5	After scrubbing, turn flotation machine off.	None.	None.
6	Remove flot charge.	None.	Be careful, do not spill any solids.
7	Rinse vigorously over 150M screen.	Acid contact – hands.	Wear gloves.

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Robert Walker**
TRA No: MET Lab 08	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Amine Flotation (Bench Scale)	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Place amine flot cell under amine flot machine.	None.	None.
2	Lower flot machine into cell and fill with water.	None.	None.
3	Turn flot machine on.	Possible electrical shock.	Inspect electrical switches. Report any faulty equipment.
4	Add reagents (amine/kero.). Let mix for at least 30 seconds.	Possibility of splash.	Use caution. Add reagents carefully and accurately.
5	Transfer sample from plastic beaker into flot cell.	Possibility of splash.	Use caution.
6	Raise flot machine, rinse thoroughly and wash conc. into a pan. Wash amine tails into a pan.		Do not splash sample. Watch for pinch points.

7	Mix conc. in pan; place a small sample on hot plate.	Could burn finger or hand on hot plate.	Keep hands clear of hot plate.
8	Take dry sample from hot plate, place on petri dish for microscope check.	Possible burn. Be careful not to break petri dish causing cuts.	Keep clear of hot plate. Do not spill any sample.
9	Record observation from microscope. Check on flot note sheet – dump sample back into pan.	None.	None.
10	Put pans into oven.	Possible burn from hot oven.	Be careful when loading samples into oven.

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Task Risk Assessment

Dept/Area: Four Corners Metallurgical Lab	**Written by: Betty Webster**
TRA No: MET Lab 11	**Reviewed by: Betty Webster Date: 11/30/2022**
Task: Jaw Crusher Operation	**Approved by: W. Priscilla Williams Date: 11/30/2022**

Step	Task Steps	Potential Hazards	Controls
1	Dumping samples into Jaw Crusher	Rocks discharging from the mouth of the crusher.	Always wear some form of secondary eye protection when operating crusher.
2	Removing sample from Jaw Crusher	Hand injuries. Possible pinch point.	Never remove machine guarding from crusher.

APPENDIX E – New Wales Laboratory Task Risk Analysis

In addition to the TRAs in this appendix, the TRAs listed below are common to most Mosaic labs and apply to the New Wales Facility. **The common TRAs are in Appendix "H".**		
TRA Number	**Title**	**Common to:**
Common TRA 001	**Operating BICO Rock Grinding Mill (Pulverizer)**	**Concentrates and Minerals QC Labs**
Common TRA 002	**Compressed Gas Cylinders**	**Concentrates and Minerals QC Labs**
Common TRA 003	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 004	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 005	**Glassware Usage**	**Concentrates and Minerals QC Labs**
Common TRA 006	**Sample digestion / Hotplate safety**	**Concentrates and Minerals QC Labs**
Common TRA 007	**Pipetting**	**Concentrates and Minerals QC Labs**
Common TRA 009	**Working with Sulfuric Acid**	**Concentrates QC Labs Only**
Common TRA 010	**Phosphoric Acid Sample Handling**	**Concentrates QC Labs Only**
Common TRA 011	**Oven and Muffle Furnace Safety**	**Concentrates and Minerals QC Labs**
Common TRA 012	**ICP Routine Operation and Maintenance**	**Concentrates and Minerals QC Labs**

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Task Risk Assessment

Changing the combustion tube in the Leco Nitrogen Analyzer (Page 1 of 3 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 004	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Changing the combustion tube in the Leco Nitrogen Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Removing and replacing the carousel assembly and the loading head.	Falling objects (tools and/or Leco components). Pinch points and/or strains. Thermal burns.	Standard PPE for the lab is: proper eye protection, lab coat and disposable gloves. Ensure there is room (away from the edge of the counter) to place the tools and the Leco components/parts. Use a lab cart if needed. Be aware of the weight of the carousel assembly and the loader head. Use caution when lifting and laying down the heavy components. The bottom of the loader head could be hot; handle it with caution.
2	Removing the lance tube, and the lance tube assembly, from the combustion tube; and replacing it with a new lance tube. (continues)	Thermal burns.	Caution: The lance tube is extremely hot (nearly 2,000o F) when removed from the instrument. Use the lance extractor tool to remove and replace the lance tube assembly. Make sure the tool is properly attached to the lance tube assembly before lifting.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

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Task Risk Assessment

Changing the combustion tube in the Leco Nitrogen Analyzer (Page 2 of 3 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 004 (Continued)	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Changing the combustion tube in the Leco Nitrogen Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
2 (Cont.)	Removing the lance tube, and the lance tube assembly, from the combustion tube; and replacing it with a new lance tube.	Thermal burns. Cuts.	Allow the lance tube assembly and tool to cool. Use caution when handling glass quality quartz. If the lance tube or combustion tube breaks, wear cut resistant gloves for cleaning the cool shards.
3	Removing and replacing the crucible from the combustion tube. (Continues)	Thermal burns.	Caution: The crucible is extremely hot (nearly 2,000o F) when removed from the instrument. Make sure the area is clear of other employees to prevent touching someone with the hot crucible. Use the crucible extractor tool and extract the crucible by applying firm pressure on the handle of the tool. Transfer the crucible to a cooling tray. Note: for added safety, carry the crucible with the extractor tool and a stainless-steel tray under the crucible in case the crucible breaks or falls.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
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Task Risk Assessment

Changing the combustion tube in the Leco Nitrogen Analyzer (Page 3 of 3 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 004 (Continued)	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Changing the combustion tube in the Leco Nitrogen Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
3 (Cont.)	Removing and replacing the crucible from the combustion tube.	Thermal burns.	Put a "HOT" sign by the crucible to warn other employees that the crucible is hot. When replacing the crucible, make sure the crucible extractor tool is cool before using.
		Cuts	Apply firm pressure to the handle and use the crucible extractor tool to lower the new crucible on the wool strips
4	Removing and replacing the quartz wool strips from the combustion tube.	Thermal burns.	Use the quartz wool extractor to remove the old quartz strips. Place the quartz wool in fume hood by the crucibles to cool. Note: for added safety, carry the quartz wool in a stainless-steel tray, in case it breaks up or falls. When replacing the strips, make sure the quartz wool extractor tool is cool before using.

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Task Risk Assessment

Changing the combustion tube in the Leco Nitrogen Analyzer (Page 1 of 2 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 005	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Changing the combustion tube in the Leco Nitrogen Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Prepare the instrument for maintenance.	Thermal and electrical exposures.	Standard PPE for the lab is: proper eye protection, lab coat and disposable gloves. Allow furnace assembly to cool, at room temperature, for a minimum of six hours. Preferably cool overnight. Turn furnace temperature off and unplug the instrument from the energy source.
		Pinch Point.	Keep body parts away from the sliding tabletop
2	Removing and reinstalling the following components: carousel assembly, loader head assembly, loader head block and the secondary side interface block.	Falling objects (tools and/or Leco components). Pinch points and/or strains.	Ensure there is room (away from the edge of the counter) to place the tools and the Leco components/parts. Use a lab cart if needed. Use caution when lifting and laying down the heavy Leco components.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
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Task Risk Assessment

Changing the combustion tube in te Leco Nitrogen Analyzer (Page 2 of 2 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 005 (Continued)	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Changing the combustion tube in the Leco Nitrogen Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
3	**Removing the old combustion tube and installing a new one.**	**Pinch Points** **Cuts**	**Maintain control of the furnace assembly, or ask for help, while working.** **Make sure you are ready, and well positioned, before you start to extract the tube. Maintain control of the tube.** **Cut resistant gloves must be worn when handling the combustion tube.**
4	**Place the instrument back in service.**	**Thermal and electrical exposures.** **Pinch Point**	**Close any access panel opened during the service before plugging in the instrument; and look around the instrument for pinched lines and cords.** **Plug the instrument to the energy source and turn the instrument on. Monitor to ensure is working properly.** **Keep body parts away from the sliding tabletop**

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Task Risk Assessment

Handling sodium fluoride solid and sodium fluoride solutions (Page 1 of 3 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 014	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Handling sodium fluoride solid and sodium fluoride solutions	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Drying, weighing and transferring weighed portions into a volumetric flask.	Toxic chemical if contact with skin, eyes, inhalation and ingestion.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Wearing apron and disposable sleeves is mandatory for this task. Secondary eye protection for this task is: face shield and goggles or face shield and safety glasses is mandatory. There is no alternate secondary eye protection for this task In case of skin contact, apply gluconate and flush with water for 15 minutes. If eye contact, flush with water for 15 minutes. In both cases, contact your supervisor and get medical attention immediately. Respiratory protection (respirator N95) is needed while weighing and transferring NaF2. Keep all sodium fluoride containers tightly sealed when not in use.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
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Task Risk Assessment

Handling sodium fluoride solid and sodium fluoride Solutions (Page 2 of 3 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 014 (Continued)	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Handling sodium fluoride solid and sodium fluoride Solutions	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
2	Adding 1:1 hydrochloric acid to weighed sodium fluoride; and digesting samples.	Chemical exposure and Inhalation of toxic fumes.	Wear primary and secondary PPE as covered in step 1. Ensure fume hood is on. In case of skin contact, apply gluconate and flush with water for 15 minutes. If eye contact, flush with water for 15 minutes. In both case, contact your supervisor and get medical attention immediately. Add D.I. water to flask first and shake to dissolve the sodium fluoride salt before adding hydrochloric acid.
3	Mixing, transferring, pipetting and running solutions of NaF2.	Chemical exposure, inhalation or absorption.	Wear primary and secondary PPE as covered in step 1. Notes about sodium fluoride solutions: solutions of 4ppm or lower are considered relatively save because 4ppm is the maximum allowed in potable water. However, prolong contact with solutions above 0.7 ppm is not advised. For this reason, gloves are required when handling all fluoride solutions. When mixing, use a stirrer bar and a stirrer plate. No shaking by hand or inverting the volumetric flask is allowed.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
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Task Risk Assessment

Handling sodium fluoride solid and sodium fluoride Solutions (Page 3 of 3 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 014 (Continued)	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Handling sodium fluoride solid and sodium fluoride Solutions	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
3 (Cont.)	Mixing, transferring, pipetting and running solutions of NaF2.	Chemical exposure, inhalation or absorption (Continued).	Only use plastic bottles for long storage of the solutions. Exposures of 5 minutes or more, with solutions of 4ppm or higher, need to be flush for 15 minutes and they need to be reported to the supervisor. The technician(s) involved need to be evaluated by medical. In case of skin exposure with solutions of 4 ppm or lower, regardless of the time, flush the area for 15 minutes and report it to your supervisor. Medical care is not needed. In case of eye exposure, regardless of the time and concentration, flush the eyes for 15 minutes. Contact your supervisor and get medical attention.
4	Disposal of sodium fluoride solutions and sodium fluoride/sodium citrate mixed solutions.	Chemical exposure, inhalation or absorption	Wear primary and secondary PPE as covered in step 1. See controls in step 3 Use caution to avoid contact with skin/eyes. Flush down the lab sink with copious amount of water.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

Phosphate Business Unit Program
Environmental, Health and Safety (EHS) Department

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Task Risk Assessment

Emptying Waste Product Containers (Page 1 of 1 Page)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 017	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Emptying Waste Product Containers	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Handling sample waste containers. This includes: moving the containers to the dumpsters, lifting and emptying waste containers in the dumpsters.	Strains, pinch points and trips and slips.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Work gloves are recommended, but not mandatory. Do not fill the waste containers all the way to the top. Empty containers when half full, or less. When lifting, use proper lifting techniques by using your leg muscles for lifting, not your back. Always hug the load when possible. Get help if container is too heavy to lift or to carry comfortably and safely. Be aware of surroundings and be alert for slipping hazards. techniques.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
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Task Risk Assessment

Filling small containers with methanol or other Organic Alcohol (Page 1 of 1 Page)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 018	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Filling small containers with methanol or other Organic Alcohol	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Transferring to smaller containers.	Contact with chemical.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Use only approved containers. Place smaller containers in a sink and pour slowly to avoid overfilling. If overflow does occur run water into the sink to clear the drain and do not pour any acids in the sink for at least 5 minutes.
		Fire.	No smoking, sparks or open flames permitted.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
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Task Risk Assessment

Using the screen shakers (Page1 of 1 Page)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 020	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Using the screen shakers	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Loading, unloading shaker screens and working around the shaker when it is in operation.	Pinch points.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Avoid placing fingers in potential pinch points including under the base plate and the lid.
		Cuts/abrasions.	Inspect screens for damage before using. Replace damaged screens, or screens that do not fit correctly.
		Strains.	Use proper tool for separating screens.
		Noise.	Wearing hearing protection when running screens is mandatory.

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Task Risk Assessment

Handling Gooch Crucibles (Page 1 of 1 Page)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 021	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Handling Gooch Crucibles (Page 1, Only Page)	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Handling crucibles. This includes: loading, unloading crucibles to and from the manifold and cleaning and prepping the crucibles.	Contact with chemical. Cuts.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Inspect all crucibles prior and after using. Discard immediately any that are cracked or chipped Wearing cut resistant gloves, when working with the crucibles, is not mandatory, but recommended. When loading crucible in the manifold, use gentle (but firm) pressure. A slight twist can help achieve a secure fit. Before removing crucibles from the manifold, release the vacuum on the crucible. To do this: turn "OFF" the vacuum and release the vacuum.

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Task Risk Assessment

Handling and washing the Vapodest 50S Tubes (Page 1 of 1 Page)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 022	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Handling and washing the Vapodest 50S Tubes	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Loading and unloading tubes I and out of the Vapodest unit. .	Exposure reagents or to waste chemicals. Thermal burns.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Allow the tubes to cool for about 5 minutes before removing the tubes from the carousel for cleanup.
2	Cleaning the tubes in either the glassware wash station or by hand.	Cuts.	Place tubes in a tube carrier to transport to the wash station area. Place the tubes over the spindles of the wash rack and wash as you would any other type of glassware. If washing by hand, wear cut resistant gloves and do not bump the tubes against the sides of the sink or each other.

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Task Risk Assessment

Transfer of Hazardous Waste Liquids to Drums or Temporary Containers (Page 1 of 1 Page)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 023	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Transfer of Hazardous Waste Liquids to Drums or Temporary Containers.	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Pour the liquid into the receiving drum or container. This includes Methanol waste and solution containing Barium Chloride or Barium Sulfate.	Exposure to the chemical waste and fumes. Strains.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Small size container transfers (less than 5 gallons) require just the standard PPE for the lab. When the transfer is 5 gallons or more, a face shield and an apron are additionally required. Avoid breathing fumes by keeping the face away from the flow into the receiving container. Get help lifting any container you feel is too heavy or puts you in an awkward position.
2	Disposing or moving waste chemical to the bunker.	N/A	Contact Mosaic's environmental specialist for this task.

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Task Risk Assessment

Changing Reagents on the Leco Sulfur Analyzer (Page 1 of 1 Page)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 024	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Changing Reagents on the Leco Sulfur Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Removing reagents tubes and installing reagents tubes	Exposure to chemicals. Cuts.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Wear cut resistant gloves when handling glassware. Do not apply excessive force when removing or reinserting the reagents tubes. Slide the tube upward until the bottom end can swing free and remove or install as needed.
2	Emptying, cleaning and refilling the reagents tubes.	Exposure to chemicals. Cuts.	Empty and refill the tubes under the fume hood. Keep the bulk regent bottles and waste receptacles closed as much as possible. Wear cut resistant gloves when handling glassware. Inspect tubes for cracks or defects and discard all defective tubes.

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Task Risk Assessment

Handling combustion boats in the Leco Sulfur Analyzer (Page 1 of 2 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 025	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Handling combustion boats in the Leco Sulfur Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Inspecting the boats before using.	Abrasions.	Standard PPE for the lab is: eye protection, lab coat and disposable gloves. Discard any boat with cracks, chips or hairline cracks.
2	Inserting the sample boats in the combustion chamber,	Thermal burns. Exposure to infrared radiation	To insert, place the boat near to the chamber door and use the insertion/removal tool to push in the boat. Return the sample insertion/removal tool to the designated spot designated for the tool. The tool will be hot. Avoid looking directly into the combustion chamber. Use the filter lens, on the insertion/removal tool, to view the opened chamber
3	Removing and cooling the sample boats. (Continues)	Thermal burns.	To remove, use the insertion/removal tool to pull the boat out and drag it to the LECO's cooling tray.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
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Task Risk Assessment

Appendix E

Handling combustion boats in the Leco Sulfur Analyzer (Page 2 of 2 Pages)

Dept/Area: New Wales QC Laboratory	**Written by: Lab Personnel Prior to 01/01/2015**
TRA No: 025 (Continued)	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Handling combustion boats in the Leco Sulfur Analyzer	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
3 (Cont.)	Removing and cooling the sample boats. (Continued)	Thermal burns.	Return the sample insertion/removal tool to the designated spot designated for the tool. The tool will be hot. Allow the boats to cool 3 to 5 minutes and use tongs to transfer to the cooling pan. Note: When using tongs to transfer the boats, apply just firm pressure. Excessive pressure can crack the boats or create 'hairline' fractures.
		Exposure to infrared radiation	Avoid looking directly into the combustion chamber. Use the filter lens, on the insertion/removal tool, to view the opened chamber.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

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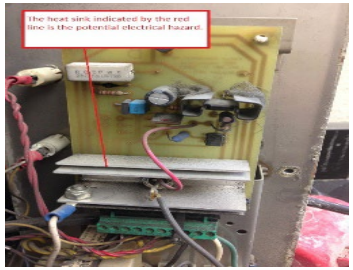
Task Risk Assessment

Replace timer board on pneumatic tube system (Page 1 of 1)

Dept/Area: New Wales QC Laboratory	**Written by: Debbie Barley Date: 02/28/2019**
TRA No: 026	**Reviewed by: Angel Hernandez Date: December 21, 2022**
Task: Replace timer board on pneumatic tube system	**Approved by: Alan Shobert Date: December 21, 2022**

Step	Task Steps	Potential Hazards	Controls
1	Unplug (Remove) 3-wrire plug from electrical receptacle. (Enlarge picture for more details). 	Electrical Exposure.	Equipment owner and person(s) working on equipment must place their locks and tags in the electrical plug Lockout/Tagout device.
2	Verify that the correct pneumatic system station has been locked out.	Electrical Exposure.	Press the “send” switch on the front panel of the pneumatic system station.
3	After repairs have been completed, remove lock & tag and return station to service	Electrical Exposure.	Plug the 3-wire plug in the electrical receptacle.

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APPENDIX F – Riverview Laboratory Task Risk Analysis

In addition to the TRAs in this appendix, the TRAs listed below are common to most Mosaic labs and apply to the Riverview Facility. **The common TRAs are in Appendix "H".**		
TRA Number	**Title**	**Common to:**
Common TRA 001	**Operating BICO Rock Grinding Mill (Pulverizer)**	**Concentrates and Minerals QC Labs**
Common TRA 002	**Compressed Gas Cylinders**	**Concentrates and Minerals QC Labs**
Common TRA 003	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 004	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 005	**Glassware Usage**	**Concentrates and Minerals QC Labs**
Common TRA 006	**Sample digestion / Hotplate safety**	**Concentrates and Minerals QC Labs**
Common TRA 007	**Pipetting**	**Concentrates and Minerals QC Labs**
Common TRA 008	**Chittick Gasometric Apparatus for CO_2 Analysis**	**Concentrates and Minerals QC Labs**
Common TRA 009	**Working with Sulfuric Acid**	**Concentrates QC Labs Only**
Common TRA 010	**Phosphoric Acid Sample Handling**	**Concentrates QC Labs Only**
Common TRA 011	**Oven and Muffle Furnace Safety**	**Concentrates and Minerals QC Labs**
Common TRA 012	**ICP Routine Operation and Maintenance**	**Concentrates and Minerals QC Labs**

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Task Risk Assessment
Appendix F
Replacing LECO Sulfur Reagents

Dept/Area: Riverview QC Laboratory	**Written by:**
TRA No: 005	**Reviewed by: Zane Hranac** **Date: 12/19/2022**
Task: Replacing LECO Sulfur Reagents	**Approved by: Andres Jimeno** **Date: 12/19/2022**

Step	Task Steps	Potential Hazards	Controls
	Remove spent reagent tubes	Exposure to reagents Cuts from broken tube	Use caution, do not apply excessive force when removing reagent tubes from holders. Wear chemical resistant gloves, eye protection, and lab coat. Visually inspect glassware for chips/cracks. Discard damaged tubes. Wear cut resistant gloves when handling damaged glassware.
	Disposing of spent reagents	Exposure to reagents	Wear chemical resistant gloves, lab coat, and safety glasses to transfer depleted reagents into designated waste area.
	Washing the glass reagent tube	Exposure to reagents. Cut from broken reagent tube.	Wear chemical resistant gloves, safety glasses, and lab coat Visually inspect glassware for chips/cracks. Discard damaged tubes. Wear cut resistant gloves when handling damaged glassware.
	Refilling reagent tube	Exposure to reagents	Slowly transfer fresh reagent to reagent tubes. Wear chemical resistant gloves, safety glasses Use a powder funnel to minimize spillage.
	Re-attach reagent tubes	Exposure to reagents. Cuts from reagent tube.	Use caution; do not apply excessive force when re-attaching the tube. Visually inspect glassware for chips/cracks. Discard damaged tubes. Wear cut resistant gloves when handling damaged glassware.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.

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Task Risk Assessment
Appendix F

Operating VAP500C Nitrogen Analyzer

Dept/Area: Riverview QC Laboratory	**Written by: Zane Hranac**
TRA No: 011	**Reviewed by: Zane Hranac** **Date: 12/19/2022**
Task: Operating VAP500C Nitrogen Analyzer	**Approved by: Andres Jimeno** **Date: 12/19/2022**

Step	Task Steps	Potential Hazards	Controls
1	Refilling reagents	Chemical burns from transferring reagents from one container to the other Reagent cart tipping over when returning it to storage.	Safety glasses with side shields, lab coats and, chemical resistant gloves are required to ensure exposure is kept to a minimum. Ensure tubing from cubitainer is secured before starting to fill the reagent jugs. Hold reagent cart with both hands when returning it to storage position
2	Using sample vessels	Potential cut due to chipped or cracked glass vessels.	Visually inspect flask for chips or cracks before use.
3	Handling hot digested sample vessels	Potential burn from hot glassware Exposure to heated NaOH solution	Use thermal gloves to remove heated flasks from carousel. Use portable rack to transport hot sample vessels. Wait for samples to cool before handling.
4	Cleaning sample vessels	Chemical burns	Allow flask to cool completely before cleaning or adding water. Wear chemical resistant gloves, lab coat, and safety glasses. Use low pressure water stream to clean glassware to avoid splash-back.

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Task Risk Assessment
Appendix F

Changing Combustion Tube on LECO 832DR

Dept/Area: Riverview QC Laboratory	**Written by: Zane Hranac**
TRA No: 13	**Reviewed by: Zane Hranac** **Date: 12/19/2022**
Task: Changing Combustion tube on LECO S-832DR	**Approved by: Andres Jimeno** **Date: 12/19/2022**

Step	Task Steps	Potential Hazards	Controls
1	Turn furnace off and allow to cool to room temperature	None	Check furnace system diagnostics in software to ensure that furnace has cooled. Ensure furnace is cooled slowly to avoid cracking the tube.
2	Put instrument in front end maintenance mode and disable motors of Autosampler	Pinch points	Be sure to disable motors so that maintenance can be performed without danger of them initializing.
3	Disassemble broken/spent combustion tube	Thermal burn Cuts	Ensure tube has cooled to room temp. Use cut resistant gloves to avoid exposure to broken ceramic.
4	Install new tube	Pinch Point	Be aware of pinch points when installing new tube into furnace. Enable all motors and initialize them to properly home each one.
5	Return furnace to operating temperature	None	Ensure to ramp up temperature slowly.

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Task Risk Assessment
Appendix F

Operating and handling combustion boats in the LECO S-832DR with Autosampler

Dept/Area: Riverview QC Laboratory	**Written by: Zane Hranac**
TRA No: 14	**Reviewed by: Zane Hranac** **Date: 12/19/2022**
Task: Operating and handling combustion boats in the LECO S-832DR with Autosampler	**Approved by: Andres Jimeno** **Date: 12/19/2022**

Step	Task Steps	Potential Hazards	Controls
1	Inspect combustion boats before use	Abrasions	Inspect combustion boats for cracks and other defects. Use cut resistant gloves to dispose of any boats that show signs of compromised integrity
2	Transferring boats to the autoloader	Pinch points	Be sure autosampler hotel is not in motion when placing samples in their appropriate autosampler location
3	Analyze samples	Pinch Points	Allow autosampler hotel to come to a complete stop before touching it.
4	Removing combustion boats from bucket	Thermal Burns Abrasions	Allow boats to cool in the disposal bucket. Using the bucket handle pour the combustion boats in the boat holding area Use cut resistant gloves to dispose of any broken boats in the glass waste disposal **Assume boats are hot until otherwise determined**

APPENDIX G – Faustina Laboratory Task Risk Analysis

In addition to the TRAs in this appendix, the TRAs listed below are common to most Mosaic labs and apply to the Faustina Facility. **The common TRAs are in Appendix "H".**		
TRA Number	**Title**	**Common to:**
Common TRA 002	**Compressed Gas Cylinders**	**Concentrates and Minerals QC Labs**
Common TRA 003	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 004	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 005	**Glassware Usage**	**Concentrates and Minerals QC Labs**
Common TRA 006	**Sample digestion / Hotplate safety**	**Concentrates and Minerals QC Labs**
Common TRA 007	**Pipetting**	**Concentrates and Minerals QC Labs**
Common TRA 008	**Chittick Gasometric Apparatus for CO_2 Analysis**	**Concentrates and Minerals QC Labs**
Common TRA 009	**Working with Sulfuric Acid**	**Concentrates QC Labs Only**
Common TRA 010	**Phosphoric Acid Sample Handling**	**Concentrates QC Labs Only**
Common TRA 011	**Oven and Muffle Furnace Safety**	**Concentrates and Minerals QC Labs**
Common TRA 012	**ICP Routine Operation and Maintenance**	**Concentrates and Minerals QC Labs**

Dept/Area: Faustina QC Laboratory	**Written by: Whitney Hines**
TRA No: LA-001	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Collecting Liquid Ammonia Samples at Storage Tank	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Opening valves to collect liquid ammonia samples	Cryogenic burns Inhalation of ammonia vapor Cuts Spills and Splashes	Proper PPE including thermo gloves Proper PPE including full-face respirator and checking closest wind sock to properly position yourself upwind Inspect all glassware before, during, and after and dispose of any chipped or broken glassware and replace with new glassware Proper PPE including full body spill resistant coveralls, nitrile gloves under thermos gloves, and rubber boots Open the valves slowly to ensure that excessive pressure is not released at any point during collection
2	Transporting samples back to the lab	Spills and Splashes Inhalation of ammonia vapor Roadway Hazards	Continue wearing all PPE used during collection during transport Properly secure the stopper into collection flasks and make sure stopper vents are pointed away from driver

Dept/Area: Faustina QC Laboratory	**Written by: Whitney Hines**
TRA No: LA-002	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Analyzing Liquid Ammonia Samples	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Evaporation of samples before analyzing	Spills and Splashes Inhalation of ammonia vapor	Continue to wear nitrile gloves and coveralls until samples are under fume hood Continue to wear full-faced respirator until fume hood is turned on and samples are properly secured under hood
2	Testing for oil content	Inhalation of residual ammonia vapor Inhalation of Freon vapor	Mix and swirl Freon into flask after evaporation, under fume hood Vent separatory funnel under fume hood
3	Testing for water content	Inhalation of residual ammonia vapor	Keep flask under fume hood until the complete evaporation of ammonia is complete
4	Cleaning glassware	Cuts	Proper PPE including safety glasses and nitrile gloves Cut resistant gloves required if any glassware has chips or cracks for proper disposal

Dept/Area: Faustina QC Laboratory	**Written by: Whitney Hines**
TRA No: LA-003	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Collecting Ammonia Process Gas Samples	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Sample collection preparation done in the lab	Potential cut hazard if glassware breaks Wrist, arm, or back strain Inhalation of ammonia vapors Burn	Inspect all glassware before, during, and after use to check for any chips, cracks, or damage and properly dispose of any damaged glassware Pick up and carry Wet Gas Meter properly, ask for help if needed Release any residual ammonia process gas remaining in metal sampling cylinders under a fume hood
2	Transporting sampling equipment to and from ammonia plant	Wrist, arm, or back strain Vehicular traffic Trip Hazards Overhead Hazards	Transport any heavy items including Wet Gas Meter, sampling table, and collection flask on a separate trip using golf cart or in truck bed Transport all other material needed including metal sampling cylinders, emergency respirator, extra nitrile gloves, sample bottles, and thermos gloves with the use of a wagon Proper PPE is required while pulling wagon including reflective clothing to ensure vehicular traffic can properly see you because most sampling is done in the early morning while still dark

3	Collection of Front-End process gas samples which include Inlet Low Temperature Shift, A Shift Guard, B Shift Guard, Exit Methanator, Exit Low Temperature Shift, Primary, Secondary, Zinc Bed, and High Temperature Shift	Burns Inhalation of dangerous gas Fire Unexpected releases Trip hazards Overhead hazards	Proper PPE is required including nitrile gloves and thermo gloves rated for up to 600F Emergency respirator is always around waist or in wagon within arm's reach Ammonia Plant Operator escort will radio in any fire or release Attach the exit vent to the bottom of each sample collection cylinder to allow venting of process gases into air high above sample point
4	Collection of Back-End process gas samples which include Inlet Methanator, CO2 Purity, Inlet Converter, Exit Converter, Purge Gas, Fuel Gas, Hydrogen Product	Inhalation of ammonia vapor Fire Unexpected releases	Emergency respirator is always around waist or in wagon within arm's reach Ammonia Plant Operator escort will radio in any fire or release Attach the exit vent to the bottom of each sample collection cylinder to allow venting of process gases into air high above sample point

Dept/Area: Faustina QC Laboratory	**Written by: Whitney Hines**
TRA No: LA-004	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Analyzing Ammonia Process Gas Samples	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Titrating Back-End process gas samples including Inlet Converter, Exit Converter, and Purge Gas	Cuts Chemical burn	Inspect and proper dispose of any damaged glassware Proper PPE including safety glasses, lab coat, and nitrile gloves
2	Analyzing gas samples using Gas Chromatograph	Inhalation of ammonia vapor	Inspect and test that all connections to and from metal sampling cylinder are correct before opening valve to inject sample in the GC All samples should be emptied/vented after testing under a vent hood

Dept/Area: Faustina QC Laboratory	**Written by: Whitney Hines**
TRA No: LA-005	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Ammonia Plant Pump Oils	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Analyze Ammonia Plant Oils for Water and Sludge content	Cuts	Inspect and dispose of any damaged glassware Proper PPE including nitrile gloves ensure proper grip on glassware
2	Disposal of Oil Samples mixed with Toluene reagent	Spills Fire Skin irritant	Use a funnel to pour the samples into the waste container Properly seal the waste container with a cap will carrying to the Hazardous Waste drum outside of the lab Pour contents into Waste drum slowly to ensure that no sample is wasted Always keep the oil and toluene samples, reagent bottles, and waste container away from any ignition sources to avoid fires

Dept/Area: Faustina QC Laboratory	**Written by: Z. Hranac**
TRA No: LA-012	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Operating VAP500C Nitrogen Analyzer	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Refilling reagents	Chemical burns from transferring reagents from one container to the other Reagent cart tipping over when returning it to storage.	Safety glasses with side shields, lab coats and, chemical resistant gloves are required to ensure exposure is kept to a minimum. Ensure tubing from cubitainer is secured before starting to fill the reagent jugs. Hold reagent cart with both hands when returning it to storage position
2	Using sample vessels	Potential cut due to chipped or cracked glass vessels.	Visually inspect flask for chips or cracks before use.
3	Handling hot digested sample vessels	Potential burn from hot glassware Exposure to heated NaOH solution	Use thermal gloves to remove heated flasks from carousel. Use portable rack to transport hot sample vessels. Wait for samples to cool before handling.
4	Cleaning sample vessels	Chemical burns	Allow flask to cool completely before cleaning or adding water. Wear chemical resistant gloves, lab coat, and safety glasses. Use low pressure water stream to clean glassware to avoid splash-back.

Dept/Area: Faustina QC Laboratory	**Written by: Allison Naquin**
TRA No: LA-015	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Handling LECO Reagents	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Handling reagent tubes	Cuts Skin irritant Eye irritant Respiratory irritant	Always inspect tubes before handling. If a crack is noted, dispose and wear cut resistant gloves and dust mask while handling. Do not use excessive pressure when removing and installing reagent tubes. Use lubricant to aid in installation.
2	Disposing of reagents	Skin irritant Eye irritant Respiratory irritant	Dispose of Halogen Scrubber and glass wool in non-hazardous waste drum. Dispose of anhydrone in hazardous waste drum. Wear safety glasses, lab coats, and nitrile gloves.
3	Refilling reagent tubes	Skin irritant Eye irritant Respiratory irritant	Work inside a fume hood. Wear safety glasses, lab coats, and nitrile gloves. Transfer using funnels to prevent spills.

Dept/Area: Faustina QC Laboratory	**Written by: Allison Naquin**
TRA No: LA-016	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Methanol Handling	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Transferring methanol	Flammable Skin irritant	Perform transfers away from any flame or heat source, preferably in a hood. All containers must be labeled. Clean up spills promptly. Wear safety glasses, lab coats, and nitrile gloves.
2	Storage	Flammable	Store in the Flammable Storage Cabinet

Dept/Area: Faustina QC Laboratory	**Written by: Allison Naquin**
TRA No: LA-019	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Gradex and Screen Shaker Use and Maintenance	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Placing and removing screens from the shakers	Cuts Pinch points Sprains and strains	Inspect screens for damage before use. Replace damaged screens, or screens that do not fit correctly. Avoid placing fingers in potential pinch points (between the screens and the screen holder). DO NOT bypass safety interlocks. Use proper tool for separating screens. Have good body positioning.
2	Gradex use and maintenance	Cuts Pinch points	DO NOT bypass safety interlocks. Turn off instrument air when performing maintenance. Be aware of pinch points when re-installing sieves

Dept/Area: Faustina QC Laboratory	**Written by: J. Chauvin**
TRA No: LA-024	**Reviewed by: J. Chauvin** **Date: 12/21/2022**
Task: Changing Combustion tube in LECO 832S	**Approved by: Whitney Hines** **Date: 12/21/2022**

Step	Task Steps	Potential Hazards	Controls
1	Turn furnace temperature off and allow to cool to room temperature	None	Check furnace system diagnostics in software to ensure that furnace has cooled. Ensure to cool down furnace slowly to avoid cracking the tube.
2	Put instrument in front end maintenance mode and disable motors of Autosampler	Pinch points	Be sure to disable motors so that maintenance can be performed without danger of them initializing.
3	Disassemble broken/spent combustion tube	Thermal burn Cuts	Ensure tube has cooled to room temp. Use cut resistant gloves to avoid exposure to broken ceramic.
4	Install new tube	Pinch Point	Be aware of pinch points when installing new tube into furnace. Enable all motors and initialize them to properly home each one.
5	Return furnace to operating temperature	None	Ensure to ramp up temperature slowly.

APPENDIX H – Phosphate Quality Control Labs Common Task Risk Assessments

The TRAs listed below are common to most Mosaic labs.		
TRA Number	**Title**	**Common to:**
Common TRA 001	**Operating BICO Rock Grinding Mill (Pulverizer)**	**Concentrates and Minerals QC Labs**
Common TRA 002	**Compressed Gas Cylinders**	**Concentrates and Minerals QC Labs**
Common TRA 003	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 004	**Handling Cubitainers**	**Concentrates and Minerals QC Labs**
Common TRA 005	**Glassware Usage**	**Concentrates and Minerals QC Labs**
Common TRA 006	**Sample digestion / Hotplate safety**	**Concentrates and Minerals QC Labs**
Common TRA 007	**Pipetting**	**Concentrates and Minerals QC Labs**
Common TRA 008	**Chittick Gasometric Apparatus for CO_2 Analysis**	**Concentrates and Minerals QC Labs**
Common TRA 009	**Working with Sulfuric Acid**	**Concentrates QC Labs Only**
Common TRA 010	**Phosphoric Acid Sample Handling**	**Concentrates QC Labs Only**
Common TRA 011	**Oven and Muffle Furnace Safety**	**Concentrates and Minerals QC Labs**
Common TRA 012	**ICP Routine Operation and Maintenance**	**Concentrates and Minerals QC Labs**

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Operating BICO Rock Grinding Mill (Pulverizer) Page 1 of 2 pages

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
Common TRA 001	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Operating BICO Rock Grinding Mill (Pulverizer)	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Opening and closing the grinder.	Pinch points, cuts and abrasions.	Allow grinder to come to a COMPLETE STOP before opening. Use caution when opening and closing the lid due to the heavy weight and potential for pinch points. Inspect the face plate, latch, leaf spring and other small parts for damage. Report any damaged parts immediately.
2	Grinding samples	Dust inhalation, noise and eye injury.	Turn on the exhaust fan. Hearing protection is mandatory. Primary and secondary eye protection: either face shield and goggles or face shield and safety glasses is mandatory. These 3 controls remain in effect until all grinding activities are done, and the grinder is cleaned and turned off (steps 2 and 3). Dust masks are optional but recommended. If the exhaust fan stops working, dusk masks become mandatory. Ensure the catch pan (bottom drawer) is closed tightly and stays closed. Long hair must be tied back when grinding. Do not wear loose fitting clothing or a lanyard while grinding. Feed rock to grinder at a moderate rate, do not overload it. Be mindful of body position. Do not stand over the sample shoot to avoid being hit by flying debris.

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Operating BICO Rock Grinding Mill (Pulverizer) (Page 2 of 2 Pages)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
Common TRA 001	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Operating BICO Rock Grinding Mill (Pulverizer)	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
3	Cleaning the grinder	Dust inhalation, pinch points, noise, eye injury and compressed air hazards.	Turn on the exhaust fan. Hearing protection is mandatory. Primary and secondary eye protection: either face shield and goggles or face shield and safety glasses is mandatory Allow grinder to come to a COMPLETE STOP before opening. Compressed air used for cleaning shall be a maximum of 30 psig and only approved nozzles shall be used. Compressed air shall not be used for cleaning body, or clothes.

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Task Risk Assessment
Appendix H
Compressed Gas Cylinders (Page 1 of 2 Pages)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
Common TRA 002	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Compressed Gas Cylinders	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Removing the regulator from an empty gas cylinder; and/or, attaching the regulator to a new cylinder.	Pinch points, sparks, fire and accidental release.	Except when moving cylinders, all cylinders must remain secured to the wall with a cylinder bracket and a strap that is in good condition. Make sure you are working on the correct gas cylinder. Close the cylinder valve and do not over tighten. Vent the cylinder, to release stored pressure, by turning the adjusting knob clockwise and noting the pressure drop on the gauge. With oxygen cylinders, use a brass wrench to prevent the production of sparks. With all cylinders, use the correct size of wrench to prevent slippage and personal injury or damage to the cylinder. Do not apply excessive force to the wrench and watch for potential pinch points. Visually inspect the regulator for damages To prevent accidental releases, all empty cylinders must be tagged “Empty” and all full cylinders must be tagged “Full”. Valve caps must be kept on when the cylinder is not in use; even if the cylinder is empty. Remember, oxygen supports combustion; No smoking or open flames when working in the cylinders’ area.

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Compressed Gas Cylinders (Page 2 of 2 Pages)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
Common TRA 002	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Compressed Gas Cylinders	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
2	Removing the valve cap from a full cylinder and replacing the cylinder valve cap on an empty cylinder.	Pinch points and back or muscle strain.	Watch for pinch points, check body positioning and do not use excessive force. When removing the valve cap, use only the 'Strap Wrench' and do not use excessive force. Never improvise a "cheater bar". If over-tightened, or cross threaded, label it for the supplier. When replacing the valve cap, make sure it is not cross threaded and only hand tighten the cap.
3	Open the cylinder valve and adjust the correct output pressure on the second stage valve (low-pressure gauge).	Fire, accidental release or injury from damaged regulator.	For all cylinders, except oxygen cylinders: open the valve slowly until the pressure stops rising on the high-pressure gauge. For oxygen cylinders only: open valve slowly until the valve is fully open. Turn the adjusting knob, on the second stage side until the correct output pressure shows on the secondary gauge. Wait a few minutes and adjust it again, if needed. Before leaving the cylinders' area, ensure all cylinders are still secured from falling.

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Task Risk Assessment
Appendix H
Handling Cubitainers (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
Common TRA 003	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Handling Cubitainers	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Receiving, transporting and storing the cubitainers.	Spill or splash, skin and/or eye contact and muscle strains.	When receiving, visually inspect the structural integrity of the boxes and check the containers for leaks, loose caps or damage. When transporting, visually inspect the structural integrity of the boxes before moving the Cubitainers and use a lab cart or a hand truck, when appropriate. When storing, visually inspect the structural integrity of the boxes and check the containers for leaks, loose caps or damage before lifting. Use proper lifting techniques when lifting the cubitainers. Store the boxes on a shelf or in a plastic tray off the floor.
2	Dispensing reagents from cubitainers.	Spill or splash, skin and/or eye contact.	Inspect the container and dispensing system for leaks, loose caps or damage. When possible, dispense away from you or to the side.
3	Disposing of empty cubitainers.	Skin or eye contact with chemical and chemical spill.	Use fresh water to triple-rinse the cubitainers before discarding to the dumpster.

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Task Risk Assessment
Appendix H
Bottle Top Dispensers (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
Common TRA 004	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: C	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Dispensing acids, bases, reagents and other solutions.	Chemical burns to, damage to the eye and/ skin and inhalation of fumes.	Wear primary and secondary eye protection: face shield and goggles or face shield and safety glasses. An alternate secondary eye protection is to lower the fume hood sash to shoulder level to protect the eyes and the face. Only dispense acids under a fume hood with the exhaust running. Before using, inspect the receiving container, the dispenser and the dispenser's tip to ensure they are in good working conditions and the tip is securely attached to the dispenser Point the tip away from your body and make sure the tip is inside the receiving container before dispensing. Use only moderate pressure to dispense the liquid. Clean or replace dispensers that leak or require heavy pressure to use. (Note: Do not clean or replace auto dispenser until you have received proper training on both tasks). Wear cut resistant gloves when handling broken glass or sharp pieces of plastic.
		Cuts	
2	Removing, cleaning or replacing bottle top dispensers.	Spill or splash, chemical burn to the eyes or skin and inhalation of fumes.	Note: Use caution when removing. The dispenser's drawing tube will drip when it is removed from its container. Only perform this task under a fume hood with the exhaust fans running. Slowly remove the dispenser from the container and allow the drawing tube to drain back into the container. Use a pan or container to rest the bottle top dispenser and to any extra drippings.

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Task Risk Assessment
Appendix H
Glassware Usage (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: Common TRA 005	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Glassware Usage	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Prior, during and after using glassware, inspect it for chips, cracks and other defects.	Sharp edges or broken glass. Spill/splash and chemical exposure.	Replace glassware every 6 months. Dispose of any chipped, cracked or broken glassware in the broken glass containers deployed within the lab. Wear cut resistant gloves when handling cracked or broken glassware. Wear proper PPE. Aprons and sleeve guards are optional but recommended.
2	Inserting a stopper in a volumetric glass flask.	Sharp edges or broken glass. Spill/splash and chemical exposure.	Wear cut resistant gloves when inserting stopper. Use the correct stopper size. Wet the stopper, before using it, to reduce the friction and apply moderate downward force to insert the stopper. Wear proper PPE. Aprons and sleeve guards are optional but recommended.
3	Inserting a stir bar in a volumetric glass flask.	Broken glass. Chemical exposure.	Do not drop the stir bar in the flask; tilt the flask and allow the stir bar to slide in. Wear proper PPE. Aprons and sleeve guards are optional but recommended.
4	Mixing a solution in a flask.	Spill/ splash and chemical exposure.	Before starting the magnetic stirrer, make sure it is set at the correct RPMs. If mixing manually, make sure the stopper is secured before starting. Grasp the flask by the neck (at the stopper) and under the bulb simultaneously, invert repeatedly.
5	Flask washing	Broken glass. Chemical exposure.	Handle carefully and keep them from knocking into each other or hard surfaces. Wear proper PPE. Aprons and sleeve guards are optional but recommended.

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Task Risk Assessment
Appendix H
Sample digestion / Hotplate safety (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: Common TRA 006	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Sample digestion / Hotplate safety	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Placing, digesting and removing flasks from hot plate.	Spill/splash and exposure to chemical and fumes.	Ensure that Fume Hood is on and operating properly. Before using, check the tongs are working properly.
		Thermal burns	Use care not to touch the hot plate and consider your hand and arm positioning to avoid a steam burn. Allow glassware to cool before removing from the fume hoods
		Chemical burns	Do not reach over a digesting sample; and do not extend your upper body into the fume hood.
		Broken glass	Inspect the glassware prior to use; and only use tongs to remove hot glassware from the hotplate.

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Task Risk Assessment
Appendix H
Pipetting (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: Common TRA 007	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Pipetting	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Placing bulb on a pipette, siphoning the aliquot, dispensing the aliquot and cleaning the pipettes.	Spill/splash, chemical exposure and broken glass.	Note 1: Pipetting by mouth is strictly prohibited. Note 2: Wearing gloves when pipetting is optional. Note 3: Using an electronic pipetting device or dispenser, eliminates all the hazards; except for the chemical exposure, which is mitigated by wearing PPE. Prior to use, inspect the pipet for damages. Grasp the pipet near the top (within 2-3 inches) and gently place the bulb on the pipet. Never hold the pipet near the middle when placing a bulb on the end. Never force a bulb onto a pipet by using undue pressure; use a different size bulb if the one you are trying to use will not go on easily. A tight-fitting bulb usually can be put on by first wetting the bulb at the insertion point. When washing, wash 1 pipette at a time.

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Task Risk Assessment
Appendix H
Chittick Gasometric Apparatus for CO_2 Analysis (Page 1 of 2 Pages)

Dept/Area: Concentrates and Minerals QC Laboratories	Written by: Lab Personnel Date: Prior to 03/28/2019
TRA No: Common TRA 008	Reviewed by: Angel Hernandez Date: 03/29/2021
Task: Chittick Gasometric Apparatus for CO_2 Analysis	Approved by: Trace Yates Date: 03/29/2021

Step	Task Steps	Potential Hazards	Controls
1	Adding 30% Hydrogen Peroxide to reaction vessel.	Chemical burn to the skin. Chemical burn to eyes and inhalation of fumes. Broken glass,	Wear proper PPE and perform this task inside an operating fume hood. Aprons and sleeve guards are optional but recommended. Primary and secondary eye protection is required. This includes either face shield and goggles or face shield and safety glasses. An alternate secondary eye protection is to lower the fume hood sash to shoulder level to protect the eyes and the face. Inspect the Apparatus and reaction vessel prior to use. See Common TRA for Glassware.
2	Adding Potassium Iodide to heated Hydrogen Peroxide.	Chemical and thermal burns to the skin. Chemical burn to eyes and inhalation of fumes. Broken glass,	Wear proper PPE and perform this task inside an operating fume hood. Aprons and sleeve guards are optional but recommended. Note: There is a potential for a violent exothermic reduction-oxidation reaction; add potassium iodide slowly to keep the reaction under control. Primary and secondary eye protection is required. This includes either face shield and goggles or face shield and safety glasses. An alternate secondary eye protection is to lower the fume hood sash to shoulder level to protect the eyes and the face. Inspect the Apparatus and reaction vessel prior to use. See Common TRA for Glassware.
3	Connecting and removing the reaction vessel to the Chittick apparatus.	Broken glass. Chemical exposure.	Proper PPE and cut resistant gloves are required for this task. Grasp the reaction vessel close to the top to reduce the chance of breakage. Wear proper PPE. Aprons and sleeve guards are optional but recommended.

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Chittick Gasometric Apparatus for CO2 Analysis (Page 2 of 2 Pages)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: 008	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Chittick Gasometric Apparatus for CO2 Analysis	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
4	Filling and using the 1:2 Hydrochloric acid dispensing buret.	Broken glass.	Proper PPE and cut resistant gloves are required for this task. Grasp the reaction vessel close to the top to reduce the chance of breakage.
		Chemical exposure.	Wear proper PPE. Aprons and sleeve guards are optional but recommended. Dispense the HCl slowly to prevent boil overs.

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Task Risk Assessment
Appendix H
Sulfuric Acid Sample Handling (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: 009	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Working with Sulfuric Acid	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Handling sulfuric acid bulk bottles.	Spills, splashes and chemical burns to the skin and (or) the eyes.	In addition to the standard lab PPE acid apron with sleeves and face shield are required. Incoming bulk sulfuric acid most be in shipping containers and bottles approved by the vendor. Transport individual bottles in "bottles totes" safety carriers. Triple rinse the empty bottles before disposing in the dumpster.
2	Handling sulfuric acid samples. This includes picking up, weighing, titrating and disposing of the samples.	Spills, splashes and chemical burns to the skin and (or) the eyes.	Wearing of acid aprons, sleeves and face shields is optional but recommended. Samples must be contained in Nalgene 4 oz. / 125 mL Teflon (FFP) bottles. Do not pick up sulfuric samples that are not in the specified bottles. Test the caps to be sure they are on tight. Use only approved cradles and carriers for transporting samples; do not remove the acid bottles from the carriers. Use only clean and dry disposable pipets. Do not pass pipet with sulfuric acid in it across any part of your body. Use caution to not have the pipet "fling" any acid from the tip. Rinse used pipet with water when done and discard. Always add acid to water (NEVER add water to acid) **Rinse the outside of the sample bottle if you suspect there is acid on the bottle.** **If diluting the acid remember to add acid to water and not the opposite.**

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Appendix H
Phosphoric Acid Sample Handling (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: 010	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Phosphoric Acid Sample Handling	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Carrying, shaking, opening and closing phos acid sample bottles and cups.	Spills and splashes. Contact with the skin or the eyes.	Wearing disposable gloves is required; inspect of the gloves often and change as needed. Wash your hands often. Ensure the lids are tight and in good conditions. Wash exterior of sample bottles or cups if there is phosphoric acid on them. When shaking the sample cups, hold a paper towel over it to prevent flinging acid. Shake sample cups below chest level. Never shake them at eye level. Do not leave open bottles of phosphoric acid unattended Close containers tight.
2	Cleaning phos acid bottles and cups.	Spills and splashes. Contact with the skin or the eyes.	A face shield is not required, but is recommended, the water pressure from the faucet may increase the chances of splashing After cleaning, examine bottles and cups and discard worn or damaged bottles.

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Task Risk Assessment
Appendix H
Oven and Muffle Furnace Safety (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: 011	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: Oven and Muffle Furnace Safety	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Placing samples in and removing samples from the lab ovens and muffle furnaces.	Thermal burns.	With the lab ovens: use handle clamps or heat resistant gloves when removing sample pans from the ovens. Be sure oven door is positioned well out of the way of your elbows and hands. Use the "HOT Signs" to keep other lab personnel informed. With the muffle furnaces: use long tongs for loading and unloading the crucibles in and out of the furnace. Be sure the door is secured and away from your elbows and hands. Place hot crucibles on a cooling rack and place a "HOT" sign by the hot crucibles to warn other lab personnel.
2	Handling samples after their removal from the lab ovens and muffle furnaces.	Thermal burns	The sample pans and crucibles remain hot for several minutes after removal from the ovens and furnaces. Allow to cool before touching them.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

Phosphate Business Unit Program
Environmental, Health and Safety (EHS) Department

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Task Risk Assessment
Appendix H
ICP Routine Operation and Maintenance (Only 1 Page)

Dept/Area: Concentrates and Minerals QC Laboratories	**Written by: Lab Personnel Date: Prior to 03/28/2019**
TRA No: 012	**Reviewed by: Angel Hernandez Date: 03/29/2021**
Task: ICP Routine Operation and Maintenance	**Approved by: Trace Yates Date: 03/29/2021**

Step	Task Steps	Potential Hazards	Controls
1	Set up and operation of the ICPs.	Electric shock.	Only users that have been trained are authorized to use the instruments. Safety devices and interlocks shall not be bypassed or disconnected.
		Radio Frequency Radiation.	Persons with medical implants sensitive to RF signal shall not enter the room and must remain at least 50 feet away from the instruments.
		Oxygen deficiency and toxic vapors.	Check oxygen monitor frequently, especially as you enter the room. It MUST be 20.9%. Make sure that the exhaust fan is on.
		Thermal burns.	Keep hands clear of exhaust area while instrument is operating.
2	ICP Maintenance.	Electric shock.	Only users that have been trained are authorized to perform maintenance on the instruments. Safety devices and interlocks shall not be bypassed or disconnected.
		Radio Frequency Radiation.	Persons with medical implants sensitive to RF signal shall not enter the room and must remain at least 50 feet away from the instruments.
		Oxygen deficiency and toxic vapors.	Check oxygen monitor frequently, especially as you enter the room. It MUST be 20.9%. Make sure that the exhaust fan is on.
		Thermal burns and Cuts.	Allow the instrument to cool before opening the torch compartment. Wear cut resistant gloves for disassembly and assembly of the torch, nebulizer and spray chamber
		Back or muscle strain	Keep your back straight, bend at the knees, and do not turn or twist the body while lifting the ICP rinse solutions jugs. Ask for help when necessary.

Insert rows: Click on a row or rows, then go to Table / Insert / Row Above or Row Below. The Step number(s) will automatically renumber.
Delete rows: Click on a row or rows, then go to Table / Delete / Rows. The Step number(s) will automatically renumber.

APPENDIX I – New Wales Laboratory Procedure for Handling Laboratory Waste

1. Purpose / Objective

To establish a procedure for the handling of waste generated at the QC laboratory.

2. Procedure Scope

This procedure applies to Mosaic personnel who handle hazardous and non-hazardous laboratory waste. Hazardous waste accumulated in satellite accumulation drums will be handled in accordance with the Procedure for Handling Waste in Satellite Accumulation Areas (SAA). Once drums are ready to be moved from the SAAs to the Bunker, Procedures for Handling Hazardous Waste will be followed.

3. Responsibilities

Environmental Department:

- Characterize waste;
- Perform periodic inspections of SAAs;
- Manage storage, transportation, and disposal of waste once it is moved to the Bunker.

Area Superintendent:

- Ensure adherence to this procedure;
- Coordinate with Environmental Department to identify potentially hazardous wastes that are to be managed in the laboratory;
- Notify Environmental Department when new chemicals are utilized in the laboratory so that a waste determination can be made;
- Ensure the locations of SAA containers within laboratory are communicated to the Environmental Department;
- Maintain control of the SAA;
- Communicate the hazardous waste handled in SAAs to the appropriate personnel in the Area;
- Move the SSA drum to the Bunker within 3 days after the drum is full.

Personnel handling waste in SAAs:

- Adhere to this procedure;
- Be aware of what waste may be generated within work area and how each should be handled;
- Notify the Supervisor if SAA drum is damaged or leaking;
- Notify the Supervisor immediately when the SAA drum is full.

4. Procedure

Category	Procedure
Label	Affix Mosaic Waste ID Tag (Figure 1) on each accumulation container. Identify contents clearly with terms like: Spent Acetone & Methanol, Acidic Waste, etc. For hazardous waste, affix a hazardous waste label (Figure 2) to the container (or outer container holding smaller containers), but do not date the label until 55-gallons of waste is accumulated, the container is full, or the container is moved to the Bunker, whichever occurs first.

	A container of a P-listed chemical that is to be disposed must be dated at that time that >1 quart is accumulated. The lab currently does not stock any P-listed chemicals.
General Handling	The containers must be inspected for signs of defects such as dents, cracks, severe rusting, holes, damaged lid or caps, etc., before use. Funnels may be used when adding waste fluids to the containers but must be removed after use. Containers must be closed when waste is not being added or removed. Notify the Plant Services Department Supervisor and the Laboratory Supervisor immediately upon reaching the limit of 55-gallons of hazardous waste or 1 quart of P-listed hazardous waste. Container(s) must be moved to the Bunker within 3 days of reaching the limit.
Prohibitions	No laboratory waste other than that specified below may be discharged in the Lab sinks.
Safety	Individuals must adhere to all safety requirements associated with laboratory activities being performed. Drums of flammable liquids must be stored in accordance with all applicable safety policies and regulations.
Waste Streams	
Solid samples (phosphate rock, gypsum, dry products, feed products, limestone, and other dry solid samples). Dispose in dedicated dumpsters behind the Lab labeled "AFI, Rock & Gyp Waste Product" and "Granular Recycle Products," respectively.	
Sulfuric Acid Samples Return to sulfuric acid plants.	
Liquid material from PhosAcid Plant & PhosAcid Clarification Areas (including process water samples and Check 22 samples), **phosacid from Granulation Plants,** and **Non-defluorinated phosacid from AFI** (Transfer Acid)**.** Discharge in the Lab sink.	
Leftover analytical solutions from the digestion of PhosAcid, process water samples, rock samples, gyp samples. Discard in the Lab sink.	
Defluorinated PhosAcid samples from AFI. Return to AFI in original sample containers.	
Leftover analytical solutions other than those listed above (i.e. digests from Granular and AFI products, waste solutions from the Shimadzus, Vaporseat 50, ICP's, Fluorine analysis, acid-base titrations, trace metal analysis, etc.) Discard in the Lab sink.	
Flammable Solvents (e.g. Methanol from Suspended Solids vacuum reservoir) Collected in an intermediate container, then transfer into a hazardous waste SAA drum by the end of the shift. The intermediate container must be labeled with the contents and a statement that it must be emptied by the end of the shift.	
Unwanted or Expired Chemicals (Labpacks) Do not remove manufacturer's label from containers. Place original containers in a 5-gallon bucket and label as specified in the Label Section above.	
Spill Cleanup Debris Place in appropriately sized container and notify the Environmental Department for handling.	

Figure 1

Information on Waste ID Tag

- **Contents:** (i.e., Flammable Solvents)
- **From (Production Area):** QC Lab
- **Contact Person:** (i.e., Name, Phone and Extension of Lab Supervisor).
- **Date**: For SAA, use the date the drum was filled.

Figure 2

- **Accumulation Start Date** (Add the date when the drum was filled or moved to the Bunker).
- **Contents:** (i.e., Describe)

5. References

40 CFR Part 262; Part 262.34(c) Satellite Accumulation

FL Chapter 62-730 FAC Hazardous Waste

EPA Memorandum “Frequent Questions about Satellite Accumulation Areas”, Robert Spring, March 17, 2004

A Guide on Hazardous Waste Management for Florida’s Laboratories, FDEP June 2011

6. Revision Log

Revision Log				
Rev. No.	**Revision Reason**	**Approved By**	**Revised By**	**Revision Date**
001	Change to handling of Defluorinated Phosacid samples	G. Baig / R. Marsella	A. Wortman	09/25/13
002	Change disposition of Leftover analytical solutions to discarding in Lab sink. Minor edits to sample types and instrumentation used.	G. Baig/ R. Marsella	A. Wortman	02/26/15

APPENDIX J – New Wales Laboratory Procedure for Prevention and Management of Chemical spills

Mosaic	Create Date: July 12, 2013,	Revision Date: July 24, 2013	Created By: C. Gonzalez
	Department: Quality Control Laboratory – New Wales		Approved By: R. Marsella
	Title: Chemical Spills		Procedure #:

1. SCOPE AND FIELD OF APPLICATION

This procedure provides information for the prevention and management of chemical spills.

2. PRINCIPLE & DEFINITION

In our laboratory, an accidental chemical spill is the unplanned release of a substance that could be harmful to human health and/or to the environment.

Appropriate spill containment procedures and equipment must be implemented to control or reduce the risk from any spill or leak of any chemical in the laboratory. Neutralizing the chemical spill during spill cleanup will make the material safer to handle for proper disposal.

3. CRITICAL SPECIFICATIONS & INTERFERENCES

- All spills should be cleaned immediately using the appropriate spill kit. Spill Kits are located at the Spill-Kit-station in the “comp box” storage area.
- The cause of the spill should be investigated as soon as possible and appropriate measures must be implemented to prevent any recurrence.
- Contact the Environmental Department to dispose of recovered material.
- Most spills are preventable therefore…

  (a) Place chemical containers being used in a hood or lab bench area that reduces the possibility of accidentally knocking over a container.
  (b) Use trays on benchtops or in fume hood where spills could happen.
  (c) Keep all unused reagents in their appropriate storage area and keep your work area clean and free of unnecessary equipment and clutter.
  (d) Plan your movements carefully and deliberately. Look where you are reaching to ensure you will not cause a spill.
  (e) Transport large chemical containers in a chemical carrier or a cart.
  (f) Get familiar with the Task Risk Assessment prior performing the task.

4. APPARATUS

a) EMD Spill Solv. Chemical Spill Treatment Kit
b) JT Baker Flammable Solvent Spill Clean-up Kit
c) Mallinckrodt Caustic Spill Clean-up Kit
d) Mallinckrodt HF Acid Spill Kit

- **SAFETY PRECAUTIONS**

  - Never use combustible or reactive materials (such as paper towels) to clean up or absorb spilled reagents.
  - Do not clean up or neutralize acid spills with bases. Do not neutralize base spills with acids. A potential aggressive and exothermic reaction may occur.
  - Read and follow the instructions on the spill kit.
  - Wear all appropriate PPE.
  - Add neutralizing agents slowly and deliberately. A chemical reaction may occur that involves some heat generation and the evolution of gas.
  - For hydrofluoric acid spills use ONLY the HF acid spill kit. HF is a weak acid, and does not completely dissociate. Therefore, sufficient time must be allowed for the neutralizing agent to neutralize the acid. Keep the tube of calcium gluconate gel handy.

5. REAGENTS, SOLUTIONS & STANDARDS

- Acid Spill Neutralizer: sodium bicarbonate, sodium carbonate or calcium carbonate.
- Alkali (base, caustic) neutralizer: sodium bisulphate, boric acid or oxalic acid.
- Solvents/Organic: Inert absorbent such as vermiculite, clay, sand
- HF: Magnesium Sulfate

6. SAMPLE PREPARATION

N/A

7. PROCEDURES

Major Spills

Refer to New Wales Emergency Action Plan, Section E-3 P.20

Minor Spills

Note:

For Flammable Liquids Spills- control or eliminate all sources of ignition- turn off all electrical and heat generating equipment.

For Acid Spills- *if possible*, dilute a concentrated acid spill with water before using the spill kit to reduce the generation of heats and fumes.

a) Limit access to the immediate area where the spill has occurred.

b) Notify Shift Supervisor or designate right away.

c) Obtain and use the PPE and Spill Kit **appropriate** to the spill situation i.e. nitrile gloves, laboratory coat/corrosive apron, safety glasses and goggles and/or face shield.

d) Check the airflow in the spill area. It is important to avoid breathing vapors from the spilled chemical.

e) Right any overturned containers where the spill originated or stop leak at source **if safe to do so**.

f) Every Spill Kit comes with their own clean-up instructions; you can find these instructions underneath the spill kit's lid. Follow the instructions.

g) Once the spill has been cleaned up, if appropriate, the shift supervisor will fill out a report on the incident reporting program and will contact the New Wales Environmental Department (ext.5173) for waste proper disposal.

8. EXPRESSION OF RESULTS

N/A

9. QUALITY ASSURANCE PLAN

N/A

10. REFERENCES

http://www.lbl.gov/ehs/chsp/html/acids_bases.shtml

http://www.labmanager.com – Article No.1054 How to Neutralize Chemical Spills.

http://www.labmanager.com – Article No.1127 Preventing Chemical Spills

OHS Advisory Service, Guidance sheet 4: Chemical Spill Management.

11. REVISIONS None

APPENDIX K – Carlsbad Laboratory Task Risk Assessments

In addition to the TRAs in this appendix, the TRAs listed below are common to most Mosaic labs and apply to the Carlsbad Facility. **The common TRAs are in Appendix "H".**		
TRA Number	**Title**	**Common to:**
Carlsbad TRA 001	**Chemical Analysis**	**Concentrates and Minerals QC Labs**
Carlsbad TRA 002	**Compressed Air Usage**	**Minerals QC Labs**
Carlsbad TRA 003	**Grinding Samples**	**Minerals QC Labs**
Carlsbad TRA 004	**Hazardous Waste Disposal**	**Concentrates and Minerals QC Labs**
Carlsbad TRA 005	**Potassium Cyanide Handling and Disposal**	**None**
Carlsbad TRA 006	**Reagent Preparation**	**Concentrates and Minerals QC Labs**
Carlsbad TRA 007	**Truck Safety**	**Concentrates and Minerals QC Labs**

Potash Business Unit Program
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Task Risk Assessment
Appendix K
Chemical Analysis

Dept/Area: Carlsbad QC Laboratory	**Written by: Graham O'Brien Johnson**	**Date: 12/11/2023**
TRA No: 001	**Reviewed by: Graham O'Brien Johnson**	**Date: 12/20/2023**
Task: Chemical Analysis	**Approved by: Graham O'Brien Johnson**	**Date: 12/20/2023**

Step	Task Steps	Potential Hazards	Controls
1	Examine work area	All hazardous work area conditions.	Always inspect work areas before starting a job, remove hazards if possible and report. Review SDSs, SOPs and all relevant documentation before starting job. Wear/use all required PPE. Identify all safety equipment in the event of an emergency.
2	Inspect equipment	Chemical exposure, cuts and abrasions	Inspect all glassware: discard and replace any chipped, scratched or broken. Inspect all necessary PPE to ensure in good working condition
3	Boil sample	Thermal energy, chemical exposure	Use caution when handling hot liquids. Always use tongs when removing boiling samples from hotplate.
4	Titrate sample	Chemical exposure	Always wear nitrile gloves and safety glasses when handling chemicals.
5	Clean station	Chemical exposure, slips, trips and falls, cuts.	Dump hazardous waste appropriately, see TRA. Wash glassware, inspect for cracks and chips. Be careful with slippery, soapy water and glassware. Clean any chemical or product spills on counter or floor.

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Task Risk Assessment
Appendix K
Compressed Air Usage

Dept/Area: Carlsbad QC Laboratory	**Written by: Nicole Tiszai**	**Date: 11/01/2011**
TRA No: 002	**Reviewed by: Graham O'Brien Johnson**	**Date: 12/20/2023**
Task: Compressed Air Usage	**Approved by: Graham O'Brien Johnson**	**Date: 12/20/2023**

Step	Task Steps	Potential Hazards	Controls
1	Examine work area	All hazardous work area conditions.	Always inspect work areas before starting a job, remove hazards if possible and report.
2	Place face shield on	Dust in eyes, inhaling dust	Make sure face shield is on correctly so won't fall off.
3	Turn air valve on.	Pinch points	Watch for pinch points when turning the valve on.
4	Bring hose to desired position	Tripping hazard	Keep hose out of walkways, minimize excess hose
5	Use compressed air	Pinch points, dust in eyes, inhaling dust, flying debris, hearing damage	When using air hose, watch for pinch points when holding down handle. When cleaning, watch to stay clear of grinders so you do not get caught on anything. Never blow air on yourself or others.

6	**Sweep floor**	**Slips, trips and falls**	**Sweep floor after blowing product on the floor**
7	**Turn off air valve**	**Pinch points and stored energy in the flex line**	**Turn valve off when done with air wand. Watch for pinch points.**
8	**Bleed air line**	**Pinch points, dust in eyes, inhaling dust, flying debris, hearing damage**	**Always bleed the line by pressing down on the handle until flow stops. Keep all hearing and face protection on until line is bled.**

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Task Risk Assessment
Appendix K
Grinding Samples

Dept/Area: Carlsbad QC Laboratory	**Written by: Nicole Tiszai**	**Date: 07/13/2011**
TRA No: 003	**Reviewed by: Graham O'Brien Johnson**	**Date: 12/20/2023**
Task: Grinding Samples	**Approved by: Graham O'Brien Johnson**	**Date: 12/20/2023**

Step	Task Steps	Potential Hazards	Controls
1	Examine work area	All hazardous work area conditions.	Always inspect work areas before starting a job, remove hazards if possible and report.
2	Inspect equipment	Pinch point, electrical energy, kinetic energy, hearing damage	Inspect pulverizer at beginning of each shift prior to operating. Look for frayed wires, faulty switches, bypassed safety mechanisms. Lock and tag out any defective equipment. Watch for pinch points.
3	Turn on grinder	Pinch point, electrical energy, kinetic energy, hearing damage	Make sure all safety switches are connected and in good working condition.
4	Grind sample	Pinch points, dust in eyes	Do not bypass guards. Keep lid closed to minimize dust.
5	Clean grinder	Pinch points, dust in eyes, hearing damage, flying debris	Ensure grinder is off and de-energized. Wear face shield and hearing protection. Do not point compressed air at yourself or others.

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Task Risk Assessment
Appendix K
Hazardous Waste Disposal

Dept/Area: Carlsbad QC Laboratory	**Written by: Russel King**
TRA No: 004	**Reviewed by: Graham O'Brien Johnson Date: 12/20/2023**
Task: Hazardous Waste Disposal	**Approved by: Graham O'Brien Johnson Date: 12/20/2023**

Step	Task Steps	Potential Hazards	Controls
1	Examine work area	All hazardous work area conditions.	Always inspect work areas before starting a job, remove hazards if possible and report. Review SDSs, SOPs and all relevant documentation before starting job. Wear/use all required PPE. Identify all safety equipment in the event of an emergency.
2	Inspect jugs and drums for spill, leaks or cracks	Chemical exposure, slips, trips and falls.	Be aware of leaks or spills to avoid slips, trips and falls or exposure to chemicals.
3	Pour waste into funnel	Chemical exposure, slips, trips and falls.	Ensure drums are not full prior to pouring. Double-check the waste being dumped matches the waste in the drum. Log the amounts and types of waste dumped. Clean any spills promptly.
4	Return all equipment and lock Conex.	Chemical exposure, slips, trips and falls, pinch points	Remove jugs and equipment from Conex. Close door, minding the wind. Replace padlock.

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Task Risk Assessment

Appendix K

Potassium Cyanide Handling and Disposal

Dept/Area: Carlsbad QC Laboratory	**Written by: Graham O'Brien Johnson**	**Date: 12/11/2023**
TRA No: 005	**Reviewed by: Graham O'Brien Johnson**	**Date: 12/20/2023**
Task: Potassium Cyanide Handling and Disposal	**Approved by: Graham O'Brien Johnson**	**Date: 12/20/2023**

Step	Task Steps	Potential Hazards	Controls
1	Examine work area	All hazardous work area conditions.	Always inspect work areas before starting a job, remove hazards if possible and report. Review SDSs, SOPs and all relevant documentation before starting job. Wear/use all required PPE. Identify all safety equipment in the event of an emergency.
2	Secure work area	All hazardous work area conditions.	Remove all unnecessary persons from work area. Put up signs indicated dangerous chemicals in use, authorized personnel only. Alert all staff present of the use of potassium cyanide (KCN).
3	Take extra precautions	Chemical exposure	Always have a second, trained employee as an observer in case of incident. Wear additional PPE, including disposable apron and sleeves, second pair of nitrile gloves, dust mask if desired. Full face respirator and medical grade oxygen must be available on-site.
4	Ensure the fume hood is on and functioning properly.	Chemical exposure	Keep sash at designated height. Test airflow before every time KCN is to be used.
5	Keep bottle locked in poison cabinet or fume hood.	Chemical exposure	Keep KCN locked in the designated poison cabinet when not in use. When in use, keep in designated KCN fume hood. Do not leave bottle open unless actively in use.

6	**Keep pH 10 buffer and bleach on hand.**	**Chemical exposure**	**Have pH 10 buffer and dilute bleach solution available whenever KCN is to be used. Never use acids in KCN fume hood. Contact with acids will liberate toxic hydrogen cyanide gas.**
7	**In the event of a KCN spill**	**Chemical exposure**	**For minor spills, blot paper towel with pH 10 solution, wipe up spill, and dispose in Satellite Accumulation Area (SAA). For larger spills, sweep up into disposable container and place in SAA. For spills outside of fume hood, evacuate all personnel and contact emergency response and EHS. Place empty KCN bottles in SAA, or rinse three times, collecting rinsate in SAA, and dispose in trash.**
8	**Return all chemicals and equipment**	**Chemical exposure**	**Return KCN to posion cabinet, lock, secure key in lockbox. Remove outer gloves, sleeves and apron, and dispose in SAA. Wipe all surfaces first with pH 10 buffer, then with bleach, using paper towels, and dispose of in SAA. Fill out log sheets and place in KCN binder.**

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Task Risk Assessment
Appendix K
Reagent Preparation

Dept/Area: Carlsbad QC Laboratory	**Written by: Graham O'Brien Johnson**	**Date: 12/11/2023**
TRA No: 006	**Reviewed by: Graham O'Brien Johnson**	**Date: 12/20/2023**
Task: Reagent Preparation	**Approved by: Graham O'Brien Johnson**	**Date: 12/20/2023**

Step	Task Steps	Potential Hazards	Controls
1	Examine work area	All hazardous work area conditions.	Always inspect work areas before starting a job, remove hazards if possible and report. Review SDSs, SOPs and all relevant documentation before starting job. Wear/use all required PPE. Identify all safety equipment in the event of an emergency.
2	Wear appropriate PPE	Chemical exposure, slips, trips and falls.	FR clothing or lab coat, nitrile gloves, safety glasses are always required. Concentrated acids and bases require face shield and apron or fume hood. See potassium cyanide TRA for specific requirements.
3	Inspect equipment	Chemical exposure, cuts and abrasions	Inspect all glassware: discard and replace any chipped, scratched or broken. Inspect all necessary PPE to ensure in good working condition
4	Combine reagents	Chemical exposure	Pour and weigh chemicals slowly and carefully Contain and cleanup spills immediately. Never add water to acid, always add acid to water.
5	Mix reagents	Chemical exposure, rotating equipment, Electrical energy	Ensure mixer is unplugged in when not in use. Remove any strings, lanyards, necklaces or other dangling items. Keep hair up and out of reach.

6	**Transfer reagents**	**Chemical exposure, slips, trips and falls, back strain, potential energy.**	**Pour slowly and carefully to avoid spills. Make sure all containers are closed before moving. Use proper lifting technique.**
7	**Clean station**	**Chemical exposure, slips, trips and falls, cuts.**	**Dump hazardous waste appropriately, see TRA. Wash glassware, inspect for cracks and chips. Be careful with slippery, soapy water and glassware. Clean any chemical or product spills on counter or floor.**

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Task Risk Assessment
Appendix K
Truck Safety

Dept/Area: Carlsbad QC Laboratory	**Written by: Ashley Casey**	**Date: 02/03/2023**
TRA No: 007	**Reviewed by: Graham O'Brien Johnson**	**Date: 12/20/2023**
Task: Truck Safety	**Approved by: Graham O'Brien Johnson**	**Date: 12/20/2023**

Step	Task Steps	Potential Hazards	Controls
1	Perform vehicle inspection	All hazardous work area conditions.	Always inspect work areas before starting a job, remove hazards if possible and report. Fill out vehicle inspection form each shift before usage.
2	Wear appropriate PPE	Slips, trips and falls, mobile equipment	Hard hat, safety glasses, high-visibility FR clothing and 8" lace-up steel toe metatarsal boots are all required within the plant. Have a radio on hand for entering restricted areas. Safety belt must be worn by all passengers at all times while in the vehicle.
3	Signal all movement	Mobile equipment	Honk twice before reversing and hank once before driving forward. Obey posted speed limits, 5 mph in plant, 10 mph by warehouse.
4	Stop safely	Mobile equipment	Come to a complete stop at all stops signs and crossings. If the driver exits the vehicle, it must be in Park, turned off, and have the wheels chocked.