



Procedures Manual

	MANAGEMENT SYSTEM PROCEDURES	V27. 2024
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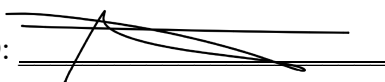
QMS Procedures Manual – STATEMENT OF INTENT

Airde Mechanical Services, LLC is committed to providing so far as is reasonably practicable, a working environment that is safe and without risk to health for all its employees, contractors and third parties through the effective implementation regards health, safety and environmental policies and procedures. We do not accept any compromise in terms of QMS Management System Procedures at any time, even in the most difficult of complex surroundings.

- Safe working practices and the implementation of the following guiding principles are the responsibility of all Peregrine Risk Management personnel and are to be viewed as an integral part of our culture.
- Aspire to achieve an ‘Incident Free’ environment’, as a commitment to preventing injury, ill health, and protecting the environment including the prevention of pollution.
- Ensure that a robust QMS Management System Procedures are maintained and made available to all relevant interested parties via our corporate website.
- Ensure compliance with legal and other requirements applicable to our business activities.
- Empower our employees to stop unsafe acts or activities and encourage the reporting of Accidents, incidents and near misses.
- Ensure effective communication of our QMS Management System Procedures, including the ongoing consultation with, and participation of our employees and contractors to determine if further measures are required in terms of continual improvement.
- Ensure that all hazards and environmental aspects are identified and subsequently risk assessed. Suitable risk mitigation measures are to be adopted to ensure that we provide a safe and healthy working environment, manage our environmental impacts and reduce risks so far as is reasonably practicable
- Ensure that roles and responsibilities are identified with arrangements in place for the management of health, safety and environmental matters.
- Set and review HSE objectives and targets, using the Management Review process, policies and procedures in our SOMS as the framework for driving continual improvement.
- Ensure the effective management of contractors and sub-contractors who conduct work on our behalf.
- Provide enough resources and training where required to ensure HSE excellence whilst promoting awareness and responsibility.
- Review and revise this Policy regularly.
- The Senior Leadership Team is responsible for the overall ownership of the health, safety and environment management system. The QMS Management System Procedures and statement of intent are approved and endorsed by the CEO and will be reviewed annually.

CEO: Terry Steeves SIGNED:

DATE: 15 February 2024



This Statement of Intent is displayed at the Head Office and is available to all personnel including visitors and contractors. All employees are required to read it and communicate any query to the Directors.

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MSP-001 EMERGENCY RESPONSE PROCEDURE

1.0 PURPOSE

1.1 This procedure ensures that **AIRDE** Regions identify and are prepared for possible emergencies in the respective area(s) they are working in.

2.0 SCOPE

2.1 This procedure applies to all offices, warehouses and sites that **AIRDE** employees and crew are working in.

3.0 RESPONSIBILITY

3.1 The Managing Director is responsible for implementing this procedure, preparing the annual drill/test schedule and auditing for compliance.

3.1.1 The Segment Managers are responsible for identifying possible emergencies for the offices under their jurisdiction.

3.1.2 The Site Supervisors are responsible for identifying possible emergencies on work sites, consulting affected workers and sub-contractors for input in establishing and implementing the emergency response plan, liaison with the client to incorporate client specific requirements and training/drilling crew on the procedures.

3.1.3 Fire wardens are responsible for ensuring all personnel have been evacuated and closing the office doors for confirmation.

3.1.4 The Site Supervisor is responsible for ensuring the first aid kit is adequate for the hazards they are working in and contains all the relevant materials prior to starting the job.

4.0 PROCEDURE

4.1 Potential Emergencies

4.1.1 Each Region and work site is required to have a site-specific Emergency Response Plan posted that identifies possible emergencies and handling instructions. These plans should include at minimum:

- Medical Emergencies: including identification of the first aiders, first aid kit(s) and emergency numbers (in order of intended use). Note All **AIRDE** vehicles are required to have first aid kits;
- Fire: including use of fire extinguishers. Note All **AIRDE** vehicles are required to carry fire extinguishers;
- Bomb Threat/ Suspicious Packages: how to identify and deal with suspicious packages and actual bomb threats;

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- Suspicious Behavior: including how to identify a person committing or threatening to commit an act that is likely to be hazardous to the health and safety of the employer or any of his or her employees and the subsequent actions to take;
- Spills: including response to a spill or leak of a hazardous substance in a workplace controlled by the employer.
- Black-out: including safety protocols be implemented in the event of a failure of the lighting system
- Sites are required to develop Confined Space and Rope Rescue Plans in accordance with the scope of work

4.2 Media

4.2.1.1 The only person in the company authorized to make statements to the media is the Managing Director. He/she may delegate this responsibility as deemed appropriate. The Managing Director shall ensure that media statements are approved prior to release.

4.2.1.2 In the event the media contacts a person (either in person or by phone) who is not authorized to release information, that person shall politely state the following “I thank you for your inquiry, however I am not authorized to release details regarding any alleged events. I will put you through (pass your name along) to an individual who can provide you with this information.”

4.3 Medical Emergencies

4.3.1 First Aid Teams

4.3.1.1 There is to be a minimum of 2 persons trained (by an accredited training provider) in Standard First Aid for each office/facility. At a minimum all site supervisors are to be trained in First Aid and CPR. The number of first aid persons required will vary depending on local legislation and client regulations.

4.3.1.2 Names of First Aiders must be posted.

4.3.2 First Aid Supplies

4.3.2.1 Each site/office will have readily accessible to them first aid supplies. These kits must meet at minimum provincial/state requirements but can be enhanced based on the hazards of the operations. The list of required items is to be documented inside the kit for inventory purposes.

4.3.2.2 First Aid Kits:

- Must be stored in a clean dry location preventing damage or contamination. Any deficiencies must be reported to the supervisor for resolution.
 - Must be clearly marked and unobstructed from view
 - Unless a tamper seal is placed on the first aid kit:
 - Site: first aid equipment is to be inspected prior to commencement of work to confirm availability and service ability;
 - Building: first aid equipment is to be inspected once per month.
- 4.3.2.3 Drugs, antiseptics, inhalants, medicines, or proprietary preparations shall not be included in First Aid kits unless specifically approved, in writing, by the Director of HSE&Q or Managing Director.
- 4.3.2.4 Where the eyes or body may be exposed to hazardous corrosive materials, suitable eye wash station and emergency showers must be available.

4.3.3 Providing First Aid

4.3.3.1 In the event of a medical emergency, the following actions should be taken:

- Notify applicable emergency service, request assistance, and provide the Emergency operator with the following:
 - Name and telephone number;
 - Company name and address;

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- Time and type of incident;
- Name and quantity of materials released;
- Extent of injuries, if any; and
- Possible hazards to others or the environment;
 - If safe to do so; administer first aid.
 - Stay with the casualty until medical aid arrives.
 - If the injury is minor, the person in charge can make arrangements to bring the casualty to a medical facility.

4.3.4 Review of Emergency Plans

4.3.4.1 Emergency plans must be reviewed quarterly or whenever circumstances have changed that may affect the current emergency response plan. If the plan must be amended, all affected employees must be consulted.

4.4 Fire

4.4.1 Alarm

4.4.1.1 The person discovering a fire or any other emergency must sound the alarm as soon as possible. When on a client's site you will use the alarm, system provided by the client. When no alarm system is provided an air, horn is to be used to sound a local alarm. Three short blast of the air horn will indicate emergency and personnel are to proceed to a safe location.

4.4.2 Communication of a Fire

4.4.2.1 The emergency contact list is to be consulted for appropriate hierarchy for communicating an emergency. All major emergencies need to be controlled immediately, the local emergency department should be contacted first, and then the emergency contact list consulted. When communicating the emergency give your NAME, the LOCATION, and DESCRIPTION of the emergency.

4.4.2.2 If a site has its own phone system, follow that company's telephone reporting procedure, or contact the local emergency department.

4.4.3 Response to a Fire

4.4.3.1 If you are trained to do so you may attempt to extinguish the fire. Do not try to do so until:

- You have sounded the alarm;
- There is another person to assist;
- You are confident that you can deal with the fire; and
- A clear exit is available at all times.

4.4.4 Signage

4.4.4.1 Signs shall be posted in conspicuous places at all entrances to a fire hazard area:

- Identifying the area as a fire hazard area; and
- Prohibiting the use of an open flame or other source of ignition in the area. For off-site locations, fire hazard areas should be identified and communicated to employees prior to commencing work activities.

4.4.5 Fire Wardens

4.4.5.1 At least one fire warden per floor is to be designated. The warehouse will also have its own fire warden and designate.

4.5 Bomb Threat / Suspicious Packages

4.5.1 Any indication, no matter how vague, that an explosive device has been, or may have been, placed on any AIRDE property or in an area where AIRDE crew are working must be regarded as a threat until an analysis or subsequent events prove otherwise.

4.5.2 Guidelines for identifying a suspicious package:

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- The item was not delivered by a carrier. Most bombers set up and deliver the bomb themselves;
- If delivered by carrier, inspect for lumps, bulges, or protrusions, without applying pressure.
- Handwritten addresses or labels from companies are improper. Check to see if the company exists and if they sent a package or letter;
- Packages wrapped in string are automatically suspicious, as modern packaging materials have eliminated the need for twine or string;
- Excessive postage on small packages or letters indicates that the object was not weighed by Post Office;
- Any Foreign writing, addresses, or postage;
- Handwritten notes, such as: “to be opened in the privacy of” and “CONFIDENTIAL”;
- Improper spelling of common names, places or titles;
- Generic or incorrect titles;
- Leaks, stains, or protruding wires, string, tape, etc.;
- Packages or letters hand-delivered or dropped off for a friend;
- No return address or nonsensical return address;
- No postage or non-cancelled postage
- Any letters or packages arriving before or after a phone call from unknown person asking if item was received.

4.5.3 If a person has been advised of a bomb threat or believes a package is suspicious in nature, that person must contact his/her Supervisor immediately. If on client site, then the client representative must be informed. The person in charge will:

- Appraise the threat;
- Obtain as much information as possible;
- Contact the police and other emergency services;
- Muster personnel to a safe area.

4.6 Suspicious Behavior

4.6.1 Any employee who encounters a person (including members of the public, coworker, etc. and who is acting in a behavior that may result in harm to himself or others is to report the situation immediately to his/her Supervisor who will:

- Appraise the threat;
- Obtain as much information as possible;
- Contact the police and other emergency services.

4.7 Chemical Spill

4.7.1 If on client property and the emergency situation could threaten human health or the environment, an assessment of the pending danger indicates that an evacuation of the local area (i.e. other businesses, etc.) is advisable, immediately contact: the client Health Safety Environment Coordinator or client liaison person per the guidelines provided during the client’s safety orientation.

4.7.2 In the event of a hazardous material spill, take the following actions.

In the event of a hazardous material spill, take the following actions:

Identify the problem and evaluate the hazard

- Do not enter hazardous area.
- Remain upwind.
- Keep personnel away from spill site.
- Identify the hazardous material.

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- Obtain sSDS for detailed information

Contact Emergency Services

- If you do not know what the product is or you know that it is a hazardous product – evacuate the area (building) immediately and call emergency services.
- If it is a very large spill of a relatively safe product (oil) and you do not have sufficient resources to stop the flow or to contain it, call emergency services.
- Do not re-enter facility until the emergency officials give you permission to do so.

Control/Stop the Leak

- Only if you know what the product is and you are sure there is no risk to your safety, may you try to stop the leak. This may be as simple as turning off a tap or up righting a container.
- Use appropriate PPE. (refer to SDS)

Contain the Spill

- If you can't stop the leak, then try to contain the spill.
- Take every measure to prevent the product from contaminating sources of water supply i.e. entering the sewer system.
- Use appropriate PPE. (refer to SDS)

Dispose of Spill Materials

- The spilled materials and absorbent must be collected and disposed of properly. Contact your local Waste Management Provider or Dept. of Environment for disposal procedures.

4.8 Black-Out

4.8.1 All offices are to have emergency backup lights that automatically illuminate in the event of a power failure. Where emergency routes include stairs and the area is poorly illuminated by the backup lights, then strips of reflective tape is to be placed on each step.

4.8.2 Back-up lights are to be tested on a monthly basis.

4.9 Confined Space Rescue

4.9.1 When our personnel are working within a confined space, we must be prepared to provide a rescue at all times. No one is to enter a confined space until the following minimum precautions are taken:

- Safety equipment is readily available;
- Trained Confined Space Rescuers are readily available;
- All confined space permits are in place. This may include Lock Out permits, Hot Work Permits; etc.;
- Confirmation that the space is safe to enter;
- Continuous atmospheric monitoring is provided; and
- Additional precautions required by our confined space permit system are in place.

4.10 Rope Access Rescue

4.10.1 All **AIRDE** personnel involved in rope work must be certified by the Industrial Rope Access Trade Association (IRATA) or Society of Professional Rope Access Technicians (SPRAT). They must complete an extensive rope access course which demands that the technician complete rigorous rope rescue training.

4.10.2 **AIRDE** has developed five generic rescue plans. Prior to the commencement of a job, the supervisor must select the appropriate plan needed for rescue. He must review the plan with the technicians prior to conducting the rope work. The plan must be written and attached to the safety talks. They will be reviewed prior to each shift.

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4.10.3 In the event of a rope rescue requirement, the Level III Supervisor will be in charge of the rescue. All personnel will take direction from him/her.

4.11 Evacuation

4.11.1 Evacuation Plan

4.11.1.1 All sites are to have an evaluation plan posted and regularly reviewed for suitability. The plan should include at minimum:

- Location of evacuation areas
- Location of fire extinguishers
- Location of first aid kits
- Location of muster station

4.11.2 Muster Station

4.11.2.1 All locations are to have a “Muster Point” for personnel to gather during an evacuation. This location is typically given during site orientation. If on a client site and this information is not provided; the **AIRDE** supervisor is to get the information from the client and pass it on to our workers.

4.11.2.2 The only exception to this is if the emergency is of such a magnitude that the area(s) also becomes too hazardous to the safety of personnel. Under such circumstances, the supervisor or client will choose an alternate “muster area”, such as the street (if no longer passable by vehicles) or another lot in the vicinity. In all cases, it will be imperative that any other location chosen must be done so only after evaluation of the threat of electrical hazards, fire or explosion, or chemical hazards.

4.11.2.3 The muster station for each site must be posted, pointed out during orientation and clearly labeled.

4.11.3 Evacuation Process

4.11.3.1 If it has been determined there is a need to evacuate the facility, the facility management will be responsible to sound the alarm within the facility to alert all affected employees to the actual emergency. Supervisors and Emergency Coordinators will implement an evacuation or appropriate action according to the emergency as listed in the plan below and evacuate all **AIRDE** personnel to the designated evacuation assembly area.

4.11.3.2 There are normally two types of evacuations:

- Partial – the removal of persons in immediate danger.
- Complete – the removal of all persons from the entire facility.

4.11.3.3 The evacuation process is as follows:

- Employees are to move in an orderly manner to the nearest exit. Do not panic, and remain calm. If possible and safe to do so, assist those person(s) who need help evacuating.
- Do not stand or remain in the exit doorway. The doors must completely close to effectively prevent air from rushing in to help the spread of fire and/or smoke. Keep the exit doorway clear.
- Be sure to report anyone not accounted for to the person in charge;
- Ensure that Security and emergency personnel are notified; and evacuate all personnel from the area when required;
- If in a building, close all doors behind you. Many doors are “fire rated” and can assist in reducing the potential spread of fire and smoke, but only if they are closed completely;
- If there is smoke, employees should breathe through their nose in quick, short breaths, and crawl along the floor;
- After exiting, go to the designated safe ASSEMBLY AREA.

4.11.4 Re-Entry

4.11.4.1 Wait for word from the Emergency Services Personnel before attempting re-entry of the building or returning to work.

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4.12 Emergency Equipment

4.12.1 In order to be prepared for any emergency, the field supervisor must ensure the appropriate emergency equipment is available. The location of the equipment must be clearly marked or visible and it must be addressed during the rescue plan or safety talks. Emergency equipment will vary depending on the job, however at minimum all sites/offices will have:

- Fire Extinguishers
- First aid kit
- Communication device – radio or cell phone
- Eye wash bottles
- Air horns

4.13 Training

4.13.1 Personnel must be trained to perform rescue. This training will be specific to the hazards associated with the work they are doing. Example:

- Every employee shall be instructed and trained in the procedures to be followed by him/her in the event of an emergency; and the location, use, and operation of fire protection equipment and emergency equipment provided by **AIRDE** and the clients.
- When working on ropes, they must complete the Level I IRATA and or SPRAT course which teaches rope rescue.
- Fire Wardens must have fire extinguisher training.

4.14 Drills / Exercises

4.14.1 At minimum, drills are to be completed as per the following schedule:

Drill, Person Responsible, Number Frequency, and How

Fire HSE&Q Director 1 / Office Annual Email to Segment Manager's requesting a fire drill during that week. Drill assessment form to be completed and returned to HSES&Q Director.

4.14.2 The participation of drills is mandatory for all personnel.

4.14.3 The Managing Director is to be provided with the exact time and date of the drill. Prior to starting the drill, a page to all employees will advise of the drill and not to phone the emergency services.

4.14.4 The HSE&Q Director will notify the Alarm Company before and after and fire drill so that they do not inadvertently contact the Fire Department believing that our drill is an actual alarm. Give approximate time duration of the drill.

4.14.5 The person in charge of the drill will assess the drills for:

- Employee knowledge of emergency procedures
- Employee staff performance during drills

4.14.6 Once the drill is completed the person in charge of the drill will advise all participants of any concerns that have been noticed and all positive aspects of the drill.

4.14.7 A completed drill assessment report will be provided to the Managing Director (as applicable) for review.

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MSP-002 EMPLOYEE HSEQ COMMUNICATION

1.0 PURPOSE

1.1 Management and Supervisors should encourage employees to utilize the HSE&Q Communication Card to make suggestions for improvement, document hazardous observations and behaviors as well as provide feedback for positive observations in the field. All employees will have access to a **Hazard Communication Card**, to provide a means to document observations in the facility/field.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** employees and contractors who are required to follow **AIRDE**'s procedures. Note that clients may have specific procedures for reporting hazardous conditions and behaviors and their system may be used in place of this procedure.

3.0 RESPONSIBILITY

3.1 All employees are responsible for reporting hazardous conditions and behaviors and taking corrective action as appropriate to mitigate the risk.

3.2 The Supervisor is responsible for reviewing this information at safety meetings and for communicating the cards with the crew and HSE&Q Department.

3.3 The HSE&Q Director is responsible for conducting trend analysis on the data received and assisting the Supervisor and OPERATIONS COORDINATOR in follow up actions as needed.

4.0 PROCEDURE

4.1 Definitions

4.1.1 **Hazardous Condition/Behavior:** Any situation with the potential to cause injury or illness. You may have a hazard to do with machinery, equipment, raw materials, workplace, other workers, your job, and poor housekeeping.

4.1.2 **Suggestion for Improvement:** Any ideas you have to improve current procedures, processes or the way you do your job (including type and use of equipment, PPE and materials)

4.1.3 **Positive Observation:** Any observation that demonstrates a process, work behavior (**AIRDE** Crew, Contractor, Client, etc.) that is going well.

4.2 Reporting

4.2.1 The card is designed to be used to ensure that the employee is provided with a means of reporting without fear of reprisal. Feedback is provided to the employee on their suggestions, whether positive or negative

4.2.2 The card is to be made available at various locations within the site or facility where employees may easily find them. Each location should be readily identifiable and a means for depositing the completed cards provided. Cards can also be turned into the HSE&Q Department/Segment Manager if appropriate to the situation (i.e. timing of action is not safety sensitive).

4.2.3 When a suggestion or observation is documented, the employee should also make note of the actions he/she took to mitigate the risk. If long term solutions are recommended, these should be noted for review of the Supervisor.

4.3 Follow-up

4.3.1 The Field Supervisor will review the cards and discuss with the crew as appropriate. Cards will be collected and sent to the office with other paperwork from the project. Any cards that are not closed

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out by the Supervisor will be logged for follow-up by the HSE&Q Department.

5.0 REFERENCES

MSF-002 Hazard Communication Card

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MSP- 003 DRUG, ALCOHOL ABUSE, & DISCIPLINARY ACTION

1.0 PURPOSE

1.1 The purpose of this policy is to provide standards and guidelines that affirm the company's commitment to minimize risk associated with our operations by providing a safe and healthy workplace which is free of any non-positive effects associated with alcohol, drug or other substance use. This policy is one more component of our overall safety program. All **AIRDE** employees must abide and follow every procedure in this handbook. Insubordination and or deviation from procedures without written consent will result in disciplinary action and up to termination.

2.0 SCOPE

2.1 This program applies to all employees and contractors while they are engaged in company business or working on company premises. This procedure applies to DOT and Non-DOT Testing.

3.0 RESPONSIBILITY

3.1 The Director of HR is responsible for organizing all drug and/or alcohol tests, maintaining the records of the results and initiating any disciplinary actions as a result of non-compliance with the program.

3.2 The Director of HSE&Q is responsible for advising the HR Department of any requirements for post incident testing.

3.3 The Segment Managers are responsible for advising the HR Department with the names of individuals required for client specific D&A Testing as well as those who require D&A Testing for DOT compliance.

3.4 All employees are responsible to report suspicions of substance abuse to their supervisor. All employees are responsible to report probable side effects of over the counter prescriptions to the Supervisor.

3.5 All onsite Level 3 Supervisors are responsible for conducting workplace inspections to ensure all safety procedures and protocol are being followed.

4.0 PROCEDURE

4.1 General

4.1.1 **AIRDE** has a Drug and Alcohol policy that is fully supported by a testing program. Anyone testing positive for being under the influence of alcohol or drugs will be subject to disciplinary action.

4.1.2 All persons under the scope of this program and their personal effects on the property of **AIRDE** are subject to search.

4.1.3 Refusal by any employee to submit to a search or D&A test will subject that employee to disciplinary action up to and including termination.

4.1.3 This program includes ALL **AIRDE** safety protocol. All safety procedures are to be followed. Any insubordination or failure to comply with the safety of all employees, safety procedures, and protocol will be subject to disciplinary action and up to and including termination.

4.1.4 Safety violation notices will be issued to employees, subcontractors, and any other hired persons/company who are in violation of any **AIRDE** safety protocol including: state, or federal safety regulations. Which can lead to disciplinary action and up to termination.

4.2 Fit for Duty

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4.2.1 All employees are expected to report for scheduled work fit for duty. Employees are also expected to remain fit for duty when on paid standby. If unexpected circumstances arise where an individual is requested to perform unscheduled services while under the influence of alcohol, drugs (controlled and uncontrolled), it is the responsibility of that individual to decline the call.

4.3 Collection and Sampling

4.3.1 Collection, sampling, and testing methods will be completed by a competent 3rd Party in accordance with recognized industry practices.

4.4 Reasons for Testing

4.4.1 With regard to company policy on the use and possession of drugs, a drug and alcohol test is required as follows:

4.4.1.1 **Pre-Access:** It is a condition of employment for all **AIRDE** personnel to have a pre-access D&A test to be paid for by the Company. If pre-access drug and alcohol results are positive, the employee will be removed from schedule work activities. At the discretion of the Company, the employee may be able to provide, at his/her expense, another D&A test indicating non-positive results before being considered for continued employment and further assignments. Clients may require separate pre-access testing for employees prior to entry on site.

4.4.1.2 **Random:** The Company reserves the right to conduct random D&A tests in order to remain compliant with industry requirements. As well, the employee may be subject to random D&A tests by the clients of **AIRDE** as part of their due diligence in ensuring their Health and Safety program standards are met. If an employee's test results are positive, the employee will immediately be removed from the site and the Company will investigate the matter.

4.4.1.3 **Just Cause:** If the Company and/or Supervisor suspects the employee is under the influence of drugs or alcohol, the employee will automatically be removed from the site. The employee will be made aware of the concerns and the Company will ensure the employee has a safe method of transportation off the site premises. The Company will investigate the matter and if the employee is deemed to have been under the influence of drugs or alcohol, the employee will be disciplined, up to and including termination of employment for cause.

4.4.1.4 **Post Incident:** Post incident testing is handled in the same manner as Just Cause and is initiated when there is a likelihood of human error. Post incident testing can include both drug and alcohol substances.

4.4.1.5 **Post Rehabilitation:** Individuals who suspect they have a substance dependency or emerging alcohol or drug problem are encouraged to seek advice from a qualified medical professional and to follow appropriate treatment promptly before job performance is affected or violations of this policy occur. No one with an alcohol or drug problem will be disciplined for voluntarily requesting help in overcoming their problem. However, the help must be accessed prior to being notified that they must report for a test under this policy, or prior to the initiation of disciplinary action under the policy. Accessing assistance does not eliminate the requirement for participation in an aftercare program, and maintenance of satisfactory performance levels. Disciplinary action under the policy cannot be avoided by a request for counseling or treatment, or by disclosure that the individual is already involved in a treatment program. Where in the opinion of a qualified professional there is a risk that an individual could not perform their responsibilities, the individual will be removed from duty until company management is confident, they are able to safely return to work. Work schedules will be adjusted within reasonable limits to accommodate any period of time the individual is required to attend the treatment or counseling program, and coverage for employees will be within

the limits of the company benefits program.

4.4.1.6 Follow-up Testing: When a person tests positive for drug and/or alcohol and employment is continued, he/she may be subject to any or all of the following conditions (For the purpose of this procedure, a safety sensitive position is a person to be called upon to perform or supervise climbing duties):

- Reassignment where available and appropriate;
- Assessment by a substance abuse professional (SAP) to determine if counseling or treatment are required (at the expense of the employee);
- Clearance by the SAP that the recommended program was followed;
- Pass a return to duty test;
- Unannounced testing as recommended by the SAP;
- Unannounced testing as required by the company;
- Adhere to any rehabilitation conditions or requirements; and
- No further policy violations during the monitoring period.

4.5 Cut-Off Limits

4.5.1 For the purpose of this program, a positive alcohol test will be one in which the blood alcohol concentration is at or above .04% BAC. However, in those instances where an employee is subject to an unannounced testing program on return to duty after treatment, or on return to duty after a positive test result, a positive test will be one in which the blood alcohol concentration is .02% or more. A positive drug test is one in which the amount of drug in the sample identified by the confirmation test is at or exceeds the cut-off levels established below. These are:

Substance Tested	Screen Level	Confirmation Level	Measurement
Marijuana	50	15	ng/ml
Cocaine	150	100	ng/ml
Amphetamines	500	250	ng/ml
Opiates	2000	2000	ng/ml
PCP	25	25	ng/ml
Barbiturates	300	300	ng/ml
Benzodiazepines	300	300	ng/ml
Methadone	300	300	ng/ml
Methaqualone	300	300	ng/ml
Propoxyphene	300	300	ng/ml
Alcohol	40 mg	40 mg	mg/100 ml urine

4. Positive Test Results

4.6.1 Any positive test result will be considered a violation of this policy, whether or not the drugs or alcoholic beverage were actually consumed on company business or premises. Failure to report for a test, refusal to submit to a test, or any attempt to tamper with a test sample are grounds for disciplinary action. All re-scheduled tests are at the expense of the individual.

4.6.2 In the case of a verified positive test result, the person who has been tested may request a split sample (if split sample collection was conducted) to be tested by an accredited laboratory of that person's choice within 72 hours of receiving their results, or to direct the sample to be re-tested at an accredited laboratory.

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4.7 Consequences of Violation

4.7.1 If any individual violates the provisions of this program or does not meet satisfactory standards of work performance as a result of alcohol or other drug use, appropriate disciplinary action will be taken. In all situations, an investigation will be conducted and documented to verify that a program violation has occurred before disciplinary action is taken. Therefore, management has the authority and discretion to hold out of service any employee who is believed to be involved in an incident that could lead to disciplinary action pending the results of the investigation. The appropriate discipline in a particular case depends on the nature of the policy violation and the circumstances surrounding the situation.

4.7.2 In any situation where the employee fails a drug and alcohol test and requires a subsequent test to show non-positive results, the test is at the expense of the employee. Any expenses incurred related to the removal of an employee from a job site due to a positive drug test or inappropriate consumption of alcohol will be incurred by the employee. This includes transportation costs, accommodation, follow-up tests, etc.

4.8 Non-Prescription and Prescription Medication

4.8.1 It is the responsibility of every employee taking medication to heed the warnings contained on the label and / or any warnings given by the prescribing physician and / or the dispensing pharmacist. Such warnings may caution against driving, operating machinery, etc. Failure to heed such warnings shall be cause for disciplinary action.

4.8.2 Any employee taking any medication with a warning must inform their immediate supervisor prior to starting work if the warning indicates the effects of the medication would in any way prohibit the employee from completing assigned duties in a safe manner.

4.8.3 The supervisor is responsible for ensuring that an employee taking medication does not engage in duties that could endanger the employee and fellow workers.

4.9 Impaired Driving Charge or Conviction

4.9.1 All individuals who operate any motor vehicle on behalf of **AIRDE** for business purposes are required to maintain a valid driver's license. Any loss of license must be reported, and the individual will no longer be qualified to drive on behalf of the company.

4.9.2 Any individual charged with an impaired driving offense (including but not limited to restricted to blowing over the legal BAC in that jurisdiction, driving while impaired, or refusal to blow into a breath analyzer) when operating a vehicle on behalf of one of the companies, must inform their supervisor immediately. The temporary loss of a driver's license as a result of a charge will result in a full investigation, and a range of actions which may include assessment, alternative work, dismissal or any other appropriate action depending on the circumstances. A conviction for an impaired driving offense when driving on company business or in a company vehicle is grounds for termination of employment. Each situation will be fully investigated, and action taken will depend on the circumstances surrounding the event.

4.9.3 Failure to report the loss of license will be grounds for termination of employment.

4.10 Searches

4.10.1 **AIRDE** reserves the right to conduct unannounced searches for alcohol and illicit drugs on premises owned, contracted or otherwise controlled by the company, including mobile equipment or vehicles, where there are reasonable grounds to believe that they may be present. Supervisors are

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responsible for identifying situations where an unannounced search is justified (in accordance with the above) and will be responsible for obtaining senior management approval before initiating any action.

4.11 Confidentiality

4.11.1 Confidentiality and record keeping will be maintained by the Human Resource Department except where limited disclosure is necessary for related health and safety concerns. (i.e. There is deemed to be a potential for risk to self, others or the company).

4.12 Communications

4.12.1 The Drug and Alcohol Program will be explained to all employees during the orientation training. A copy of the employee's acknowledgement and agreement to adhere to the program will be signed by the individual and maintained in the employee's file.

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MSP-004 SAFETY MEETINGS

1.0 PURPOSE

1.1 This procedure provides an overview of the safety meetings which are required to ensure employees thoroughly understand the safety regulations and hazards involved in their work.

2.0 SCOPE

2.1 This procedure applies to all projects.

3.0 RESPONSIBILITY

3.1 General

3.1.1 The Field Supervisors are responsible for reviewing and enforcing the Safety Meetings procedure, and for monitoring its implementation. Field Supervisor(s) are responsible for ensuring that documentation required by this procedure is properly maintained. (If a Job Safety Supervisor is assigned to the project, he/she will be responsible for all documentation.)

4.0 PROCEDURE

4.1 Meetings

4.1.1 Orientation Meetings

4.1.1.1 Safety orientation starts at the commencement of employment. Basic regulations regarding the safety requirements are discussed at this meeting.

4.1.1.2 Special orientation meetings could be scheduled prior to the beginning of each job task if necessary or special job tasks are required. The Supervisor should communicate special precautions to eliminate hazards. Each employee attending these meetings must sign an attendance form. Clients may also hold special classes regarding certain hazards or situations as well as site safety orientations and policies.

4.1.2 Health & Safety Site Safety Representative Meetings

4.1.2.1 If required, a site-specific Safety Representative will be provided. The site and company management will comply with the communication requirements of all Safety Meetings and Requests. Minutes of the meeting shall be recorded.

4.1.2.2 H&S Site Safety Representatives will meet the requirements of the jurisdiction they are working in.

4.1.3 Daily Job Hazard Analysis Safety Meetings (JHA)

4.1.3.1 Employees who wish to discuss specific safety issues are encouraged to do so at these meetings. All safety meetings must be documented and a copy kept in the Job Folder File.

4.1.3.2 Objectives of the tailgate meeting are:

- To encourage safety awareness.
- To get employees actively involved.
- To motivate employees to follow proper safety practices.
- To encourage employees to report or discuss job hazards.
- To introduce workers to new safety rules.
- To provide vital information on accident causes and types.

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4.1.3.3 The tailgate safety meetings are to be held at least once every shift or if procedures or a plan changes at any point, to communicate on safety issues. These meetings are to be held by the Field Supervisor, Supervisor(s), or designated employee.

4.1.3.4 Only items concerned with safety will be discussed during this meeting.

4.1.3.5 Field personnel must attend the safety meeting held at the worksite, or at other specified locations.

4.1.3.6 Information pertaining to safety and any hazardous conditions that have been disseminated through management will be discussed at these meetings. Each employee will be encouraged to participate in all discussions.

4.1.3.7 The topic of the meeting should be prepared in advance in order to maintain employee's attention.

4.1.3.8 Minutes of the meeting should be recorded on the "Daily Job Hazard Analysis Form MSF-003".

4.1.3.9 The HSE&Q Department may offer suggestions to discuss at Daily JHA Meetings i.e. Lessons Learned, new procedures, etc. Further to this, the Supervisor is required to develop his/her own meeting topics.

4.1.3.10 All staff, contractors, client representatives and attendees are encourage to introduce and identify site safety or job issues and hazards to the supervisor for inclusion in the meeting, and to be noted in the minutes

4.1.3.11 All staff, contractors, client representatives and attendees must sign form MSF-003 (JHA) at the conclusion of the meeting.

4.1.4 How to Conduct a Meeting

4.1.4.1 Whether presenting a safety topic in written form from the office, or preparing one yourself, the basic steps listed below should be followed in order to maintain attention and interest:

- **Introduce the Topic:** Begin with the subject matter or the reason for the meeting. Use some humor if appropriate.
- **Present the Facts:** Be as concise as possible when providing any information to the employees. Use only credible facts and figures.
- **Demonstrate:** Use visual aids to demonstrate your point. Use employees to "act out" or role play a new safety procedure or policy to give the meeting added impact.
- **Open the meeting up for discussion:** Use this time for questions and answers, clarify any misunderstandings, and obtain feedback from the employees.
- **Summarize the major points:** Recap the key points you have discussed. End the meeting on a note of things that the employee should remember.
- **When you have selected a topic or been provided one for your meeting,** review the material in advance to familiarize yourself with the information. Use any supplemental material you can think of to reinforce or illustrate the meetings' subject matter. Make a note on the outline material where you may want to emphasize important information or add any appropriate facts, or accident statistics.

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- When presenting the meeting from a prepared topic, try not to read the information word for word, but if it is necessary to do so, this method is better than no meeting. It is better to be prepared and know what you are to say, visual aids readily accessible, support equipment available, and demonstration rehearsed. This will allow the meeting to run more smoothly and keep employees attention. Employees will otherwise be distracted by disorganization, rambling discussion, or ill planned demonstration.

4.2 Training

4.2.1 Training of all personnel affected by this program will be provided periodically. This includes training of new or transferred personnel i.e. Field Supervisors, and other management representatives who are expected to effectively implement the program.

4.3 Records

4.3.1 All safety meetings must be documented. Ref: MSF-003 Job Hazard Analysis (JHA) acknowledging review and understanding of the Safe job Work Plan MSF-004.

5.0 REFERENCES

MSF-003 Job Hazard Analysis

MSF-004 Safe Job Work Plan

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MSP-005 CONFINED SPACE PROCEDURE

1.0 PURPOSE

1.1 This procedure is designed to protect the health and safety of AIRDE Mechanical Services employees and outside contract or personnel. This policy will assist personnel in preparing for confined space operations and conducting these operations effectively. This policy will be considered our “Code of Practice” for confined space. No policy can replace training and judgment.

2.0 SCOPE

2.1 This policy applies to AIRDE employees engaged in confined space operations at any location on or off company property. All contractor personnel engaged in confined space operations on AIRDE property or involving confined spaces under the substantial control of the company will comply with all aspects of this policy.

3.0 RESPONSIBILITY

3.1 The Managing Director or his/her designee is responsible for maintaining the validity of this procedure. The Operations Coordinators are responsible to ensure personnel are adequately trained in Confined Space prior to starting a job. The Managing Director or his/her designee is responsible for managing the training records.

4.0 PROCEDURE

4.1 Definitions

4.1.1 Attendant – An individual station outside the confined space that monitors the entrants inside the confined space. There must be at least one attendant for each confined space. Attendants must meet AIRDE training requirements to perform this job.

4.1.2 Entrant – An employee who is authorized by AIRDE Mechanical Services. to enter a confined space.

4.1.3 Blanking or Blinding – The absolute closure of a pipe, line or duct, by fastening across it's bore a solid plate or “cap” which completely covers the bore; which extends at least to the outer edge of the flange at which it is attached; and which is capable of withstanding the maximum upstream pressure.

4.1.4 Depending on the jurisdiction, a confined space is an enclosed space or partially enclosed space that has one or more of the following characteristics;

- Is not designed for human occupancy
- Has limited or restricted means for entry or exit
- Has one or more of the following characteristics:
 - o Contains or has a known potential to contain a hazardous atmosphere
 - o Contains a material with the potential for engulfment of an entrant
 - o Has an internal configuration such that an entrant could be trapped
 - o Asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section
 - o Contains any other recognized serious safety or health hazard.

4.1.5 Double block and bleed – The closure of a line, duct or pipe by locking and tagging a drain or vent that is open to the atmosphere in the line between two locked-closed valves.

4.1.6 Emergency – Any occurrence (including any failure of hazard control or monitoring equipment) or event(s) internal or external to the confined space that could endanger entrants.

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4.1.7 Entry – The act by which a person intentionally passes through an opening into a confined space. The entrant has entered as soon as any part of the entrant’s face breaks the plane of an opening into the space.

4.1.8 Hazardous atmosphere – An atmosphere that exposes employees to a risk of death, incapacitation, injury or acute illness from one or more of the following causes:

- An atmospheric oxygen concentration below 19.5 % or above 22.5%. Note that these limits may vary depending on the province/ state or jurisdiction.
- A flammable gas, vapor, or mist in excess of 10% of its lower explosive Limit (LEL)
- An atmospheric concentration at or above the permissible exposure limit of any substance considered toxic
- An airborne combustible dust at a concentration that obscures vision at a distance of five feet (1.52M) or less
- Any atmospheric condition recognized as immediately dangerous to life or health

4.1.9 Hot work permit – The written authorization to perform operations that could provide a source of ignition, such as riveting, welding, cutting, burning or heating.

4.1.10 Inerting or Purging – Rendering the atmosphere of a confined space non-flammable, non-explosive or otherwise chemically non-reactive by displacing or diluting the original atmosphere with steam or a gas that is non-reactive.

4.1.11 In-plant rescue team – A group of employees designated, organized, and trained to perform rescues from confined spaces in their facility.

4.1.12 Isolation – The separation of a permit space from unwanted forms of energy that could be a serious hazard to permit space entrants. Isolation is usually accomplished by blanking or blinding; removal or misalignment of pipe sections or spool pieces; double block and bleed; or lockout and/or tag-out.

4.1.13 Line breaking – The intentional opening of a pipe, line or duct that is or has been carrying flammable, corrosive or toxic material, an inert gas, or any fluid or gas at a pressure or temperature capable of causing injury.

4.1.14 Oxygen deficient atmosphere – An atmosphere containing less than 19.5% oxygen by volume.

4.1.15 Retrieval line – A line or rope secured at one end to the worker by a full-body harness, or wristlets, and with its other end secured to either a lifting (or other retrieval) device, or to an anchor point located outside the entry portal to the confined space.

4.2 Hazard Assessment

4.2.1 If a worker is required to enter a confined space or a restricted space to work, a supervisor must appoint a competent person to conduct a Confined Space Survey. MSF-006 Confined Space Evaluation Survey Form.

- Identify and assess the hazards the worker is likely to be exposed to while in the confined space or restricted space
- Specify the type and frequency of inspections and tests necessary to determine the likelihood of worker exposure to any of the identified hazards
- Perform the inspections and tests specified
- Specify the safety and personal protective equipment required to perform the work
- Identify the personal protective equipment and emergency equipment to be used by a worker who undertakes rescue operations in the event of an accident or emergency.
- If changes occur, the space is to be re-evaluated

4.3 Confined Space Identification Marking

4.3.1 AIRDE Mechanical Services. has evaluated the entire facility and identified the following as

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confined spaces:

- A survey form was completed for each confined space. A sample survey form is attached to this policy. Each survey form is on file.
- Each confined space listed is posted at each entry point with a sign indicating that the area is a confined space and that a written permit is required for entry. No personnel are permitted to enter a confined space without a written permit. “DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER”

4.4 Permit System

4.4.1 The AIRDE Mechanical Services. has prepared and made available a written confined space entry permit. This permit will be completed for any confined space entry. Any authorized entrant or attendant, whether an employee of AIRDE Mechanical Services. or a contractor, may begin the permit process by requesting a permit from their supervisor or the safety department. MSF-005 Confined Space Permit (CSP)

4.4.2 The written permit contains five major sections:

- General Information
- Atmospheric Monitoring
- Isolation of the Space
- Hazards of the Space
- Equipment Required

4.5 General Information

4.5.1 This section is for recording general information about the confined space and the work project. The permit expiration date and time are established at the time the permit is approved. This time will normally be the end of the work shift. The date and time that the permit is started should be entered, the confined space identifying number, the estimated duration of the entry, and the actual completion time and date.

4.5.2 The location of and a general description of the space should be filled in. A short description of the purpose for entering the confined space is also recorded.

4.5.3 The names of each entrant and attendant involved in this entry are listed. The names of the person in charge, work crew supervisor, area supervisor, and person monitoring the atmosphere are all listed.

4.5.4 If hot work will be involved in the project, the permit number, a description of the hot work will be filled in, and a copy of the hot work permit attached.

4.5.5 If the person in charge feels that a review of the entry operation is necessary, they may request a review by the safety or industrial hygiene department. If this is done the reviewer should sign the form where indicated.

4.5.6 List the alarm device available for the attendant and the location of the nearest phone. The in-plant rescue team and outside rescue team phone numbers must be listed.

4.5.7 The person in charge must check off that they have confirmed the training qualifications of all personnel involved in the project and have conducted a pre-entry briefing of all personnel.

4.6 Atmospheric Monitoring

4.6.1 This section is divided into prior to entry and retest areas. Both areas are identical. If initial prior to entry monitoring indicates that the atmosphere is within safe limits it is not necessary to record the results of additional monitoring.

4.6.2 The oxygen and flammable blocks allow recording of these standard test readings. The acceptable range is indicated in small type within each block.

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4.6.3 Toxic materials must be specifically identified by chemical name. The SDS column is to be checked off indicating that the person in charge has reviewed the SDS on the chemical. The permissible exposure limit (PEL) for the chemical is recorded in the column marked PEL. The next column is for recording actual monitoring results.

4.6.4 Identifying information on the instrument(s) used for atmospheric monitoring must be completed. A check on the last calibration date is also required.

4.6.5 The retest section is only used if initial readings were not within acceptable ranges.

4.7 Isolation of the Space

4.7.1 The major external connections to the space are listed. Each segment includes the more common methods to secure the connection. The person in charge will evaluate the operation and circle all the actions that must be taken. As each action is completed the block should be checked off.

4.8 Hazards in the Space

4.8.1 Record the specific material that is or was most recently in the confined space and record any other hazards not covered in the below categories. The contents, configuration, and nature of work blocks allow the person in charge to circle any hazards that may be an issue during this entry.

4.9 Equipment Required

4.9.1 This section is divided into respiratory protection, personal protective equipment (PPE), lighting, ventilation, entry equipment, and rescue equipment. Check off the blocks for any equipment required for this entry. The bottom part of this section labeled “Other” is to write in item not covered in the check off area.

4.9.2 When all items have been completed the person in charge will sign the form at the bottom and post the permit next to the entry to the confined space. The permit must be returned to the safety office after the project is completed.

4.10 Operating Procedure

4.10.1 General Rules:

- Monitor the atmosphere in the confined space continuously during operations
- Use proper personal protective clothing and equipment
- Have an attendant on standby during the entire operation
- Ventilate the space with fresh air (if required)
- Isolate the space from external connections
- Use adequate lights with a back up
- Eliminate or control all hazards
- Maintain constant communications between the attendant and entrants
- Plan for emergencies
- Have rescue equipment available and ready for use

4.10.2 Atmospheric Monitoring

4.10.2.1 Atmospheric hazards account for the largest percentage of fatalities in confined space accidents. Attention to this area is critical. Atmospheric monitoring must always be done prior to entry into a space the first time and continuously while work is being performed in the space. Testing will be for oxygen content and flammable gases or vapors.

4.10.2.2 If the hazard assessment identifies a potential atmospheric hazard and a worker is required or authorized by the supervisor to enter the confined space, the supervisor will ensure that a competent worker performs a pre-entry atmospheric test of the confined space to:

- Verify that the oxygen content is between 19.5 percent and 22.5 percent by volume

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- Identify the amount of toxic, flammable or explosive substance that may be present.
- 4.10.2.3 The supervisor will ensure that as often as necessary after the first time a worker enters the confined space, a competent worker:
 - Performs the atmospheric testing every 30 minutes or more often as determined on the MSF-003 (JHA)
 - Records testing results on the confined space permit
 - Identifies and records any additional hazards
- 4.10.2.4 The supervisor will ensure that if there is a potential for the atmosphere to change unpredictably after a worker enters the confined space, the atmosphere is continuously monitored.
- 4.10.2.5 The supervisor must ensure that a confined space is inerted if it is not reasonably practicable to eliminate an explosive or flammable atmosphere within the confined space through another means.
- 4.10.2.6 If a confined space is inerted, the supervisor will ensure that:
 - Every worker entering the confined space is equipped with supplied air respiratory protection equipment that complies with applicable standards such as NIOSH, CSA, etc. Standards
 - All ignition sources are controlled
 - The atmosphere within the confined space stays inerted while workers are inside
- 4.10.2.7 If a toxic contaminate may be present a copy of the Safety Data Sheet (SDS) will be available on the job site. The person in charge will find the permissible exposure limit on the SDS and enter it on the confined space permit form. A method for monitoring the toxic material will be identified and used. If necessary, the person in charge will contact the safety or industrial hygiene department for assistance.
- 4.10.2.8 Always monitor for:
 - Oxygen concentration between 19.5% and 22.5%.
 - Flammable gases or vapors below 10% lower explosive limit (LEL).
 - Inspect atmospheric monitoring equipment prior to use. If the instrument(s) were not calibrated within the last 30 days they must be calibrated prior to use. Allow the gas detection equipment to warm up according to the manufacturers' instructions.
 - Monitor the atmosphere in the area of the confined space prior to opening the entry to the confined space. If you detect an unacceptable atmosphere, find and correct the problem prior to opening the confined space.
 - Open the entry to the confined space and monitor the atmosphere just outside the opening. Continue monitoring as you lower the monitor slowly through the entire height of the space. If detected prior to entering the space. After correcting the problem retest the atmosphere. Continue this cycle until you obtain acceptable atmospheric readings.
 - At least one entrant will wear an atmospheric monitor during operations in the confined space.
 - If operations are suspended for thirty minutes or more monitor the atmosphere again prior to reentering the space.
- 4.10.2.9 Monitor atmosphere:
 - Prior to opening confined space
 - In all areas inside confined space
 - Prior to entry of a confined space
 - Continuously during operations.

4.11 Personal Protective Equipment (PPE)

- 4.11.1 The person in charge will identify required personal protective equipment. Entrants and attendants are responsible for obtaining and properly using any required personal protective equipment.

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4.12 Hazard Elimination and Control

4.12.1 The person in charge will identify all potential hazards concerning the confined space. Each hazard will be eliminated or controlled. Hazards may exist in any of the following categories:

- Atmospheric conditions
- Contents or residual contents
- Potential energy
- Environment in the space
- Configuration of the space
- Nature of the work
- External hazards

4.13 Atmospheric Hazards

4.13.1 If atmospheric testing identifies that a hazardous atmosphere exists or is likely to exist in a confined space, the confined space will need to be ventilated, purged, or both before a worker enters the confined space.

4.13.2 If ventilating or purging a confined space is impractical or ineffective in eliminating a hazardous atmosphere, any worker who enters the confined space must wear personal protective equipment appropriate for the conditions within the confined space. This PPE will be selected by reviewing the MSF-003 (Job Hazard Analysis).

4.13.3 Forced fresh air ventilation is the first option for correcting an atmospheric hazard. Place the ventilator outside the space with the inlet six to ten feet from the entrance to the confined space. Extend the flexible duct from the outlet of the ventilator into the confined space. Ideally the end of the duct should be suspended approximately two feet above the bottom of the space. Ventilate the space for at least ten minutes and test the atmosphere. Continue until the atmosphere is acceptable. Ventilation should continue during the entire confined space operation.

4.13.4 If the space is oxygen deficient and ventilation will not correct the problem personnel will need to wear respiratory protection. If a flammable vapor or gas is present the space may need to be inerted.

4.13.5 Ventilation principles:

- Force fresh air into space
- Make sure source air is fresh
- Get air flow to bottom of space
- Use continuously

4.14 Contents and Residues

4.14.1 All contents should be removed from the space when possible. Clean interior surfaces from outside the space prior to entry when practical. Entrants must assume that residues may be present and protect themselves from contact with harmful materials. Isolate the space from all potential for fill or removal of contents during the confined space operation.

4.14.2 Contents and residues:

- Remove contents
- Clean space
- Isolate space
- Protect personnel from contact with materials

4.15 Potential Energy

4.15.1 All potential energy sources must be secured. Potential energy sources include:

- Electrical equipment and circuits

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- Hydraulic equipment and systems
- Pneumatic equipment and systems
- Mechanical equipment and systems

4.15.2 Follow the procedures in the Lock-out/Tag-out policy when appropriate.

4.15.3 Environment in the Space

4.15.3.1 Entrants will need to address any safety issues that the environment inside the space may create. Examples include:

- Slippery surfaces
- Extreme temperatures
- Extreme surface temperatures.

4.15.4 Configuration of the Space

4.15.4.1 The configuration of the space can make safe operations more difficult. Use particular care when any of the following are present:

- Unusual shape or slope
- Low overhead clearance
- Drop off in floors
- Complex layout

4.15.5 Nature of the Work

4.15.5.1 Extra caution is required if your work will include extra hazards or potentially dangerous equipment.

4.15.6 External Hazards

4.15.6.1 External hazards such as vehicle traffic, machinery, equipment, and processes may increase the hazards of the confined space entry. External hazards must be secured prior to entering the confined space.

4.16 Specific Confined Spaces

4.16.1 All specific confined spaces that require special procedures beyond the general operating procedures in this policy should be identified here and the special procedures outlined.

4.17 Emergencies

4.17.1 The supervisor must ensure that the emergency response plan includes the emergency procedures to be followed if there is an accident or other emergency.

4.17.2 These procedures should be in place to ensure a safe evacuation of the confined space or restricted space immediately.

4.17.3 The emergency response plan must be reviewed prior to the commencement of the work.

4.17.4 The emergency response plan may state that an evacuation will be mandatory when the following conditions occur:

- When an alarm is activated.
- If the concentration of oxygen inside the confined space drops below 19.5 percent by volume or exceeds 22.5 percent by volume.
- If there is a significant change in the amount of hazardous substances inside the confined space.
- An emergency exists anytime a situation occurs which threatens or may threaten the health or safety of any personnel involved in the confined space operation whether they are inside the confined space or outside the confined space.
- Hazardous substance readings exceed permissible levels.
- Unauthorized person enters confined space.
- Loss of communication of entrants.
- Other emergencies on site such as a fire, hazardous gas release, structural collapse, etc.

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4.17.5 When an emergency occurs the attendant will immediately:

- Call for the evacuation of all entrants; prevent anyone from entering the space unless they are a trained authorized member of a rescue team.
- If the injured individual is connected to a retrieval device it should be used to retrieve them immediately, if the entrant is in plain sight.
- Notify the person in charge.
- Notify the **AIRDE** Mechanical Services. rescue team, and call the designated outside rescue team if necessary. These personnel will conduct the rescue operations.

4.17.6 Under no circumstances, will the attendant ever enter the confined space to attempt a rescue!

4.17.7 If non-entry is not possible, entrants must wear a full body harness with a retrieval line secured to the back.

4.18 Training

4.18.1 Each entrant, attendant, and person in charge will receive initial training on their duties and responsibilities. Training will include coverage as described for each position below. Training will be performed prior to the individual being assigned to work on confined space projects. All individuals will train or qualify in accordance with the **AIRDE** Safety approval. The person in charge will confirm that any contractor personnel have been trained to at least the level required for employees of **AIRDE** Mechanical Services personnel for their respective positions. Record of training will be held at the Corporate Head Office.

4.18.2 Rescue training will be revalidated on an annual basis; this can be conducted through drills.

4.18.3 General Employees

4.18.3.1 All employees will receive training concerning this confined space policy prior to confined space assignment.

4.18.3.2 Confined Space Awareness Training for general employees must include:

- Confined space identification
- Policy prohibiting entry by employees not specifically trained for confined space operations

4.18.3.3 Confined Space Awareness Training shall be provided as required.

4.18.4 Entrants

4.18.4.1 Confined space entry training is valid for 2 years.

4.18.4.2 Training for entrants will cover all duties assigned and include:

- Hazard recognition and control
- Communications
- Atmospheric monitoring
- Safe work practices
- Evacuation
- Emergency procedures
- Personal protective clothing and equipment

4.18.5 Attendant (Safety Watch)

4.18.5.1 Confined space attendant training is valid for 2 years.

4.18.5.2 Training for attendants will cover all duties assigned and include:

- Hazard recognition and control
- Communications
- Personal protective clothing and equipment
- Atmospheric monitoring
- Safe work practices
- Entrant retrieval
- Emergency procedures

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4.18.6 Entry Supervisor

4.18.6.1 Confined space entry supervisor training is valid for 2 years.

4.18.6.2 Training for person in charge will cover all duties assigned and include:

- Hazard recognition and control
- Communications
- Personal protective clothing and equipment
- Atmospheric monitoring
- Safe work practices
- Work planning and supervision
- Entrant retrieval
- Emergency procedures

4.19 Duties

4.19.1 Entrant

4.19.1.1 Personnel entering a confined space are responsible for the following:

- Wear appropriate protective clothing and equipment properly
- Maintain contact with attendant
- Follow instructions of the attendant in the event of an emergency
- Use safe work practices at all times
- Sign the Confined Space Permit

4.19.2 Attendant (Safety Watch)

4.19.2.1 An attendant will be a competent person trained in the evacuation procedures in the emergency response plan as well as the general duties of an attendant. When employed this person will be located outside the confined space near the entrance.

4.19.2.2 For every confined space or restricted space entry, the supervisor will designate a competent worker to be in communication with a worker in the confined space or restricted space.

4.19.2.3 An employer must ensure that the designated worker has a suitable system for summoning assistance.

4.19.2.4 The supervisor must ensure that a competent worker trained in the evacuation procedures in the emergency response plan is present outside a confined space, at or near the entrance, if:

- The oxygen content of the atmosphere inside the confined space is less than 19.5 percent by volume.
- The oxygen content of the atmosphere inside the confined space is greater than 22.5 percent by volume.
- The concentration of a substance inside the confined space is greater than its permissible exposure limit.
- A hazard is identified by the hazard assessment and the hazard cannot be eliminated or effectively controlled.

4.19.2.5 The supervisor will ensure that the attending worker:

- Keeps track at all times of the number of workers inside the confined space.
- Is in constant communication with the workers inside the confined space.
- Has a suitable system for summoning assistance.

4.19.2.6 Personnel in the role of attendant during a confined space operation are responsible for the following:

- Maintain an accurate count of entrants in the confined space and the time they entered the space
- Record all atmospheric conditions results every 30 minutes on the **AIRDE** Atmospheric Monitoring form. These forms must be retained and collected by the supervisor at the end of each shift.
- Monitor the activities of entrants from outside the confined space,

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- Order entrants to evacuate the confined space immediately when they:
- Observe a condition that is not allowed in the entry permit.
- Detect a situation outside the space that could endanger the entrants.
- Detect an uncontrolled hazard within the permit space.
- Monitoring entry in more than one space and must focus attention on the rescue of entrants from one of those spaces; and must leave the workstation.
- Unauthorized entry of a person.
- Prevent unauthorized personnel from entering the confined space or work area.
- Monitor the atmosphere in the confined space.
- Watch for any hazards that may affect the confined space operation.
- Keep a visual watch of the workers in the confined space. They must be in direct communication with them either by face-to-face verbal communication, life line signals or by radio. In cases of emergency evacuation, an air horn will be used. Three short blasts indicate an immediate evacuation. The use of the air horn will advise other members of the rescue team that assistance may be required. All air horn activations must be followed up with radio communication.
- Call for help if an emergency occurs.
- Use a retrieval device from outside the confined space to retrieve an injured entrant.
- Ensure barriers and signs are in place to prevent unauthorized access of vehicles and pedestrians around the vicinity of the confined space.
- If an unauthorized person enters the space, the entire space must be evacuated immediately. An investigation will be held to determine how and why the person entered the space. No other entry is permitted without the express consent of the AIRDE Supervisor and the Client's representative.
- The attendant must not leave the confined space until all the entrants have exited it or the attendant has been relieved by another competent attendant.
- If the space is evacuated due to breaks, lunch, shift change, etc.... it must be secured. If this is not possible, then it must be barrier and a warning sign must be posted. Testing of the space must be conducted prior to the re-entry of workers to ensure conditions have not changed.

4.19.3 Entrant Supervisor

4.19.3.1 The person in charge during a confined space operation is responsible for the following:

- Evaluate the need for entry into the confined space.
- Ensure that all work preparations that are necessary to complete the job in the minimum time with a single entry have been completed.
 - Obtain a confined space permit form.
 - Complete the confined space permit
 - Check training qualification of all entrants, attendants, and contractor employees.
 - Conduct a pre-entry briefing of all personnel reviewing
 - Hazards
 - Required PPE
 - Hazard control
 - Operating procedures
 - Emergency procedures

4.19.3.2 Assure that a safe means of entry and exit is available to all workers required to work in confined space and rescue personnel attending to the workers. Examples of methods to ensure safety include secured steps, temporary platforms and handrails may be suitable in certain circumstances, and ensuring the area is free from traffic hazards.

4.19.3.3 Assure that the confined space is returned to operating condition when the job is completed.

4.19.3.4 Return the confined space permit to the Operations Coordinator.

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4.19.3.5 The site supervisor will ensure that personnel assigned to perform or assist in a confined space or a restricted space emergency holds the following competencies:

- Standard first aid
- The use of appropriate emergency response equipment
- Procedures appropriate to the confined space or restricted space
- Confined Space Rescue Training
- Specific training on the on-site rescue equipment provided
- Emergency procedures (AIRDE & Client's Emergency procedures)
- Communication

4.19.3.6 All personnel not assigned to duties related to emergency response but may working around confined spaces must have as a minimum and confined space awareness course.

4.20 Equipment

4.20.1 Personal Protective Equipment

- Self-contained breathing apparatus
- Airline breathing apparatus
- Full-Face respirators
- Half-Mask respirators
- Hard hats
- Safety glasses
- Goggles
- Face shields
- Coveralls
- Chemically resistant coveralls
- Disposable coveralls
- Gloves, leather
- Gloves, chemically resistant
- Safety shoes
- Booths, chemically resistant

4.20.2 Confined Space Entry Equipment

- Gas detector
- Ventilator
- Ventilator duct
- Saddle vent
- Tripod
- Retrieval device
- Rope
- Body harness
- Wristlets
- Hand lights
- Flashlights

4.20.3 Rescue Equipment

- Tripod
- Retrieval device
- Rope
- Body harness
- Wristlets
- Hand lights

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- Flashlights
- Cervical collar
- First Aid Kit
- SKED litter

4.21 Inspection

4.21.1 Equipment designated for use in confined space operations will be inspected prior to each use by the operating personnel on the job. The designated job supervisor will be responsible for inspecting all confined space equipment at least monthly. A record of this monthly inspection is maintained in the safety office. Record of daily inspection of atmospheric monitoring equipment shall include a field calibration of each instrument.

4.21.2 All PPE and emergency equipment required for use in a confined space is to be inspected by a competent person before workers enter a confined space.

4.21.3 Maintenance

4.21.3.1 Equipment requiring maintenance will be turned into the safety department immediately.

4.22 Contractor Operations Involving Confined Spaces

4.22.1 Provide to Contractor

4.22.1.1 Information on all confined spaces that may be involved in the project. Provide copies of your documents:

- Hazard evaluation of these confined spaces
- Confined space safety policies and procedures
- Procedures for entry into these confined spaces
- Safety Data Sheets for any chemicals in the area of the job
- Lock-out/tag-out policy and procedures

4.22.2 Get from Contractor

4.22.2.1 Copies of their:

- General safety procedures and policies
- Confined space entry policies and procedures
- Permit entry program
- Permit
- Training certification for all involved personnel

4.22.2.2 At least one contractor employee on the job site must be certified as an entry supervisor.

4.22.2.3 Hot work procedures and permit if the job involves hot work.

4.22.2.4 Names of past customers where they have done work involving confined spaces.

4.22.2.5 List of confined space safety equipment they will provide for use on your job.

4.22.2.6 Emergency procedures they will use on your job.

4.22.2.7 A statement indicating that they have never been cited by Federal or Provincial Safety Compliance Agencies for any confined space safety infraction. If they have been cited previously, get a copy of the citation and a statement from the contractor describing the corrective action they have instituted.

4.22.3 Ensure Your Agreement Includes

4.22.3.1 A statement signed by the contractor indicating that they assume primary responsibility for compliance with local, state and federal regulations concerning employee safety and health and

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environmental issues.

4.22.3.2 A statement signed by the contractor that they have received and understand the items mentioned above that must be provided to the contractor.

4.22.3.3 If the project will involve joint operations with your personnel and the contractor these operations must be coordinated.

4.23 After Work

4.23.1 Meet with the contractor to review safety issues that they were involved with.

4.24 Record Keeping

4.24.1 All records must be kept for 6 years in accordance to the **AIRDE** Mechanical Services. The following records kept include:

- All Atmospheric Testing Result sheets
- Job Hazard Analysis
- Rescue plans
- Confined Space Entry records
- Incident reports related to the job
- All confined space permits (Note: Client will probably retain their own permits)

5.0 REFERENCES

MSF-005 Confined Space Permit Form

MSF-006 Confined Space Evaluation Survey Form.

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MSP-006 SYNTHETIC FIBER HANDLING PROCEDURE

1.0 PURPOSE

1.1 The purpose of this procedure is to provide a safe and healthy work environment by outlining the safe work practices and general responsibilities for handling synthetic mineral fibers (SMF).

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** crew and contractors required to follow **AIRDE** procedures for handling SMF. Disposal and storage of SMF is excluded from this procedure.

2.2 **AIRDE** is not to disturb (remove, repair, install, mix) insulating materials until they have been tested to be asbestos free.

3.0 RESPONSIBILITY

3.1 The Operations Coordinator in conjunction with the Field Supervisor is responsible for completing a Safe Job Plan prior to initiation of the project.

3.2 The Supervisor is responsible for a complete understanding of the scope of work, related procedures, documentation as required on site and facilitating a daily Job Hazard Analysis (MSF-003 JHA) and Tailgate Meeting with the crew.

3.3 All personnel are responsible to adhere to the elements of this procedure and wear appropriate PPE when handling SMF.

3.4 The Client is responsible for providing the SDS's as requested, communicating the type and thickness of the insulation, communicating if heat trace is beneath the insulation, reviewing the checklist from Appendix "A", ensuring appropriate PTW's are organized and advising personnel when the potential of exposure to SMF is probable.

3.4.1 Bulk samples of insulating materials must be analyzed for asbestos prior to disturbance, removal, repair, and installation. All bulk samples must be collected by a Certified Asbestos Consultant. If immediate removal or clean-up is required, the job shall be given "A priority" to ensure that it is completed quickly. In these cases, the Certified Asbestos Consultant may assume the material is asbestos to expedite the project. If documentation (analytical results or SDS) is available to confirm that the material is asbestos free, no bulk sampling is needed.

3.4.2 Not all regulatory agencies recognize client site practice of identifying non-asbestos containing pipe and vessel insulation with blue bands. Therefore all insulation must be assumed to be asbestos containing, unless documentation for a specific unit has been verified to confirm the unit is 'Asbestos Free'. In addition, all insulating materials must be assumed to contain asbestos and therefore analyzed for asbestos.

4.0 PROCEDURE

4.1 Definitions

4.1.1 Synthetic Mineral Fibers (SMF): Are a class of insulation material used widely in residential and industrial settings. It is made primarily from glass, rock, slag, or clay;

4.1.2 Calcium Silicate (Cal-sil): Most often used for piping insulation;

4.1.3 Insulations: Chalk like blanket insulation now replacing Cal-sil insulation on piping and vessels, as well as fibrous glass insulation blankets;

4.1.4 Mineral Wool: Refers to rock wool and slag wool produced by melting and fiberizing iron ore furnace slag or siliceous limestone;

4.1.5 Fibrous glass: Is composed of mainly borosilicate glass. Fibrous glass is most often used in removable insulating pads and vertical columns;

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4.1.6 Disturbance: Is any activities that may disrupt the matrix, crumble or pulverize, or generate visible debris from the insulating material.

4.2 Common Types of SMF

4.2.1 Different types of SMF present varying degrees of hazards. The handling procedures presented in this procedure is based on fiber type.

CLASS Type Use/Location I

Refractory Ceramic Fiber (Fired or Unfired) - Gunit

Heaters and Furnaces

Fireproofing II

Mineral Wool (including Rock and Slag) - Calcium Silicate

Pipe and Vessel Insulation

Blue-banded Insulation (see note) III Fibrous Glass

4.3 Exposure Limits

4.3.1 Where exposure limits differ between US OSHA limitations, state limitations, or SDS requirements, the most stringent of the limitations shall apply. Note:

- The current Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) for Calcium Silicate is 15 milligrams per cubic meter (mg/m³) of air (total dust) and 5 mg/m³ (respirable fraction) as an 8-hour time-weighted average (TWA) concentration;
- The US OSHA standard for amorphous silica is: (80 mg/m³)/(%SiO₂). The NIOSH Sampling Method 7501 for Amorphous Silica calculates the %SiO₂ based on the percentage of crystalline silica in the sample. Because the percentage of crystalline silica in aerogel is 0%, OSHA's particulate limits of 15 mg/m³ (total dust) and 5 mg/m³ (respirable dust) apply to Aerogel exposure. The US National Institute for Occupational Safety & Health (NIOSH) standard for amorphous silica is 6 mg/m³.

4.4 Personal Protective Equipment

4.4.1 General

4.4.1.1 Protective equipment is not to be regarded as a substitute for control measures to reduce exposure levels.

4.4.2 Respiratory Protection

- Respirators shall be NIOSH certified and selected in accordance with local legislation. At minimum, respirators shall be ½ mask and air purifying type with HEPA filters N100/P100.
- Respirators shall be correctly fitted, maintained in good condition, and kept in clean storage when not in use.
- Personnel may require a medical examination prior to fit testing.

4.4.3 Hand Protection

- Employees are required to wear nitrile, latex or other impermeable gloves. Barrier creams shall also be worn to reduce skin contact;
- Kevlar sleeves shall be worn for wrist and arm protection.

4.4.4 Body Protection

- Long-sleeved, long-legged work clothes shall be worn to reduce exposure to skin as much as possible.
- Disposable clothing such as boot covers and coveralls shall be worn as appropriate to minimize contamination to clothing.

4.4.5 Eye Protection

- Splash proof chemical goggles or face shields shall be worn to avoid eye irritation or injury, especially when performing overhead work.

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- For work conducted inside a heater/furnace- a full-face respirator equipped with HEPA filter shall be worn. For work that is conducted outside the heater/furnace, a half-face respirator equipped with HEPA filter shall be worn.
- For work involving mixing and installing refractory ceramic fibers and gunite (Fireproofing) materials, a full-face respirator with HEPA Filter is to be worn.

4.5 Monitoring

- 4.5.1 When installing/removing of refractory ceramic fiber materials in heater/furnaces, support personnel must be stationed immediately outside the work area and must use half-face respirators in addition to other standard protective gear.
- 4.5.2 Air monitoring is not required when it has been clearly established that the work practices are suitable to minimize exposure to personnel. In the event that the respirable fiber levels exceed the permissible limit(s), then the Safe Job Plan (MSF-004 SJP) shall identify the applicable monitoring methods and PPE.
- 4.5.3 When monitoring is necessary, the employer shall ensure that each employee who works with SMF is kept informed of the results of all monitoring and assessment of exposure. The employer shall explain what measures are being undertaken to minimize the risk of excessive SMF exposure where this exists.
- 4.5.4 Records of monitoring shall be kept in the employees file for the life time of the person.
- 4.5.5 Measures of exposure shall be determined over a minimum sampling period of 4 hours during which time one or more consecutive samples may be collected to ensure a representative sample is obtained and hence a time-weighted average (TWA) result can be calculated.
- 4.5.6 Monitoring shall be done by a competent person.

4.6 Work Procedures

- 4.6.1 Hazard Mitigation (MSF-003 JHA) and (MSF-004 SJWP) must reference and mitigate hazards unique to SMFs
- 4.6.1.1 The Operations Coordinator, in conjunction with other relevant personnel such as the Site Supervisor, relevant contractors, etc., shall conduct a task hazard assessment for any work involving handling SMF. MSF-003 JHA and MSF-004 SJWP are living documents which will be updated as the scope of work changes. At minimum, this assessment will identify known hazards and identify controls to manage or mitigate risks. Positions responsible for the controls shall be identified for accountability.
- 4.6.2 Safe Job Work Plan (MSF-004 SJWP)
- 4.6.2.1 The Operations Coordinator in conjunction with the, Field Supervisor is to complete a Safe Job Plan to achieve the lowest workable exposure levels to SMF. At minimum, the SJP is to include:
- Reference to this procedure;
 - Reference to the applicable SDS i.e. Pyrogel XT and Thermo-12 Calcium Silicate Insulation;
 - The provision of engineering controls, such as local exhaust ventilation;
 - Attention to cleanliness and the containment of waste material;
 - Work practices to reduce the liberation of fiber i.e. using pre-cut insulation whenever possible, cutting with hand tools versus power tools, etc.;
 - Provision of appropriate personal protective equipment;
 - Estimated duration of the SMF work;
 - Confirmation of site arrangements, for example, training, storage, personal protective equipment, eye wash areas, site nurse, use of Axiom Medical Support Program, etc.;
 - Consideration as to the probable fiber levels which may be present during the project. This information should be provided by the client and should note;
 - The proportion of respirable fiber in the product;

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– The extent of any binders, cladding or sealants.

- Consideration of protection of the health and safety of employees not directly working in the SMF process; i.e. containing the area as much as possible.

4.6.2.2 The SJP shall also determine if site monitoring is required. This can be accomplished by:

- Checking available information with the client to determine whether the job has previously been assessed for typical air concentrations;
- Where reasonable doubt still exists as to the levels of exposure, monitoring of fiber levels shall be undertaken in accordance with accepted practices. Air sampling shall be undertaken by adequately trained personnel in accordance with local regulations.

4.6.3 Job Hazard Analysis (MSF-003 JHA)

4.6.3.1 The Field Supervisor is to complete the MSF-003 JHA with the crew at the site; the SDS', the Safe Job Plan (MSF- 004 SJWP) and this procedure is to be reviewed again by the crew so that full awareness of the hazards is understood and confirmation that planned controls is adequate.

4.6.4 Worksite Controls

4.6.4.1 General

4.6.4.2 Appropriate safety paperwork is to be completed with the client prior to initiating the project i.e. client permit, JHA(MSF-003) and SDS is to be readily available to all crew.

4.6.4.3 Engineering

4.6.4.4 The following engineering controls, general housekeeping and work practices shall be adhered to when handling SMF materials:

- Local exhaust is to be used where practical;
- Work practices shall minimize the release of, and exposure to, fibers and/or dust.
- Packaging and transport of materials shall be done so as to minimize the release of fibers and/or dust. This includes lowering bags/containers to the ground level carefully (not dropping);
- Correct tools shall be used for the task. Where required, manual tools shall be used in place of power tools to trim or cut SMF materials to minimize disruption to insulation.
- A HEPA vacuum attachment must be used if power tools are used to disturb ceramic fiber material. Dust suppression methods must be utilized if airborne fibers are released. An example of dust suppression method would be a portable hand operated (Hudson) sprayer.
- SMF materials shall be stored in low traffic areas, and in intact containers or under sheet covers.
- SMF materials to be sprayed or gunned shall be used and handled in a wet, rather than dry, form where workable;
- Work areas shall be cleaned regularly to remove any build-up of fibers and/or dust. Visible waste materials shall be removed promptly to avoid being trampled and spread throughout the work site;
- Cleaning shall be by an industrial vacuum cleaner with Hepa Filter (note Hepa filter shall be treated the same as contaminated material i.e. bagged or cleaned as appropriate). Wet mopping and wiping are acceptable if vacuuming is not workable;
- Waste shall be immediately placed and sealed in plastic bags or other containers which prevent fiber and/or dust emission. Disposal is the responsibility of the client;
- Disposal bags shall be and labelled as per HAZCOM requirements.
- When installing/removing refractory ceramic fiber materials in heater/furnaces, a negative air machine with HEPA filter may be used to create a negative pressure within the work area to prevent fibers from contaminating adjacent areas.
- For work involving mixing and installing refractory ceramic fibers and gunite (Fireproofing) materials, dust suppression methods must be utilized if airborne fibers are released. An example of dust suppression method would be a portable hand operated (Hudson) sprayer.

4.6.4.5 Administrative

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- Exclusion zones must completely surround the jobsite, 10 feet from jobsite 20 to 25 feet when working above ground and signs posted stating “Caution Side/Safe Side” and “Men Working Above/Falling Objects”.
- Where workable, employees not engaged in SMF work shall not be within 3 meters of the SMF work area.
- All entrances to the work area must have signs stating "Respiratory Protection Required Beyond This Point".
- When installing/removing of refractory ceramic fiber materials in heater/furnaces, support personnel must be stationed immediately outside the work area and must use half-face respirators in addition to other standard protective gear.

4.6.4.6 Personal Controls

- Adequate washing facilities shall be available, on site, to wash and treat both skin and eye irritation;
- General hand washing facilities shall be available;
- Amenity rooms shall be kept free of any fibers and/or dust as far as is workable;
- Eating, drinking, use of tobacco products and application of cosmetics shall not be used unless hands, face and arms are thoroughly washed with warm soap and water.

4.7 Removal of SMF products

4.7.1 Procedures to be applied for removal depend on the form of the original SMF insulation installed:

- The two basic forms of SMF insulation are bonded and un-bonded. The bonded form is where adhesives or cements have been applied to the SMF before delivery and the SMF product has a specific shape. The un-bonded form has no adhesives or cements and the SMF is loose material packed into a package. The un-bonded form can be packed loose or mixed with adhesives or cements before, or during, installation;
- Removal of bonded material is easier and less hazardous. Any physical abrasion, including cutting, shall be kept to a minimum during removal. Such removal can be performed in a dry condition if there is minimal physical abrasion. Only in circumstances where heat or other causes have made the bonded SMF attach itself to the substrate shall physical abrasion take place. If this occurs, removal shall be performed as for un-bonded SMF removal;
- Removal of un-bonded material is difficult and more hazardous. The un-bonded material shall be thoroughly wetted before removal takes place. Dry removal may be necessary when there are electrical and heat considerations. Increased respiratory protection may be necessary when working in enclosed or poorly ventilated spaces or where the SMF insulation has undergone physical change.

4.8 Rope Access Specific Techniques

4.8.1 Rope Access work shall comply with the IRATA guidelines and SPRAT Safe Practices as referenced herein as well as any client specific requirements. Where AIRDE and client specific requirements differ, the most stringent shall apply. Rope Access procedural controls will at minimum require a Safe Job Work Plan, Job Hazard Analysis, and a Rescue Plan.

4.9 Completion of Job

- 4.9.1 Cleaning of the work area shall be completed as per 4.5.3.4;
- 4.9.2 Upon exiting the area of installation and fabrication, place all disposable protective gear in labelled plastic bags, or proper container as per local regulations and/or customer requirements. Rope Access gear brought onto site such as ropes, climbing hardware, helmets and kit bags shall be thoroughly vacuumed or cleaned as per section 4.5.3.4;
- 4.9.3 At the completion of the job, clean the work area in accordance with section 4.5.3.4;

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4.9.4 All personnel shall thoroughly wash hands, face, arms and any other exposed areas before leaving the work site.

4.10 Emergency First Aid Treatment

4.10.1 Emergency services and first aid services shall conform to the requirements of the relevant State or Territory authority, client and SDS recommendations.

4.10.2 Reference is made to AIRDE's Incident Management Procedure for information on incident response, reporting protocols, case management, etc.

4.11 Training

4.11.1 Employees shall be provided with appropriate instruction, training and supervision to enable them to safely perform their tasks. Employees shall be instructed in safe work practices for handling SMF materials and, where necessary, correct procedures for the selection, wearing and maintenance of personal protective clothing and equipment. The extent of instruction and training shall be appropriate to the duties of the individual within the organization and be sufficiently detailed to ensure that the individual understands not only the procedural and safety requirements, but also the reasons for these requirements.

4.11.2 Supervisors and employees who work with SMF shall be provided with adequate information, instruction and training on:

- Any health information relating to SMF handling and/or exposure obtained from labels and SDS;
- The importance of controlling the creation of SMF and/or fibrous dust in the atmosphere to the lowest workable levels;
- The probable exposure levels associated with the type of job;
- How safe work practices, such as control measures, respiratory protective equipment and protective clothing, can be used effectively;
- The role and significance of air monitoring;
- Employer responsibilities; and
- Employee responsibilities.

5.0 REFERENCES

- MSF-003 Job Hazard Analysis
- MSF-004 Safe Job Work Plan
- OSHA [29 CFR 1910.1000, Table Z-1].
- OSHA's Hazardous Waste Operations and Emergency Response Standard [29 CFR 1910.120].
- SDS – as appropriate



ACI RAP Bulletin 6

FIELD GUIDE TO
CONCRETE REPAIR
APPLICATION PROCEDURES

Vertical and Overhead Spall Repair by Hand Application



ACI RAP Bulletin 6
(Reapproved 2010)

Field Guide to Concrete Repair Application Procedures

Vertical and Overhead Spall Repair by Hand Application

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Structural Disclaimer

This document is intended as a voluntary field guide for the Owner, design professional, and concrete repair contractor. It is not intended to relieve the user of this guide of responsibility for a proper condition assessment and structural evaluation of existing conditions, and for the specification of concrete repair methods, materials, or practices by an experienced engineer/designer.

ACI Repair Application Procedure 6.

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Introduction

One of the most common application methods for repairing concrete is by hand troweling mortars. This method can be used to repair spalled or deteriorated concrete (Fig. 1) or to resurface vertical, overhead, and horizontal concrete surfaces. Applying repair materials by hand does not require significant equipment and is ideal for shallow surface repairs, especially in areas with limited or difficult access. While both portland cement-based and resin-based repair mortars have been used for trowel-applied vertical and overhead repairs, this field guide focuses on the application of portland cement-based repair materials.

Before any concrete repair is initiated, the root cause of the damage should be determined with a thorough condition survey of the structure. Typical causes of concrete damage can include corrosion of embedded metals from exposure to chloride ions from deicing salts or sea spray in coastal areas; disintegration from freezing-and-thawing cycles when the concrete is saturated with water; or deterioration from chemical attack. Understanding the cause of the deterioration, the owner's repair objectives, and the in-service environment of the concrete structure will help in the proper selection of repair materials and application methods.

The technique of hand troweling repair mortars requires the selection of a sag-resistant mortar and attention to detail during application to achieve an adequately consolidated repair that is well-bonded to the concrete substrate. The successful installation is a function of good surface preparation, application techniques, curing procedures, and properties of the repair material selected.

What is the purpose of this repair?

Hand-applied repair mortars replace damaged concrete and are generally recommended for thin repairs that are cosmetic in nature. Thin overlays of mortar can also be applied to renovate deteriorated vertical and overhead concrete surfaces. This technique, when properly executed, improves the appearance of the deteriorated structure and provides additional protection to the concrete surface.

When do I use this method?

Structural repair projects generally require other repair methods such as form and cast-in-place, grouted pre-placed aggregate repair, or shotcrete. Experienced workers using wood floats, sponges, or steel trowels can achieve a variety of finishes with trowel-applied mortars. Hand application has been used to repair vertical and overhead surfaces including walls, columns, beams, soffits, and building facades.

Placement thickness can vary depending on the type of materials selected and the size, depth, and orientation of the repair cavity. Placement thickness can range from 1/8 to 2-3/4 in. (3 to 70 mm) on vertical surfaces, and 1/8 to 1 in. (3 to 25 mm) on overhead surfaces in a single layer. Deeper placements may require repair material to be placed in additional layers.

How do I prepare the surface?

The recommended steps in properly preparing the surface to receive a hand-applied mortar are as follows:



Fig. 1—Concrete delamination.



Fig. 2—Bulk concrete removal.

1. *Bulk concrete removal and edge conditioning*— Loose, delaminated concrete should be removed until the substrate consists of sound concrete (Fig. 2). Where corrosion of the reinforcement exists, continue bulk removal along the reinforcing steel and adjacent areas with evidence of corrosion-induced damage that would inhibit bonding of repair materials. Bulk concrete removal should include undercutting the corroded reinforcing steel by approximately 3/4 in. (19 mm). The shape of the prepared cavity should be kept as simple as possible—generally square or rectangular in shape. The edges of the patches should be sawcut perpendicular to the surface to a depth of 1/2 in. (13 mm) to avoid feather edging the repair material (Fig. 3).

2. *Final surface cleaning*— Use abrasive blasting (Fig. 4) to remove residual dust, debris, fractured concrete, and contaminants that prevent proper bonding. If abrasive blasting is not feasible, pressure washing using a minimum 3000 psi (250 MPa) may be acceptable depending on the bond strength required. Blowing with oil-free compressed air or alternately, the use of a vacuum, may be appropriate if dust is still present after the blasting. The final surface texture should be rough, with approximately a 1/4 in. (6 mm) amplitude (Fig. 5) (Concrete



Fig. 3—Edge conditioning.



Fig. 4—Final surface cleaning.

Surface Profile [CSP] No. 6 to 9 per ICRI Technical Guideline No. 310.1R-2008);

3. *Treatment of exposed reinforcement*—Bond-inhibiting corrosion should be removed from the reinforcing steel by an abrasive blasting wire wheel or needle scaler. If the cross-sectional area of the reinforcing steel has been significantly reduced, a structural engineer should be consulted. If a reinforcing steel coating has been specified, apply the coating after the reinforcing steel has been cleaned (Fig. 6).

4. *Substrate saturation*—Most portland cement-based materials require the base concrete to be in a saturated, surface dry (SSD) condition prior to application to prevent a rapid loss of moisture from the repair material and into the substrate. An SSD condition is achieved when the body of the concrete is saturated and free surface water and puddles have been removed from the surface of the concrete. An SSD surface is not recommended if a polymer bonding agent is to be used. When using polymer bonding agents, follow the manufacturer's recommended surface preparation requirements. The general recommendations previously given may be influenced by several factors, including:

- Desired roughness profile of the prepared surface (This may be specified by the manufacturer of the repair product);
- Method of surface preparation, including chipping hammers, abrasive blasting, high-pressure water-blasting, or hydrodemolition;
- Possible contamination of the surface by chemicals, oils, or grease; possible carbonation; and methods of removing contaminants or carbonated concrete;
- Repair material manufacturer's recommendations (Ask for technical data sheets and installation bulletins and read the printed instructions on the packaging.); and
- Treatment of existing cracks and joints.

For additional information, consult the recommendations of the International Concrete Repair Institute (ICRI) Guidelines No. 310.2-1997, "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Overlays," or No. 310.1R-2008, "Guide for Surface Preparation for Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion."



Fig. 5—Properly prepared surface.

How do I select the right material?

Hand- or trowel-applied repair materials are generally proprietary, prepackaged, cementitious products. Portland cement-based materials designed for hand application may also include polymers, silica fume, shrinkage-compensating materials, and other additives for enhanced physical properties and improved handling.

Specifiers, applicators, and owners can consult ACI 546.3R-06, "Guide for the Selection of Materials for the Repair of Concrete," or ICRI Guideline No. 320.2R-2009, "Selecting and Specifying Materials for Repair of Concrete Surfaces," for a useful checklist for prioritizing desired material properties. Manufacturers' technical data sheets should be consulted for material properties.

The physical property requirements such as drying shrinkage, permeability, freezing-and-thawing resistance, and mechanical properties vary from project to project depending on the expected service conditions. The properties critical to the long-term success of the repair should be determined during the evaluation phase and be specified.



Fig. 6—Treatment of exposed reinforcement.

Other factors that may influence the selection of repair materials include desired application thickness, rate of strength gain, ease of application, color, and in-place cost.

For some hand-applied repairs, sealers or decorative or protective coatings may be used to provide additional protection to the base concrete, to enhance aesthetics, or both. When this is the case, confirm the required curing and drying time (or maximum moisture content) with the sealer or coating manufacturer before application commences. For more information, consult ACI 515.1R, "Guide to Use of Waterproofing, Dampproofing, Protective, and Decorative Barrier Systems for Concrete."

What equipment do I need?

Typical equipment needed for hand-applied repair mortars includes:

- A suitable mixer unit such as a drill/paddle/pail combination for small repairs (Fig. 7), or paddle-type mortar mixers for larger applications;
- Air compressor, sawcutting equipment, blades, abrasive blast equipment;
- Water-measuring device to ensure that proper amounts of mixing water are used; and
- Finishing, handling, and testing tools required by the specification or good concreting practices.

Be sure that necessary equipment and tools are on site and in proper working order. Have backup equipment or alternate methods planned and available.

What are the safety considerations?

Concrete repair mortars are hazardous materials and should be treated as such. Job-site safety practices should include the following where applicable:

- Applicable Safety Data Sheet (SDS) should be on hand;
- Machinery and equipment used must have the correct safety guards and warnings in place;
- Workers should wear protective gloves and other clothing needed to prevent skin contact with wet, highly alkaline cementitious materials;



Fig. 7—Typical equipment to mix materials.

- A face shield or safety glasses are needed to provide eye protection;
- Eye wash facilities should be available on the job site.
- Dust masks are needed for workers operating or working near the material mixer and forced-air respirators used for abrasive blasting;
- Hearing protection must reduce sound levels reaching the inner ear to limits that are specified by the United States Occupational Safety and Health Administration (OSHA); and
- Confirm that adequate ventilation is available in closed spaces before operating equipment that emits dangerous exhaust fumes.

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Preconstruction meeting

Prior to proceeding with the repair, a preconstruction meeting is recommended. The meeting should include representatives for the owner, engineer, contractor, materials manufacturer, and any other parties needed to explain the means, methods, and materials necessary to achieve the repair objectives. See ICRI Guideline No. 320.2R-2009, "Guide to Selecting and Specifying Materials for Repair of Concrete Surfaces."

Repair procedure

1. Apply the repair material.

- Mix the material following the manufacturers' recommendations;
- Scrub a thin bond coat of the repair mortar into the SSD substrate, thus filling pores to ensure intimate contact and to help prevent sloughing or sagging of repair



Fig. 8—Hand application of repair material.

materials on vertical and overhead surfaces. Alternatively, apply a bonding agent if required by the manufacturer or the repair specification;

- Apply the material with adequate pressure before the bond coat dries (Fig. 8). Thoroughly consolidate the repair material into the corners of the patch and around any exposed reinforcement in the repair zone. Full encapsulation of the reinforcement is important for long-term durability; and
- If a second lift is required, thoroughly roughen the surface of the first lift by scoring the soft mortar to achieve an aggressive finish, similar in profile to the prepared concrete substrate. This process will promote additional mechanical bond between lifts. If the second lift will not be immediately applied, keep the first lift moist until application of the second lift. After the first lift has reached final set, moisten the surface of the first lift, scrub in a thin layer of fresh mortar, and apply the second lift of material. Once the desired thickness has been achieved, strike off level with the adjacent concrete.

2. Finish and cure the repair.

- Finish the repair material to produce a final finished appearance as required by the project specifications. Because of the nonbleeding, “sticky” nature of many of these materials, the use of an evaporation control film may be helpful; and
- As with all portland cement-based materials, proper curing will provide enhanced physical properties. Good curing procedures prevent rapid moisture loss at early ages. Consult the product manufacturer for curing instructions. Curing will generally be conducted in accordance with ACI 308R, “Guide to Curing Concrete.” The use of curing compounds (Fig. 9) that comply with the moisture retention requirements of ASTM C309, or moist curing are common curing methods.

How do I check the repair?

Requirements may include:



Fig. 9—Spray application of curing compound.

- Before and after photos;
- Confirmation of acceptable surface preparation. This may include observing the surface amplitude profile. Alternatively, direct tension testing of the prepared surface will provide quantitative data regarding the level of surface preparation achieved;
- Material testing performed by a qualified testing agency;
- Sounding the cured repair for delaminations;
- In-place direct tensile bond testing of the hardened, cured repair to the base concrete using methods similar to those described in ICRI Technical Guideline No. 210.3-2004, “Guide to Using In-Situ Tensile Pull-Off Tests to Evaluate Bond of Concrete Surface Materials,” published by the International Concrete Repair Institute. Important observations include maximum stress, expressed in psi or MPa, and failure mode (base concrete, bond line, or cohesive failure of the mortar).

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MSP-007 ROPE ACCESS PROCEDURE

1.0 PURPOSE

The purpose of this document is to provide information and guidance on acceptable practices and procedures to protect persons from the hazards associated with rope access work methods when working at height. This document is written for all persons concerned with rope access work and especially for those primarily responsible for establishing and administering rope access work methods. This document contains requirements recommended for use by enforcement authorities in establishing regulations or codes on rope access work methods. Guidelines established by IRATA (International Rope Access Trade Association) and SPRAT (Society of Professional Rope Access Technicians) must be adhered to. In any instance where there is contradiction between these guidelines and local legislation, the local legislation must take precedence. These guidelines are referenced in the ICOP (International Code of Practice)¹ and the Safe Practices for Rope Access Work².

2.0 SCOPE

This document sets forth accepted practices for rope access work performed using non-metallic synthetic ropes. This document does not apply to emergency response or emergency response training, except as provided in Section 15.

2.1. Exceptions Regulatory agencies may have requirements that are different from this standard.

2.2. Interpretations Request for interpretations of this standard shall be in writing and addressed to the Secretariat of this standard.

2.3. Defined Terms

2.4. **Safe Job Work Plan:** A written statement prepared by the **employer** describing how a particular job (or types of jobs where these will be essentially identical) should be undertaken to ensure any risks to health and safety of the workers, or others who may be affected, are minimized or eliminated. The documentation prepared by the **employer** describing how a particular job or jobs **should** be undertaken may have different titles such as **Safe Job Work plan, Confined Space Permit**, work plan and tailboard form.

2.5. **Access zone:** The area in which people are at risk of falling such as **on-rope** or near a working edge. This area requires protective measures such as verbal warnings, signs, barriers, safety lines, or other devices designed to prevent or arrest a fall.

2.6. **Aid climbing:** A method of vertical or lateral movement in which the rope access technician moves from one **anchor** to another closely placed **anchor**.

2.7. **Anchor, anchorage:** A place, fixing or fixture that supports and to which the various ropes and rope systems are attached. **Anchor, main:** **Main anchors** are located at the top of and provide the primary support for the life-safety system. **Anchor, deviation:** **Deviation anchors** change the direction of the rope system. In common practice, the rope does not connect to a **deviation anchor**, but runs through a **carabiner** or connector. In general, use a **deviation anchor** should not pull the rope system more than 20 degrees off of the vertical. **Anchor, rebelay:** A **rebelay** is a type of **anchor** located below the **main anchor** and used to direct the rope away from the fall line. The rope connects to a **rebelay anchor**. **Anchor, load sharing:** Several **anchors** connected together to make a single **anchor** that meets the strength required for rope access work.

2.8. **Approved equipment:** Equipment deemed appropriate for use with rope access techniques. **Approved equipment** shall meet the specifications set forth herein, or other specifications set forth in the **Safe Job Work Plan (MSF-004)**, if more stringent.

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- 2.9. **Ascender:** A type of **rope grab** that is used primarily for climbing a rope by gripping the rope when loaded in one direction and sliding freely in the opposite direction. **Ascender-type rope grabs** come in a variety of designs. Many of those designs are not appropriate to use as a connection to the **safety line** or for belaying a person.
- 2.10. **Belay:** A system operated by a rope access technician for the purpose of arresting the fall of another person.
- 2.11. **Carabiner:** A type of connector, formed as a complete loop with a spring-loaded entry gate.
- 2.12. **Carabiner, Locking:** A **carabiner** with a mechanism that reduces the possibility of a gate being opened inadvertently. A **locking carabiner** may include the standard screw-gate or other style **carabiner** in which a positive action is required to lock the gate. **Carabiner, two-stage locking:** A locking mechanism that requires at least two different consecutive manual actions to open the gate. **Carabiner, three-stage locking:** A locking mechanism that requires at least three different consecutive manual actions to open the gate. **Carabiner, self-locking:** A gate that locks automatically when it closes. May also be called auto-lock, quick-lock, or some variation of those terms.
- 2.13. **Descender:** A device that acts as a brake on a rope. **Descender** usually refers to a device attached to the operator and enables the operator to control the rate of descent down the rope. Many **descenders** may be attached to an **anchor** and used to control the rate of descent of a worker or equipment being lowered.
- 2.14. **Dynamic rope:** A rope that is specifically designed to absorb the energy of a fall by extending in length thereby minimizing the shock load to the worker, rope system, and **anchors**.
- 2.15. **Employer:** A corporation, partnership, proprietorship, government agency, or other organization that authorizes its employees to perform rope access work.
- 2.16. **Fall arrest:** Equipment, system, or structure that arrests the fall of a worker.
- 2.17. **Fall factor:** The maximum distance a person could fall, divided by the length of the rope attaching the person to the **anchorage** point.
- 2.18. **Fall prevention:** Equipment, system, or structure that prevents a fall from occurring.
- 2.19. **Hazard zone:** Any area where a person may be at risk as a result of the work being performed. The **hazard zone** is concerned with the risk that the public or other workers may be struck by a falling object. This includes the workers **on-rope** as well as anyone at ground level.
- 2.20. **Job Hazard Analysis:** A component of the **Safe Job Work Plan** which identifies hazards, the hazard mitigation methods and outlines requirements to promptly rescue a rope access technician. The component of the **Confined Space Evaluation Survey** which identifies hazards, the hazard mitigation methods and outlines requirements to promptly rescue a rope access technician may have different titles for different **employers**, but will contain the basic information. Names often used include **Job Hazard Analysis**, site specific safety plan, hazard analysis, tailboard form and risk assessment.
- 2.21. **Kernmantle rope:** A rope consisting of an internal load-bearing core enclosed within a separate braided sheath.
- 2.22. **Low stretch rope:** Rope that has an elongation of 6% to 10% at 10% of **minimum breaking strength**. See also **Static Rope**.
- 2.23. **Main or Working Line:** The primary rope used for descending, ascending or positioning.
- 2.24. **Minimum breaking strength:** Manufacturer's rating used by the **employer** to calculate safe working loads.
- 2.25. **On-rope:** The condition of being suspended from or attached to a rope.
- 2.26. **Proof load:** A test load applied to verify that an item of equipment will not exhibit permanent deformation under that load, at that particular time.
- 2.27. **Rescuer:** A person performing a rescue other than the rescue subject of the rescue.

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- 2.28. **Rescue service:** Organization determined by the **employer** to be capable of safe and effective rescue of rope access technicians.
- 2.29. **Retrieval:** Procedure for rescuing rope access technicians without placing a **rescuer on-rope**.
- 2.30. **Retrieval system:** The equipment (including a **retrieval** line, harness, lifting device, and **anchor**) used for rescue of rope access technicians without placing a **rescuer on-rope**. The **safety line** may be used as the **retrieval** line in a **retrieval system**.
- 2.31. **Rope access:** A means of access by descending or ascending a **main line** while the worker is protected by a **safety line**. Rope access also includes the use of climbing and **aid climbing** techniques with fall protection. Rope access technicians use a variety of rope-based skills and equipment to access buildings, other structures (on or offshore), geological features (such as cliff faces), or manmade features (such as dams). A rope is used as the primary means of support and a **safety rope** is used to attach the **fall arrest** system. Climbing and **aid climbing** techniques used by rope access technicians may use techniques other than a **safety line** for fall protection such as positioning lanyards, backup lanyards and bypass lanyards.
- 2.32. **Rope Access Program Administrator:** A person authorized by their **employer** to be responsible for managing the **employer's** rope access program, who is suitably knowledgeable, experienced, and qualified to manage the rope access program, including matters relating to safety, training, regulations, staffing, equipment selection and management, and other program responsibilities as designated by the **employer**.
- 2.33. **Rope access technician:** A person who has completed a rope access certification program and has the appropriate training and experience to perform the duties required according to the assigned level of responsibility. There are three levels of rope access technician.
- Level III Technician (Rope Access Supervisor):** A person with the training, skills, experience and certification necessary to assume responsibility for the entire rope access work site, including management and guidance of other rope access technicians on the work site, who is capable of designing, analyzing, evaluating and specifying rope access systems, and who has the knowledge and experience to direct rescue operations from rope access systems, as well as the skills necessary to perform advanced rescue from rope access systems.
- Level II Technician (Rope Access Lead Technician):** A person with the appropriate training, skills, experience, and certification to perform, under the direction of a **Rope Access Supervisor**, all rope access rigging, work and, at a minimum, has the skills necessary to perform standard rescue from rope access systems.
- Level I Technician (Rope Access Worker):** A person with the appropriate training, skills, and certification for performing, under the direct supervision of a **Rope Access Lead Technician** or **Rope Access Supervisor**, standard rope access operations and, at a minimum, has the skills necessary to perform limited rescue from rope access systems.
- 2.34. **Rope grab:** A device used to grasp a life **safety rope** for the purpose of supporting a load.
- 2.35. **Safe working load (SWL):** The designated maximum force that may be placed on an item of equipment as calculated by the **employer** from the **minimum breaking strength**.
- 2.36. **Safe zone:** Any area outside the **hazard zone** or the **access zone**.
- 2.37. **Safety, secondary, belay or backup line:** Rope used to protect against falls if the user slips or the primary support, **anchor** or positioning mechanism fails.
- 2.38. **Safety factor:** The minimum strength of the system divided by the maximum anticipated load expressed as a ratio.
- 2.39. **Shall:** The word “shall” is to be understood as denoting a mandatory requirement.
- 2.40. **Should:** The word “should” is to be understood as denoting a recommendation.
- 2.41. **Static rope:** Rope that has an elongation of 6% or less at 10% of **minimum breaking strength**. See also **Low Stretch Rope**.

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3.0 RESPONSIBILITY

3.1. A **Rope Access Program Administrator** shall be the main contact point for matters relating to the safety, training and regulatory aspects of rope access. The designated person shall be suitably knowledgeable and experienced in rope access techniques.

3.2. Rope access work practices shall include the ability for self-rescue or prompt rescue by other rope access technicians. All work plans shall include the necessary information for contacting the local emergency services.

3.3. A **Safe Job Work Plan** shall be completed before beginning rope access work. The **Safe Job Work Plan** shall include, but not be limited to, the following objectives.

List the rope access systems to be used for the proposed work.

List the members of the work team by name and identify their duties.

3.3.2.1. The **Rope Access Program Administrator** shall assess the individual team member's suitability for the work to be performed.

List the rope access equipment to be used for the work to be performed.

List the hazards associated with the work to be performed and actions to be taken to mitigate the hazards.

List appropriate personal protective equipment (PPE) to be used.

List provisions for providing security to the **anchor** location.

List public safety provisions.

Describe the accident response plan and list the outside **rescue service** and the procedure for contacting

3.4. Before starting a particular job, the **employer** shall carefully assess the work to be undertaken and ensure that all the potential hazards are identified. A site survey is required to determine the means of access, risks to people other than the rope access technicians and the nature of the working environment. From this assessment, **employers** can then prepare a suitable **Safe Job Work Plan**, with necessary separate **Safe Job Work Plan** being prepared for each particular aspect of the job.

3.5. This statement should set out the general principles and working procedures for each particular situation which are to be followed by their rope access technicians and by independent contractors used. In many cases where types of jobs are similar, sections of the **Safe Job Work Plan** could be identical and might therefore be in the form of a general document.

3.6. Before starting work, the **Rope Access Supervisor** shall complete a **Job Hazard Analysis**. In particular, attention shall be given to the following aspects:

Ability of the rope access technician to safely use materials, equipment or tools necessary for the work and whether the reaction from any equipment or tool may place the person at risk.

Whether the work may loosen material which could become a hazard to the rope access technician or other persons. Whether the time required for the work at any one location will be such that there may be unacceptable levels of risk. Whether it would be possible to quickly rescue rope access technicians from any position they could be expected to enter.

3.7. Rope access technicians permitting, planning, supervising, and carrying out the work should ensure that the following safety objectives are met: The primary objective is to organize, plan, and manage rope access work so that there will be an adequate safety margin to minimize any risks. Where the work site contains additional hazards, then the training, ability, experience, competence, and size of the work team should be of a level that is suitable to deal with any emergency arising out of the work. In circumstances where wet synthetic ropes may become a tracking path for electrical discharges, suitable precautions should be taken. Except where work is laid out to allow horizontal traversing, work shall be planned such that rope access technicians can descend vertically, with the minimum amount of pendulum to minimize the risk of chafing the rope or overloading the rope or

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anchors. Work should start from properly protected safe areas or areas made safe by the installation of temporary barriers or scaffolding. Such areas should also have a safe means of access.

Anchors should have **safety factors** that meet or exceed those required for the ropes.

3.7.6.1. The attachment to the **anchorage** should at least equal the strength of the system attached to it.

3.7.6.2. Re-direction of a rope from an **anchor** should not exceed 120 degrees unless the side loads produced at the redirection point are considered. Similarly, where the included angle at the attachment is high and produces a 'multiplier' effect, the extra forces produced should be considered. All rope access technicians should be properly supervised and self-supporting. Work teams should consist of at least the minimum number of members required to ensure that should anyone require help they can quickly perform a rescue.

3.7.8.1. To meet the above requirement, a work team should consist of at least two members.

3.7.8.2. One member of the work team should be qualified as a **Rope Access Supervisor** or **Rope Access Lead Technician**.

3.7.8.3. The **Rope Access Supervisor** should ensure that the provisions for rescue are adequate.

3.7.8.4. Sufficient personnel should be readily available to provide assistance in the event of an emergency.

3.8. The **Rope Access Supervisor** shall ensure that **anchors** have been evaluated in order to ensure that overall system safety is adequate.

Properly planned **anchorages** should be used.

3.8.1.1. In some cases, **anchorages** must be installed prior to use. In such cases, a qualified person with experience in rope access anchoring systems should design an **anchor** point to be installed.

3.8.1.2. In other cases, there will be a need to devise an **anchor** point from existing structures. Possible appropriate **anchor** points include but are not limited to steel members, I-beams, suitable trees of good size and mass, large boulders, heavy equipment and specially designed **anchor** points.

3.9. Each rope access technician shall use a **fall arrest** system meeting the fall protection regulations or standards of the jurisdiction or country of the work; such as ANSI/ASSE, CSA or EN/CE.

Safety, secondary or **backup line(s)** or other appropriate **belay** devices shall be used in addition to the **main line** unless the **employer** can demonstrate that the second line or other **belay** devices would create a greater hazard or otherwise would not be feasible.

3.9.1.1. In planning to meet these objectives, it should be noted that experience has shown significant safety benefits may be obtained if the system of work always includes the provision of at least one alternative means of support to prevent a person from falling. This means that should any one item fail within the suspension system, there will be an adequate back-up to prevent a catastrophic accident.

3.9.1.2. However, in some situations such additional measures may cause greater hazard than they mitigate. These situations should be thoroughly documented in the **Safe Job Work Plan**.

The **safety line** used for **fall arrest** should have its own separate **anchor** and should be separately fixed to the rope access technician's harness. This does not preclude both lines being attached to a single harness attachment point.

4.0 PROCEDURE

4.1. The **employer** shall develop and implement a policy statement that provides general goals and guidance for a rope access program that emphasizes management's commitment to providing a safe workplace for personnel engaged in rope access work.

4.2. The **employer** shall provide the resources that are necessary for the development, implementation and operation of their rope access program.

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4.3. The **employer** shall appoint a **Rope Access Program Administrator** who meets the requirements of this standard, and who has the authority to manage and direct the **employer's** rope access program.

4.4. The **employer** shall develop and maintain written rope access and rescue procedures for every location where its rope access technicians use rope access.

4.5. The **employer** shall ensure that rope access technicians are informed of foreseeable hazards that they may encounter during the performance of their duties.

4.6. The **employer** shall ensure that all rope access technicians have the knowledge and training necessary to safely perform the rope access work to which they are assigned.

4.7. The **employer** shall ensure that all rope access technicians assigned to supervise or otherwise manage other rope access technicians on the work site are capable in terms of knowledge, training and experience to provide such oversight.

4.8. Employee selection and capabilities

The **employer** shall verify prior rope access training and/or experience.

4.8.1.1. To assess whether a person is capable of performing this type of work requires detailed consideration of their previous experience. The **employer** should verify prior rope access training experience.

4.8.1.1.1. Other suitable experience could include mountaineering, caving and working at heights using other means of access. Experience with the fire service or military forces may also be relevant if a person has been regularly engaged in the use of methods that involve being exposed at heights.

4.8.1.2. Where practicable, references should be obtained to verify claimed experience and levels of competence.

4.8.1.3. The **employer** will be assisted in their verification and monitoring of a rope access technician's experience when their rope access technicians or applicants have a personal record log showing the training received and describing their work experience.

The **employer** shall determine that rope access technicians are sufficiently physically capable and free from any impairment that may prevent them from working safely. Rope access technicians should have a medical examination before employment in rope access work and at regular intervals.

The **employer** shall use certified **Level I Technicians (Rope Access Workers)** who have the appropriate training for the assigned tasks and/or **Level II Technicians (Rope Access Lead Technicians)** or a **Level III Technician (Rope Access Supervisor)** to conduct all work **on-rope**.

The **employer** shall use a **Level II Technician (Rope Access Lead Technician)** or a **Level III Technician (Rope Access Supervisor)** for system setup and system safety checks.

The **employer** shall provide for periodic re-assessment, recurrence training, and re-certification of the **employer's** rope access technicians.

4.8.5.1. **Employers** must ensure that employees maintain their level of ability. Refresher training should be provided for rope access technicians who have not been continuously engaged in this work.

4.8.5.2. Due to the aptitude and mental conditioning necessary for working at height, rope access technicians who have not been engaged in rope access work for six months or more should attend a suitable refresher course before being allowed to work in this manner. This may be either a refresher course or a full course at the appropriate level.

People chosen for the work should have a suitable attitude for working at height. To work safely at height requires those engaged in the work to have special characteristics.

4.8.6.1. Prospective rope access technicians should have both aptitude and attitude that would not result in panic, cause them to make mistakes in a crisis, or work in a reckless or undisciplined manner. Aptitude and attitude may vary according to height and environment of work to be performed.

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4.8.6.2. Frequently those who work at height will be remote or out of sight from their **Rope Access Supervisor**. It is, therefore, especially important that the rope access technicians can be always relied upon to behave in a sensible and responsible manner.

4.8.6.3. As part of their duties to maintain a safe place of work, the **employer** should control any tendency of rope access technicians to work in an undisciplined manner by recording this in their personal log books. An amending note canceling any adverse comments would not then be made until the **employer** is completely satisfied that there would be no recurrence.

4.9 **Duties and Responsibilities of the Rope Access Program Administrator.**

4.9.1 A **Rope Access Program Administrator** is responsible for the development, implementation, monitoring, review, and revision of the **employer's** rope access program, and has overall responsibility for the program.

The **Rope Access Program Administrator** will be responsible for setting up the **employer's** rope access program and developing or approving the **access work plan**.

At minimum, the administrator should have the knowledge and experience of a **Level III Technician (Rope Access Supervisor)** if not a certified **Level III Technician**.

The administrator should also be knowledgeable about and experienced in supervising fall protection programs and in particular fall protection systems for rope access work.

4.9.2 The **Rope Access Program Administrator** shall:

Recognize the limitations of the rope access technicians (in terms of training, qualifications, experience, and expertise) to perform rope access work, and ensure that no work is undertaken that exceeds those limitations. Have a working knowledge of current applicable federal, state and local regulations that apply to rope access and working at height, directly or indirectly, and ensure implementation of all such requirements. Establish and implement procedures for ensuring and verifying that all rope access technicians have the necessary training, skills, and experience for each rope access project to which they are assigned, according to their duties and responsibilities as outlined in this standard. Establish and implement procedures for ensuring that all hazards to which rope access technicians may potentially be exposed on a rope access project are identified, and controlled or eliminated, prior to the commencement of the rope access project. Ensure that all rope access projects are appropriately supervised.

5.0 Appropriate supervision may not always require a **Rope Access Program Administrator** or **Rope Access Supervisor** to be on-site. Depending on the nature of the work and the qualifications of the rope access technicians, the on-site **Rope Access Supervisor** may not be required if it can be shown that the safety of the rope access technicians has not been decreased. Ensure that the procurement, inspection, tracking, and replacement of equipment used for rope access projects is performed by a person (or persons) with the appropriate knowledge, training and experience to perform the assigned task as it relates to the **employer's** operations. Ensure communication and coordination with clients and their safety representatives regarding rope access safety and rescue procedures. Provide, or verify that rope access technicians are provided with all appropriate rope access, rescue and personal protective equipment for each rope access project. Ensure that procedures are in place for establishing and marking work zones, and for keeping other persons and the public out of affected work areas. Ensure that procedures are consistent with all applicable regulatory requirements and standards related to the work environment, and that such requirements are followed by all rope access technicians. Establish and implement procedures for ensuring that all required planning and documentation, including work permits, **Job Hazard Analyses**, and rescue plans are completed prior to the commencement of rope access projects, and that all affected persons are appropriately briefed. Verify that rope access technicians maintain all necessary training and certifications. Ensure that rope access technician rope access and training hours are recorded

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properly. Provide, or verify provision of, all rope access technician training required to meet the provisions of this standard and of the **employer's** rope access program.

Participate in the investigation of all incidents related to injuries or near misses involving rope access technicians during rope access work or training, either personally or through a qualified individual designated to investigate the incident(s), and taking necessary corrective action to eliminate the causes of such incidents. Perform any other duties and responsibilities that are necessary for the development, implementation, and maintenance of a safe and effective rope access program, given the particular nature of the **employer's** operations and the environment in which rope access work is to be performed.

6. Duties and Responsibilities of the Level III Technician (Rope Access Supervisor)

6.1. A **Rope Access Supervisor** shall have overall responsibility for the rope access work site and the rope access technicians assigned to that work site.

6.2. To the extent that other qualified rope access technicians are assigned a duty or responsibility that is also designated as a duty or responsibility of the **Rope Access Supervisor**, the **Rope Access Supervisor** shall retain primary responsibility to ensure and/or verify that the assigned task is accomplished.

6.3. Where appropriate, the **Rope Access Supervisor** may also perform duties and responsibilities of the **Rope Access Lead Technician** and the **Rope Access Worker**, to the extent that it does not prevent the effective performance of the **Rope Access Supervisor's** duties and responsibilities required by this section.

6.4. The **Rope Access Supervisor** shall have the authority to stop the work immediately if it is unsafe to proceed.

6.5. The **Rope Access Supervisor** shall:

Be responsible for the immediate supervision, implementation, and oversight of the rope access program at the work site. Have sufficient knowledge of current regulations that apply, directly or indirectly, to rope access and working at height, so as to ensure compliance by the rope access technicians being supervised. Direct the efforts of other rope access technicians to ensure safety and compliance with the rope access program. Communicate and coordinate with clients and their safety representatives, and other contractors on the work site where appropriate, regarding rope access safety and **rescue** procedures. Identify all hazards to which rope access technicians may potentially be exposed on a rope access project, specify the means by which such hazards are to be controlled or eliminated prior to the commencement of work, and ensure that such elimination or control has been accomplished. Specify the appropriate personal protective equipment (PPE) to be used by rope access technicians, ensure rope access technicians are properly trained in the use of such PPE in the rope access environment, and ensure rope access technicians use the PPE as required. Identify work zones, ensure that these zones are marked appropriately, and verify that adequate measures are taken to keep other personnel and the public out of any affected areas. Complete all required planning and documentation, including work permits, **job safety analyses**, and rescue plans as directed by the **Rope Access Program Administrator** prior to the commencement of rope access projects. Review all procedures prior to the commencement of work and as work site activities change to determine if additional practices, procedures, or training is needed in order to commence or continue work. Conduct job site safety meetings with all affected persons regarding applicable work permits, **Job Hazard Analyses**, **rescue** plans, or any other relevant information prior to commencement of the work. Specify the appropriate rope access equipment, systems and system components, and supervise their installation, use, and inspection. Verify that the necessary emergency services are available, including emergency medical services and ancillary **rescue services** (when applicable), and that the means to summon them are functioning.

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The **Rope Access Supervisor** is responsible for on-site **rescue** of **on-rope** persons. The **Rope Access Supervisor** shall:

6.5.13.1. Ensure that a prompt **rescue** of **on-rope persons** can be accomplished.

6.5.13.2. Manage or perform any **rescue** that may be required during the work.

6.5.13.3. Specify appropriate **rescue** procedures.

6.5.13.4. Perform or manage initial emergency care within the scope of the **Rope Access Supervisor's** training.

Remove from service any rope access equipment or other equipment (such as tools) that are used during rope access work that is damaged or has potentially sustained damage (such as from a significant shock load), until such time that it can be established that such equipment is safe for use. Ensure that all equipment on the work site is protected from damage and is maintained in a safe condition throughout the work. Document and validate rope access technician rope access hours in the manner prescribed by the **Rope Access Program Administrator**. Perform any other duties designated in the **employer's** rope access program or identified by the **Rope Access Program Administrator**. Such duties remain within that **Rope Access Supervisor's** training, skills, experience and qualifications for conducting safe rope access operations and maintaining a safe rope access work site.

6.6. Where it is determined that the use of ancillary **rescue** capability is required in the event **rescue** is needed during **rope access** operations, the **Rope Access Supervisor** shall coordinate with the provider of the ancillary **rescue** capability as required in the **rescue** section of this document.

7. Duties and Responsibilities of the Level II Technician (Rope Access Lead Technician)

7.1. A **Rope Access Lead Technician** shall have the appropriate training, experience, and qualifications to perform all **rope access** work, rigging and, at a minimum, standard **rescue** procedures under the direction of a **Rope Access Supervisor**.

7.2. A **Rope Access Lead Technician** may perform limited supervision over **Rope Access Workers** and other **Rope Access Lead Technicians** under the immediate direction of a **Rope Access Supervisor**. Such supervisory responsibilities may only be delegated to the **Rope Access Lead Technician** after: The **Rope Access Supervisor** determines that the **Rope Access Lead Technician** is capable of providing limited supervision given the circumstances of the rope access work being performed; and the **Rope Access Supervisor** determines that the **Rope Access Lead Technician** is prepared to handle all work variables and potential rescue requirements.

7.3. The **Rope Access Lead Technician** shall:

Adjust, inspect, maintain, properly use, care for, and store all rope access equipment necessary to perform the rope access work. Utilize appropriate personal protective equipment as directed by the **Rope Access Supervisor** and the **employer's** rope access program.

Recognize work site hazards, take corrective measures to eliminate or control those hazards, and notify the **Rope Access Supervisor** of all such hazards and the corrective measures taken.

Be capable of identifying work zones such as the **access zone** and **hazard zone**.

Understand and follow the requirements of all applicable work permits and **Job Hazard Analyses**.

Have a working knowledge and understanding of the **employer's** rope access program and all applicable policy and procedures. Follow the **Rope Access Supervisor's** directions regarding the work to be performed.

Notify the **Rope Access Supervisor** if assigned a task or responsibility beyond the **Rope Access Lead Technician's** training, skills, qualifications, or experience. Understand and communicate any written and verbal warnings. Construct, inspect, and analyze safe rope access systems.

Perform standard rescue procedures used by the **employer** for the specific work environment.

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Perform any other duties designated in the **employer's** rope access program or identified by the **Rope Access Program Administrator** or **Supervisor**. Such duties must remain within that **Rope Access Lead Technician's** training, skills, experience and qualifications for conducting safe rope access operations and maintaining a safe rope access work site. The **Rope Access Lead Technician** shall have the authority to stop the work immediately if it is unsafe to proceed.

8. Duties and Responsibilities of the Level I Technician (Rope Access Worker)

8.1. The **Rope Access Worker** shall have the appropriate training and qualifications for conducting standard rope access operations under the direct supervision of a **Rope Access Supervisor** or **Rope Access Lead Technician** and, at a minimum, limited **rescue** from rope access systems.

8.2. The **Rope Access Worker shall**:

Have a working understanding of the **employer's** rope access program and all applicable policy and procedures. Inspect, maintain, care for, and store personal rope access equipment.

Inspect and verify the integrity of **anchor** systems and components.

Recognize work site hazards and notify the **Rope Access Supervisor** of any such hazards.

Be capable of identifying work zones such as the **access zone** and the **hazard zone**.

Understand applicable work permits and **Job Hazard Analyses**.

Understand and communicate any written or verbal warnings.

Be familiar with **rescue** procedures and systems used by the **employer**, and assist in the performance of **rescue** from rope access systems.

Utilize appropriate personal protective equipment as designated by the **Rope Access Supervisor**.

Follow the **Rope Access Supervisor's** or, where appropriate pursuant to the requirements of this standard, the **Rope Access Lead Technician's** directions regarding the work to be performed.

Notify the **Rope Access Supervisor** if assigned a task or responsibility beyond the **Rope Access Worker's** training, skills, qualifications, or experience.

Perform any other duties designated in the **employer's** rope access program or identified by the **Rope Access Administrator** or **Rope Access Supervisor**. Such duties remain within that **Rope Access Worker's** training, skills, experience and qualifications, for conducting safe rope access operations and maintaining a safe rope access work site.

The **Rope Access Worker** shall have the authority to stop the work immediately if it is unsafe to proceed.

9. Authorized Worker

9.1. Section Held for Authorized Worker

10. Rope Access Equipment

10.1. General:

Components used in any system shall be compatible.

Rope access devices shall be constructed so that inadvertent detachment or removal from the rope is not possible when the device is used in accordance with the manufacturer's instructions.

All equipment shall minimize damage to the rope under normal use.

Equipment shall be functional in the environment in which it is used.

10.2. Standards: Rope access equipment should conform to standards relevant to the intended use.

Seek guidance from the manufacturer of the equipment if there is any doubt about whether or not a particular standard is relevant to the intended use. Rope access equipment should satisfy the legal

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requirements in effect at the location of the work. If rope access is not directly regulated by an authority having jurisdiction at the location of the work, the rope access equipment should meet one or more of the relevant equipment standards established by an international, regional or national body such as those listed for each component.

10.2.3.1. Testing methods for rope access equipment are beyond the scope of this document.

10.2.3.2. Appropriate standards for each piece of equipment must be used to test for appropriate requirements such as a component's ***minimum breaking strength***.

10.2.3.3. There are many possible appropriate standards. Each one may differ in its test methodology, weight range of the worker, and pass/fail requirements.

10.2.3.4. The most commonly used standards are listed for each piece of equipment.

10.2.3.5. Typical strength requirements may be listed for each piece of equipment to be used as a reference.

10.2.3.6. The most critical element is to ensure that the equipment being used is appropriate for the job at hand.

10.3. Certification:

All equipment shall be manufactured under an ISO 9001 or similar quality management program.

10.4. Care and Inspection of Equipment:

Equipment shall be inspected and maintained according to manufacturer's specifications.

The ***Rope Access Program Administrator*** shall establish and monitor an equipment inspection and maintenance program to ensure that:

10.4.2.1. Equipment inspection history can be traced from purchase to retirement.

10.4.2.2. Equipment is stored according to manufacturer's instructions.

10.4.2.3. Equipment is retired in adherence to manufacturer's criteria.

Rope access technicians shall perform a functional and visual check before each use to confirm equipment serviceability. Rope access technicians shall ensure that equipment is properly stored. Records listing all equipment issued, referring to the original test or certificates of conformity should be kept.

10.4.5.1. In some cases it will be helpful if they also have relevant comments noting where the equipment was used, its storage conditions, and any incidents which could affect its life (e.g. unusual loadings, use in chemical or gritty atmosphere, exposure to salt-air, etc.).

10.4.5.2. The records should note when each piece of equipment was inspected, by whom and any remarks concerning its condition at that time.

10.5. Backup System:

Requirements. The backup system shall:

10.5.1.1. Conform to 10.1 General.

10.5.1.2. Be maintained in a position as high as practical.

10.5.1.3. Be compatible with rope type and diameter.

Recommended selection criteria. The backup system should:

10.5.2.1. Have a rating for rescue loads.

The minimum strength of the backup system is based on the arrest force on the user.

10.5.3.1. Recent testing has shown that the maximum arrest force may not be adequate in determining a safe arrest force on the user.

10.5.3.2. The average arrest force should also be taken into account and may be more important to the user's safety than maximum arrest force.

10.5.3.3. ANSI/ASSE Z359.15 defines the maximum arrest force to not exceed 8 kN (1,800 lbf) and the average arrest force to not exceed 4 kN (900 lbf).

10.5.3.4. CE EN 12841 (Type A) only requires the maximum braking force (maximum arrest force), as measured during the braking period to not exceed 6 kN (1,350 lbf).

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The length of the lanyard is not specified since other factors of the backup system will restrict the length.

10.5.4.1. Factors include the free fall distance, how the backup system is used, and how the backup system is tested (e.g. an appropriate standard).

10.5.4.2. The free fall distance refers to the distance fallen before the engagement of the backup device.

10.5.4.3. Free fall distance does not include the distance fallen during deceleration (e.g. sliding of the backup device or deployment of a shock absorber).

10.5.4.4. The distance fallen during deceleration should be covered in appropriate standards with specific information for each device located in the manufacturer's instructions.

10.5.4.5. In practice, clearance requirements must be determined from the total fall distance including free fall, deceleration of the backup device, rope stretch, and harness stretch.

Examples of appropriate standards in accordance with 10.2.3 include:

ANSI/ASSE Z359.15 (not tested for two person load). 10.6.1.1. Conform to

CSA Z259.2.5 (not tested for two-person load). 10.1 General.

CE EN 353-2.

CE EN 12841, Type A.

10.6. Harnesses: Requirements. Harnesses shall:

10.6.1.2. Be of the full body type.

10.6.1.2.1. If a two-piece full body harness is used, it shall be certified as a full body harness.

Recommended selection criteria:

10.6.2.1. Most rope access harnesses will have three primary attachment points:

10.6.2.1.1. Sternal: Upper frontal attachment point typically used for connecting a backup device or backup device lanyard.

10.6.2.1.2. Ventral (Waist): Lower frontal attachment point typically used for connecting work positioning devices such as lanyards, **descenders**, and **ascenders**.

10.6.2.1.3. Dorsal: Backside attachment point located between the shoulder blades, typically used in **fall arrest**.

10.6.2.2. Leg loops should be of sufficient width and design to support the wearer in a comfortable and safe working position while allowing unhindered operation of other equipment and tools.

10.6.2.3. The harness should be compatible with a work seat.

Typically, the **minimum breaking strength** is 16 kN (3,600 lbf).

Examples of appropriate standards in accordance with 10.2.3 include:

ANSI/ASSE shall conform

Z359.11. to 10.1

CSA Z259.10. General.

CE EN 361. 10.7.1.2.

ISO 10333-1. **Carabiners**

NFPA 1983. used to

10.7. support

Connectors: human loads

Requirements. shall be of a

10.7.1.1. locking type

Connectors (e.g. screw-

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gate or auto-locking gate).
Recommended selection criteria (SECTION HELD):
Typically, the **minimum breaking strength** in the direction of loading is 22.2 kN (5,000 lbf).
Examples of appropriate standards in accordance with 10.2.3 include:
ANSI/ASSE Z359.12 (**self-locking** and self-closing types only).

CSA Z259.12.

CE EN 362 (screw links are Class Q).

ISO 10333-5 (**self-locking** and self-closing types only).

NFPA 1983.

10.8. **Descenders.**

Requirements. **Descenders** shall:

10.8.1.1. Conform to 10.1 General.

10.8.1.2. Allow for controlled descent and braking.

Recommended selection criteria. **Descenders** should:

10.8.2.1. Be appropriate for the length of the descent.

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10.8.2.2. Enable the user to stop and work hands-free.

For long descents, consideration should be given to the effects of rope-weight and heat dissipation on **descender** performance.

Consideration should also be given to reducing cumulative twisting of the rope.

Examples of appropriate standards in accordance with 10.2.3 include:

CSA Z259.2.3.

CE EN 12841, Type C.

CE EN 341, Type A (rescue only).

ISO 22159.

NFPA 1983.

10.9. **Ascenders.**

Requirements. **Ascenders** shall:

10.9.1.1. Conform to 10.1 General.

10.9.1.2. Require two or more deliberate actions by the user to be removed from the rope.

10.9.1.3. Not slip under normal use.

Recommended selection criteria. **Ascenders** should:

10.9.2.1. Be easily adjustable when moving up and down the **working line**.

10.9.2.2. Be suitable for specific use (e.g. mounted sternly).

10.9.2.3. Have attachment points for device lanyards and other devices.

Examples of appropriate standards in accordance with 10.2.3 include:

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CE EN 12841, Type B.

CE EN 567.

NFPA 1983.

10.10. Ropes: Requirements. Ropes shall:

10.10.1.1. Conform to 10.1 General.

10.10.1.2. Be made from synthetic fibers.

10.10.1.2.1. Examples of synthetic fibers include nylon, polyester, and aramid fibers.

10.10.1.2.2. Consult with the manufacturer for the type and construction of ropes to be used in extreme environments. Recommended Selection Criteria.

10.10.2.1. Life **safety ropes** should be selected which have an outer sheath that resists undue wear from edges and system components and tight enough to resist the ingress of dirt and grit.

10.10.2.2. Ropes should be **Static** or **Low Stretch**.

10.10.2.3. In special circumstances, **dynamic rope** may be appropriate to be used in place of static or **low stretch rope**. Dynamic **safety rope** should be of a kernmantle construction compliant with UIAA/CE (or comparable) standards for single climbing ropes.

Typically, 11 mm rope is used. The CI 1801 **minimum breaking strength** for 11 mm rope is 26.7 kN (6,000 lbf).

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Examples of appropriate standards in accordance with 10.2.3 include:

CI 1801.

10.11.

ANSI Z359.15.

Lanyards:

CE EN 1891,

Requirement

Type A.

s.

NFPA 1983.

10.11.1.1. Lanyards shall conform to 10.1 General.

10.11.1.2. If a lanyard is used as part of a backup system, the work positioning lanyard shall comply with 10.5 Backup System.

Recommended practices.

10.11.2.1. Lanyards (e.g. cows tails) should have sewn terminations or be terminated with an appropriate knot.

10.11.2.2. Lanyards should be as short as practical in order to minimize fall potential.

The same lanyard is often used for all work positioning lanyard cases.

10.11.3.1. For tied lanyards, data has shown that a barrel knot (sometimes referred to as a scaffold knot) is the preferred knot to use due to its energy absorbing properties. The knot may consist of either two or three wraps.

10.11.3.2. As part of the inspection process, knots should periodically be re-tied, dressed and set (e.g. hand-tightened).

For work positioning lanyards, typical **minimum breaking strength** is 17.5 kN (4,000 lbf).

10.11.4.1. If knots are used, the minimum strengths should be obtained after knots are tied.

10.11.4.2. Special care should be taken with high modulus fibers such as Spectra, Kevlar, Vectran and similar fibers with minimum elongation, which may fail when subjected to shock loading.

Examples of appropriate standards in accordance with 10.2.3 include:

CE EN354.

CE EN89

CE EN358.

ISO 10333-2.

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10.12. Requirements

Helmets: Helmets shall:

10.12.1.1. Conform to 10.1 General.

10.12.1.2. Be suitable for the type of work being undertaken (e.g. electrical work).

10.12.1.3. Have a chinstrap or other retention system to prevent the helmet from coming off the head, whether the user is upright or inverted.

10.12.1.4. Properly fit the user.

Recommended selection criteria. Helmets should:

10.12.2.1. Allow unrestricted vision.

10.12.2.2. Have the ability to mount accessories such as a visor or head lamp.

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Examples of appropriate standards in accordance with 10.2.3 include:

ANSI Z89.1, Type 1 or

Type 2.

CSA Z94.1.

CE EN 397.

CE EN 14052.

CE EN 12492.

10.13. Pulleys.

Requirements. Pulleys shall:

10.13.1.1. Conform to

10.1 General.

Recommended selection criteria

(SECTION HELD):

Examples of appropriate standards in accordance with

10.2.3 include

CE EN 12278.

NFPA 1983

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11. Access and Hazard Zones

11.1. Access Zone

An **access zone** shall be established.

Anchorages should normally be established outside the **access zone** so that the workers can do their harnesses and helmets and attach themselves to the **working line**(s) before entering into the **access zone**.

Appropriate fall protection measures shall be used by any personnel entering the **access Zone**.

11.1.3.1. Personnel in the **access zone** may require fall protection meeting the requirements of the jurisdiction or country of the work, such as ANSI/ASSE, CSA or EN/CE, during transition until the rope access **anchors** are established and personnel are **on-rope**.

11.2. Hazard Zone

A **hazard zone** shall be established and marked, blockaded or identified to warn rope access technicians and passers-by of hazards associated with the work being performed.

11.3. No one may enter the **hazard zone** unless they are wearing appropriate Personal Protective Equipment.

12. Communication Systems

12.1. An effective communications system shall be established prior to beginning work and should remain effective for all the time that work is actively taking place.

Hand or audible signals to be used for regular or emergency communications should be agreed upon and rehearsed before work begins.

12.2. Radio systems or hardline communications equipment should be used for communication purposes unless the area of work is such that all those involved are always visible to each other and within audible range.

13. Use of Suspended Work Platforms in Conjunction with Rope Access

13.1. A suspended temporary work platform should be utilized if the work is such that the rope access technician may become overtired or suffer restriction to their blood flow.

13.2. When such platforms are used in conjunction with rope access methods, the **anchorage**s for the platform **should** be totally independent from **anchorage**s used by rope access technicians as **main lines** or **safety lines**. Alternatively, support could be provided for the rope access technician by a comfort seat or strap incorporated into the harness system. This should be fitted in a manner that it does not detract from the harness being the primary means of safety.

14. Tools and Work Equipment

14.1. All tools and equipment must be suitable for the work intended and compatible with rope access work. In particular, they shall not present a danger to the safe operation or integrity of the rope access system. Work using rope access techniques may be more exposed than most other work methods due to factors including the inability of the rope access technician to move from close proximity to the work itself and to any power source or tools being used. As a result, certain tools which can be used safely from the

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ground, platforms, or other work surfaces, could cause risks to the rope access technicians or their suspension equipment unless great care is taken.

14.2. Where the rope access technicians carry tools and equipment, appropriate steps shall be taken to prevent them being dropped or falling. Every effort must be made to prevent tools and equipment from being dropped. This effort may require lanyards or for small items, some other means for preventing items being dropped. Small tools may be securely attached to the worker's harness by lanyards, carried in a bucket or bag securely attached to the worker's harness or otherwise secured.

Safety factor calculations always take into consideration the weight of tools and equipment.

14.3. All electrical equipment, plugs, sockets, couplers, leads, etc. should be suitable for the environment in which they will be used. In some cases, power leads might need to be adequately supported or secured at their upper suspension point to carry their own weight, or secured at intermediate points. Care should be taken to ensure that any such systems do not impair the rope access system or its backup.

14.4. Power tools weighing more than 10 kg should be fitted with a separate suspension system secured to an independent **anchorage**. **Anchorages** and suspension ropes used for equipment should be clearly identified to avoid confusion with those used to support persons.

14.5. Moving parts of tools should be kept clear of the operator, power leads, and the suspension equipment.

14.6. Appropriate grounding shall be provided for as necessary.

14.7. Any power tools that could cause injury to the users or access equipment shall be fitted with an automatic shut off switch that will interrupt the power and stop movement in the event of a mistake, accident, or emergency.

15. Rescue and Emergency Services

15.1. The **employer** shall have a rescue plan for every rope access work site or project. The plan shall provide for the prompt rescue and safe extrication of a sick, injured, or entangled rope access technician. The plan shall include the following provisions:

The plan shall ensure that all persons conducting rope access work have been trained and are competent to perform self-rescue. The plan shall ensure that sufficient rope access technicians trained and competent in partner rescue are present and available to perform a rescue in a manner appropriate for the mechanism of injury or the patient's medical condition. The plan shall ensure that the **Rope Access Supervisor** is capable of managing a rescue incident and where appropriate, performing a rescue.

The plan shall include the information required to respond to the appropriate emergency services.

15.2. A rope access rescue plan recognizes that the best trained persons to perform the rescue of a sick, injured or entangled worker may be other rope access technicians. Fellow rope access technicians have the training and skills for work at height, have practiced rescue techniques **on-rope**, and are immediately on site. In most cases they can have the

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rope access technician at risk on the ground by the time the local emergency services arrive.

15.3. **Retrieval systems** or methods shall be available on-site whenever a rope access technician is **on-rope**, unless use of the **retrieval** equipment would increase the overall risk of the rope access work, or would not contribute to the rescue of the rope access technician.

15.4. **Retrieval** procedures using **retrieval systems** should be practiced at regular intervals and before the start of any work at situations that are unfamiliar to the work team.

5.0 REFERENCES

1. **IRATA**. *International Code of Practice*. <<https://irata.org/downloads/2055>>
2. **SPRAT**. *Safe Practices for Rope Access Work*.
<<https://sprrat.s3.amazonaws.com/repository/root/94f5c696-db82-4249-81aa-bf41dfad51dd.pdf>>

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MSP-008 ABRASIVE BLASTING PROCEDURE

1.0 PURPOSE

1.1 To provide guidelines for abrasive blasting.

2.0 SCOPE

2.1 The procedure applies to all **AIRDE** personnel and contractors responsible to follow **AIRDE** procedures.

3.0 RESPONSIBILITY

3.1 The Director of HSE&Q is responsible for all facets of this program, and is authorized to halt any operation of THE COMPANY where there is danger of serious personal injury.

4.0 PROCEDURE

4.1 Introduction

4.1.1 **AIRDE** MECHANICAL SERVICES will ensure that all potential sources of Abrasive Blasting within our facility(s) or host employers are evaluated. This is intended to address comprehensively the issues of; evaluating and identifying potential sources of Abrasive Blasting, evaluating the associated potential health hazards, communicating information concerning these hazards, as well as establishing appropriate procedures in the use and care of personal protective equipment.

4.2 General Requirements

4.2.1 Whenever hazardous substances such as dusts, fumes, mists, vapors, or gases exist or are produced in the course of construction work, their concentrations shall not exceed the limits specified in 1926.55(a).

4.2.2 When ventilation is used as an engineering control method, the system shall be installed and operated according to the requirements of this section.

4.2.3 "Local exhaust ventilation" – Local exhaust ventilation when used as described in (a) shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapors, and gases in concentrations causing harmful exposure. Such exhaust systems shall be so designed that dusts, fumes, mists, vapors, or gases are not drawn through the work area of employees.

4.2.4 Organic abrasives which are combustible shall be used only in automatic systems. Where flammable or explosive dust mixtures may be present, the construction of the equipment, including the exhaust system and all electric wiring, shall conform to the requirements of American National Standard Installation of Blower and Exhaust

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Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), and Subpart S of this part.

4.2.5 The blast nozzle shall be bonded and grounded to prevent the build up of static charges. Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts, and the dust collector shall be constructed with loose panels or explosion venting areas, located on sides away from any occupied area, to provide for pressure relief in case of explosion, following the principles set forth in the National Fire Protection Association Explosion venting Guide. NFPA 68-1954.

4.2.6 Abrasive blast cleaning nozzles – The blast cleaning nozzles shall be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

4.2.7 Abrasive blast equipment shall be inspected before use. All fittings and hoses shall be in good condition and tightly attached.

4.3 Engineering Controls

4.3.1 We will install and maintain engineering controls (i.e. cabinets, blasting room) where possible to eliminate or reduce the amount of silica in the work area and to reduce build-up of dust on equipment and machinery surfaces.

4.3.2 Preventative maintenance will be conducted as a high priority to ensure effectiveness of the Engineering Controls.

4.3.3 Consideration will also be given where applicable to use alternate blasting media such as steel shot. Where Engineering Controls are not feasible Administrative Controls will be attempted where possible to eliminate or reduce the amount of silica or environmental dusts each worker is exposed to.

4.3.4 Where Engineering and Administrative Controls are not feasible or cannot keep the silica exposures below the PEL, then NIOSH approved respiratory protection will be selected and used. Supervisors will ensure that equipment selected will meet the following requirements:

- It will be appropriate for the particular hazard.
- It will be maintained in good condition.
- It will be properly stored when not in use, to prevent damage or loss.
- It will be kept clean, fully functional and sanitary.
- Hazards associated with wear of protective clothing, PPE, personal clothing and jewelry. Protective clothing and PPE can present additional safety hazards. Supervisors will ensure workers wear appropriate clothing and PPE. These items will be worn so as not to create additional hazards.
- In addition to respiratory equipment, disposable or workable clothing should also be worn at the work location. It is also available that the workers remove work clothes and put on clean clothes before leaving the worksite.

4.4 Training

4.4.1 **AIRDE** will determine whether training required for specific jobs will be conducted in a classroom or on-the-job. The degree of training provided shall be determined by the

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complexity of the job and the Abrasive Blasting exposure hazards associated with the individual job.

4.4.2 Prior to job assignment, **AIRDE** shall provide training to ensure that the hazards associated with Abrasive Blasting are understood by employees and that the knowledge, skills and personal protective equipment required are acquired by employees.

4.5 Personal Protective Equipment (PPE)

4.5.1 Blasters shall be equipped with heavy canvas or leather gloves, hoods, and aprons or equivalent protection against impact of abrasives.

4.5.2 Abrasive blasting hoods shall be inspected for defects and in good condition before use.

4.5.3 Foot protection shall be worn where heavy pieces of work are handled. Where helpers are used to assist the blaster, and/or other employees are working downwind or in close proximity to a blasting operation, PPE requirements shall be considered and implemented for all in the affected area if appropriate.

4.5.4 Eye and face protection shall be supplied to the blaster when respirator design does not provide such protection, and to any other personnel working nearby. Eye and face protection equipment shall conform to OSHA 1910.133.

4.5.5 Hearing protection shall be used by employees in close proximity to abrasive blasting operations. Hearing protection selected shall be compatible with other personal protective equipment worn.

4.6 Respiratory Protective

4.6.1 An air supplied respirator shall be used where hazardous materials are present in the work place (lead, silica).

4.6.2 Air for abrasive-blasting respirators must be free of harmful quantities of dusts, mists, or noxious gases, and must meet the requirements for supplied-air quality and use specified in 29 CFR 1910.134(i).

4.6.3 Properly fitting particulate filter respirators may be used for short, intermittent, or occasional dust exposures during clean-up, dumping of dust collectors, or unloading shipments of abrasives.

4.6.4 Composition of abrasive blast material can contribute to the hazards the blaster or other employees are exposed to:

- Sand - silica quartz sand. Respiratory protection shall be used with sand.
- Black Beauty - carbonized slag. Trace amounts of heavy metals are found in this product, and respiratory protection shall be worn.
- Steel shot - Although not contributory to respiratory hazard by itself, field operations may involve exposure to hazardous materials (such as lead), and therefore require respiratory protection

4.6.5 Hose length shall not exceed 300 ft. unless steps are taken to ensure that the respirator input pressure and volume are maintained at the specified value for the respirator used. Larger diameter supply hose from the compressor to the respirator hose manifold can provide higher volume. The simplest method to add length to the low pressure supply line

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is to provide output pressure higher than the pressure required by the respirator(s), and to provide a regulator at the respirator manifold to control and maintain correct respirator pressure to the respirator. An accurate pressure gauge should be located at the inlet to the respirator hose.

4.6.6 Electric compressors tend to have marginal capacity. Use of airline coolers and heaters (Vortex tubes) are to be avoided, because they cause airline pressure to drop below 6.0 Standard Cubic Feet per Minute (SCFM). At or near 4.0 SCFM, the wearer can aspirate contaminants into the respirator through the face-to-respirator shield. This is especially true during periods of heavy physical activity.

4.7 Work Operations

4.7.1 Signs should be erected to warn employees and suggest proper PPE to use in work areas where particulate or Abrasive Blasting materials may be encountered involve welding, burning, cutting, brazing, grinding, and drilling work. The equipment and materials used to accomplish work operations are those normally associated with sandblasting and painting operations.

4.7.2 Dust shall not be permitted to accumulate on the floor or on ledges outside of an abrasive-blasting enclosure, and dust spills shall be cleaned up promptly. Aisles and walkways shall be kept clear of steel shot or similar abrasive which may create a slipping hazard.

4.8 Emergency First Aid Procedures

4.8.1 Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. The composition and toxicity of the dust from these sources shall be considered in making an evaluation of the potential health hazards.

4.8.2 The concentration of respirable dust or fume in the breathing zone of the abrasive-blasting operator or any other worker shall be kept below the levels specified in 1926.55 or other pertinent sections of this part.

4.8.3 In the event of an emergency, institute first aid procedures and send for first aid or medical assistance in accordance with local procedures.

4.8.3.1 Eye Exposure: Wash immediately with large amounts of water. Lift the lower and upper lids occasionally; get medical attention as soon as possible.

4.8.3.2 Skin Exposure (imbedded particulates): Immediately flush with copious amounts of water. Remove any clothing blocking exposed skin areas and flush exposed Skin areas, get medical attention as soon as possible.

4.8.3.3 Respiratory Exposure: Get the victim to open, fresh air immediately. If breathing has stopped perform CPR. Keep the victim warm and at rest. Get medical attention as soon as possible.

4.8.3.4 Rescue Considerations: Don't become a second victim. Move the affected person from the hazardous area. If the exposed person has been overcome, initiate local emergency notification procedures. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

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4.9 Tool Selection, Evaluation, and Condition

4.9.1 The greatest hazards posed by tools usually result from misuse and/or improper maintenance. Tool selection sometimes is not considered a priority when arrangements are made to begin work. All employees will consider the following when selecting tools:

- Is the tool correct for the type work to be performed?
- Are guards installed properly and in good condition?
- Are grounding methods sufficient when working in wet conditions?
- Does the tool create sparks or heat? Has this been considered when working around flammable substances?
- Do impact tools such as chisels, wedges, or drift pins have mushroomed heads? The heads can shatter on impact, sending sharp fragments flying!
- Are wooden handled tools loose or splintered? This can result in the heads flying off and striking the user/co-workers!
- Are cutting tools sharp? Dull tools are more hazardous than sharp ones.
- Are tools stored properly when not being used? Saw blades, knives, scissors, and like sharp tools should be stored so that sharp edges are directed away from aisles and coworkers.

4.10 Silicosis

4.10.1 Silicosis is characterized by bluish skin, fever, and shortness of breath. Silica dust causes severe fungal infections in the lungs and can lead to death.

Types:

- Chronic silicosis normally develops after at least 10 years exposure to low concentrations of crystalline silica.
- Accelerated silicosis normally develops after 5-10 years of exposure to high concentrations of crystalline silica.
- Acute silicosis normally develops after a few weeks to a few years of exposure to extremely high concentrations of crystalline silica.

4.10.2 Air monitoring should be performed to determine worker exposure to crystalline silica, and also serve as the basis for selecting engineering controls.

4.10.3 Workers should be medically examined before job placement and at least every three years thereafter to detect the existence of silicosis. The Medical Exams should include:

- Medical and Occupational history
- Chest x-rays
- Pulmonary function testing
- Annual tuberculosis evaluation

4.10.4 All cases of Silicosis should be reported to the State/Provincial or Federal Health Department i.e. OSHA.

4.11 Housekeeping

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4.11.1 For surface coatings that contain hazardous materials (heavy metals), blast material and debris shall be cleaned up by using dust-free methods. Wet clean-up methods and vacuum cleaners with High Efficiency Particulate Air (HEPA) filters are recommended.

4.11.2 When abrasive blasting is performed indoors, surfaces become contaminated with dust that may contain hazardous materials. Contaminated surfaces shall be cleaned to remove as much of this contamination as possible after each abrasive blasting operation. Whenever possible, all surface coatings should be removed in a shot-blast booth or outside, as it is difficult to completely capture and remove airborne dust within a building.

4.11.3 Compressed air used for cleaning – Compressed air shall not be used for cleaning purposes except where reduced to less than 30 psi, and then, only with effective chip guarding and personal protective equipment is used.

4.12 Personal Hygiene

4.12.1 Food, drink, tobacco products, or any items meant to be placed in one's mouth should not be in the blasting area.

4.12.2 Sandblasters should wash their hands, arms, face and neck for a minimum of 15 seconds each before eating, drinking, or smoking and before leaving work for the day.

4.12.3 Workers should shower as soon as possible after leaving work.

4.12.4 Vehicles should not be parked near the sandblasting area.

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MSP-009 ASBESTOS MANAGEMENT PROCEDURE

1.0 PURPOSE

1.1 To provide general information on the hazards and control methods for working around asbestos.

2.0 SCOPE

2.1 The objective of this program is to ensure that asbestos-containing materials on worksites are managed such that the health of our employees and building occupants is safeguarded.

2.2 This program applies to all buildings and structures that AIRDE controls, to all AIRDE employees and to external organizations including contractors hired by AIRDE who may come into contact with or disturb friable asbestos containing material.

3.0 RESPONSIBILITY

3.1 Prevention

To effectively manage ACM and prevent asbestos exposures, the Asbestos Management Program requires participation by workers and occupants on site. The overall responsibility for implementing this program is shared between AIRDE any client/contractor liable to work in the vicinity of asbestos containing material. The following summarizes the key duties and responsibilities.

3.2 Consultants

- Oversees workplace inspections and prepares/updates the survey report.
- Monitors all asbestos-related activities in the buildings including operation and maintenance activities and other abatement actions.
- Provides technical advice to AIRDE personnel and makes recommendations regarding the identification of asbestos, the health hazards and the control measures related to asbestos.
- Provides ongoing asbestos training.
- Evaluates on an ongoing basis the effectiveness of the asbestos management program and recommends changes to the program as appropriate.
- Conducts AIRDE workers at regular intervals to determine the condition of the ACM and to prepare a report indicating the results.
- Monitors Custodial and Maintenance personnel, and outside contractors with regard to all asbestos-related activities through periodic site visits to ensure proper work practices.
- Reviews specifications for outside contractors working in areas where ACM is present.

3.3 Supervisors and Managers

- Upon assigning work, supervisors shall advise the Director of HSE&Q whether they suspect ACM in the vicinity of that work.

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- If it turns out that there are asbestos-containing materials in the contemplated workplace, supervisors are responsible to call stop to all operations in the immediate area affected by ACM until an approved abatement solution can be identified.
- Once work has commenced, if ACM is discovered, Supervisor must call stop to operations immediately and notify client and Airde Director of HSEQ or Managing Director. Work may not resume in the area affected by ACM until abatement is complete and the area deemed safe.

3.4 Employees

- Prior to starting work, employees are responsible to determine if asbestos is present in or around the work to be carried out (by verifying with their supervisors or Environmental Health and Safety).
- Follow the asbestos procedures (as outlined in the present asbestos management program).
- Carefully plan and complete work to avoid damaging asbestos.
- Immediately report any suspected asbestos exposure or damaged asbestos in the work area to their supervisor.
- Attend required training necessary to perform work activities.
- Do not store materials against asbestos containing materials or damage asbestos while moving furniture or other objects.
- Do not eat, drink, smoke or store food in areas containing friable asbestos containing materials

3.5 Contractors

- Must comply with the clients or AIRDE's asbestos procedures when working in the vicinity of ACM.
- Prior to starting work, the contractors are responsible to determine if asbestos is present in or around the work to be carried out (by verifying with the consultants, client or the Director of HSE&Q)

4.0 PROCEDURE

4.1 Definitions

4.1.1 Asbestos – Asbestos is a generic term describing a number of naturally occurring, fibrous, hydrated mineral silicates that differ in chemical composition and are suitable for use as non-combustible, non-conducting and chemically resistant materials. Different types of asbestos that may be found in buildings are chrysotile, amosite, crocidolite, tremolite, actinolite or anthophyllite.

4.1.2 Friable – Friable material means material that when dry can be crumbled, pulverized, or powdered by hand pressure, is therefore likely to emit fibers if disturbed. Three types of friable asbestos commonly used in buildings are:

- Sprayed fibrous fireproofing
- Decorative or acoustic texture coatings

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- Insulation/Thermal pipe insulation

4.1.3 Non-friable – Materials such as vinyl-asbestos floor tile or roofing felts are considered non-friable and generally do not emit airborne fibers unless subjected to sanding or sawing operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut, abraded or sawed, or if they are broken during demolition operations. Generally, non-friable materials cannot be easily crumbled, pulverized or powdered by hand pressure. Common types of non-friable material include:

- Vinyl-asbestos floor tiles
- Asbestos-cement products
- Asbestos-containing friction products

4.2 Introduction

4.2.1 According to regulations, asbestos is defined as the fibrous form of mineral silicates belonging to rock forming minerals of the serpentine group, that is, chrysotile, and the amphibole group, that is, actinolite, amosite, anthophyllite, crocidolite, tremolite, or any mixture containing one or more of these minerals.

4.2.2 The mineral is described as resistant and even indestructible, since it tolerates abrasion, the corrosive effect of chemical products and very high temperatures (flames). In addition to its qualities as a thermal and electrical insulating material, asbestos is relatively cheap. Once the fibers have been extracted, the product can be marketed without having to undergo a sophisticated transformation process.

4.2.3 Asbestos materials are used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials including insulation, soundproofing, floor tiles, roofing felts, ceiling tiles, asbestos-cement pipe and sheet, and fire-resistant drywall. Asbestos is also present in pipe and boiler insulation materials, pipeline wrap and in sprayed-on materials located on beams, in crawlspaces, and between walls.

4.3 Health Risks

4.3.1 Inhalation of asbestos fibers can cause serious health problems. These fibers may remain in the air for many hours if they are released from asbestos containing material (ACM) in a building. When fibers are released into the air, people in the building may be exposed. Inhalation of asbestos fibers may cause diseases that disrupt the normal functioning of the lungs. Specific diseases have been linked with exposure to asbestos:

- Asbestosis (a fibrous scarring of the lungs)
- Lung cancer
- Mesothelioma (cancer of the lining of the chest cavity)
- Cancer of the stomach and colon

4.3.2 In most cases, these diseases have been associated with heavy exposure over many years. However, Mesothelioma may result from shorter exposures to specific types of asbestos, namely crocidolite and amosite (referred to as the amphibole group).

4.3.3 Friable ACM presents the greatest hazard to workers. Three types of friable material commonly used in buildings are:

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- Sprayed fibrous fireproofing
 - Decorative or acoustic texture coatings
 - Thermal pipe, boiler/furnace insulation
- 4.3.4 Workers with a history of smoking are at increased risk of developing lung cancer than are non-smokers. This is mainly because smoking impairs the lungs ability to clear fibers and other foreign materials. Asbestos fibers which are ingested (swallowed) or which meet the skin cause no particular harm. It is when fibers are inhaled into the lungs that they can cause disease.
- 4.3.5 The presence of asbestos in buildings does not necessarily constitute a health risk to either maintenance workers or other building occupants. It is only when the fibers become airborne that they may become hazardous through inhalation or breathing them into the lungs.
- 4.3.6 It is for this reason that regulations identifying the type and location of asbestos in buildings, controlling the production and dissemination of fibers and the training of workers have been developed. Work with asbestos can be performed safely providing that measures are taken to control the production and spread of asbestos dust and to protect the workers from breathing the fibers.

4.4 Categories of Asbestos Work Based Upon Risk

- 4.4.1 TYPE 1 – Low Risk. These include the following:
- Installation or removal of manufactured goods containing asbestos: vinyl tiles, acoustic tiles, gaskets, seals, and asbestos cement products (non friable).
 - Sawing, cutting, shaping or drilling of the products mentioned above with a hand or power tool fitted with a dust collection device equipped with a High Efficiency Particulate Filter (HEPA filter).
 - Removal of drywall installed with asbestos joint filling compounds.
- 4.4.2 TYPE 2 – Moderate Risk. These include the following:
- The total or partial removal of false ceilings where friable materials containing asbestos may be found.
 - Enclosure of friable material containing asbestos except by the sprayed application of a sealant.
 - Removal of friable asbestos material where the work area can be sealed from the workers breathing area such as work in a glove bag for the removal of pipe lagging.
 - All work which is susceptible to emit asbestos dust not classified as low risk or high risk.
 - The manipulation or removal of friable materials containing asbestos where the volume of debris does not exceed 0.03 cubic meters for each minor renovation or regular work specific to the area.
- 4.4.3 TYPE 3 – Moderately High Risk. The manipulation or removal of friable materials containing asbestos where the volume of debris is greater than 0.03 cubic meters and does not exceed 0.3 cubic meters for each minor renovation or regular work specific to the area.
- 4.4.4 TYPE 4 – High Risk. These include the following:

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- Cleaning or removal of ventilation systems including rigid ducts in buildings where insulation contains asbestos applied by spraying.
- Enclosure (encapsulation) of friable material by spray application of a sealant.
- Repair, alteration or demolition of kilns, boilers or similar devices made partially or completely of refractory materials containing asbestos.
- Use of power tools to cut manufactured goods containing asbestos (Type 1, #1), not equipped with a dust collection device fitted with a HEPA filter.
- Handling of friable material containing crocidolite or amosite.
- The manipulation or removal of friable materials containing asbestos where the volume of debris exceeds 0.3 cubic meters for each renovation or regular work specific to the area.

4.5 Basic Elements of the Management Program

- 4.5.1 An initial asbestos survey to identify and record the locations and conditions of all friable asbestos containing material (ACM). To be held by the Director of HSE&Q.
- 4.5.2 The preparation of a survey report detailing results from the survey and providing recommendations for remedial action to comply with the applicable regulations. To be held by the Director of HSE&Q.
- 4.5.3 The provision of appropriate procedures for all asbestos-related work that may disturb friable ACM.
- 4.5.4 Notification of all workers or building occupants that ACM is present so that they can adopt safe work procedures to protect themselves or other occupants of the building.
- 4.5.5 Training and education of workers who may disturb friable ACM.
- 4.5.6 Personal protection for all workers who come in contact with ACM.
- 4.5.7 Inspections and air monitoring at the workplace to ensure that asbestos is being contained in the workplace.
- 4.5.8 Specific criteria for determining abatement completion, control and monitoring of external contractors performing work that may disturb friable ACM.
- 4.5.9 The maintenance of records of all asbestos-related work with ACM.
- 4.5.10 The provision for auditing the implementation and effectiveness of the program.
- 4.5.11 Communication of this program and of asbestos-related work taking place at our worksites to joint health and safety committees and to other persons who may be affected by the work.
- 4.6 General Prohibitions for all Types of Asbestos Work
 - 4.6.1 Spray application of asbestos material is prohibited.
 - 4.6.2 Use of compressed air is prohibited except when necessary to operate a respirator.
 - 4.6.3 Smoking, eating, drinking or chewing any substance is prohibited during work procedures.

4.7 Personal Protective Equipment (PPE)

- 4.7.1 All workers must be trained and informed of the risks before undertaking any asbestos related work. This training must be documented.
- 4.7.2 The training and information program must contain at least:

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- General obligations of the employer
- Worker rights and obligations
- Effects of asbestos on health
- Standards, which are applicable, and the sampling to be carried out
- Protective devices and equipment
- Tasks to be carried out and equipment to be used
- Safe working methods and procedures
- Prevention and verification methods

4.7.3 All buildings containing asbestos must be surveyed and these survey results are to be made available to the workers and the Health and Safety Committee.

4.7.4 **AIRDE** will ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes as determined by the method prescribed by applicable regulations. The air quality is to be determined from breathing zone air samples. These samples shall be representative of the 8-hour TWA and 30 min, STEL. Measurements must be documented.

4.7.5 Friable material must be kept thoroughly wetted throughout the work except where this procedure may constitute a danger that cannot be eliminated, such as work in an electrical room.

4.7.6 Residue from materials containing asbestos must be removed quickly, either with a HEPA vacuum cleaner or by wetting thoroughly before removal. Residue must then be placed in an airtight container.

4.7.7 Upon completion of the work, where non-disposable drop sheets are used, these sheets must be cleaned with a HEPA vacuum. Drop sheets intended for disposal must first be wetted and folded before disposal. The work area and the area around it must be cleaned with a HEPA vacuum or by damp wiping surfaces.

4.7.8 All containers containing asbestos must be labeled with a permanently fixed label bearing the following indications:

- MATERIAL CONTAINS ASBESTOS
- TOXIC BY INHALATION
- KEEP CONTAINER TIGHTLY CLOSED
- DO NOT BREATHE THE DUST

4.7.9 Workers must wear approved safety shoes fitted with soles, which do not slip on wet surfaces.

4.7.10 Signs and labels shall identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that Asbestos Containing Material (ACM) and/or Presumed Asbestos Containing Material (PACM) will not be disturbed. The employer shall ensure that employees working in and adjacent to regulated areas comprehend the warning signs.

4.7.11 Before undertaking any work that is likely to release asbestos fibers, all furniture must be removed from the area or protected by an airtight film.

4.7.12 If employees working immediately adjacent to a Class I asbestos jobs are exposed to asbestos due to the inadequate containment of such job, their employer shall either

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remove the employees from the area until the enclosure breach is repaired; or perform an initial exposure assessment pursuant to 1926.1101(f).

4.8 Employer Obligations

4.8.1 TYPE 1 – Low Risk. In low risk work areas, the employer must insure that employees wear respirators that satisfy either of the following:

- The respirator is approved by the National Institute for Occupational Safety and Health (NIOSH) for protection against asbestos enumerated in the NIOSH Certified Equipment List of September 30th, 1993.
- The respirator is certified to be an FFP2 type in accordance with EN-149 Standard. The equipment shall be selected, adjusted, used and cared for in accordance with applicable standards i.e. CSA Standard Z94.4-93.

4.8.2 TYPE 2 – Moderate Risk.

4.8.2.1 Any worker in the area must wear a reusable respirator fitted with a HEPA filter approved by NIOSH and protective clothing used exclusively for that purpose.

4.8.2.2 The employer must ensure that the clothing is clean before starting each workday.

4.8.2.3 Cleaning may be achieved through either washing or cleaning with a HEPA vacuum. Disposable clothing must be changed each day and used clothing disposed of at the end of every shift by sealing it in a plastic bag.

4.8.2.4 Workers may not wear or carry their clothing outside the work area or the clothes locker room. During work to enclose friable asbestos material, the work area must be sealed with airtight drop sheets.

4.8.2.5 When removing a false ceiling for the purpose of gaining access to a work area where friable material containing asbestos is found, the work area must be sealed off with airtight drop sheets and the ventilation system must be protected from contamination.

4.8.2.6 A sign with the following specifications must be posted at the entrance to each work area yellow in color, 500mm x 350mm with block writing as specified below:

- ASBESTOS 50 mm
- DANGER 40 mm
- DO NOT BREATHE THE DUST 15mm
- PROTECTIVE EQUIPMENT COMPULSORY 15mm
- NO ADMITTANCE WITHOUT AUTHORIZATION 15mm
- INHALING ASBESTOS DUST MAY BE
- HARMFUL TO YOUR HEALTH 10mm

4.8.3 TYPE 3 – Moderately High Risk.

4.8.3.1 The employer must ensure disposable protective clothing is made available. The respirator used is the same as is used for Type 2 work.

4.8.3.2 The employer must isolate the work area from the rest of the building and supply it with a ventilation system equipped with a HEPA filter.

4.8.3.3 The employer must put in place a procedure for decontaminating prior to leaving the work area:

- The work area is cleaned by a wetting procedure or with a HEPA vacuum.

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- After removal of protective clothing, the respirator and protective hard-hat are cleaned using a wetting procedure.
- The employee washes parts of his/her body that were exposed to dusts that may have contained asbestos.

4.8.4 TYPE 4 – High Risk.

4.8.4.1 Workers must wear a powered air purifying continuous-flow, half-face or full-face piece or a supplied air continuous-flow half or full face piece, if working with power tools not fitted with a HEPA vacuum dust collecting system or when working with asbestos materials (other than chrysotile) that has been thoroughly wetted.

4.8.4.2 When working with asbestos material, which cannot be wetted, workers must wear a continuous flow positive pressure respirator fitted with a hood rather than with a mask.

4.8.4.3 Before work begins, AIRDE workers and contractor must, together with the client concerned, identify in writing and make available to the workers:

- The equipment and tools necessary to carry out the work and the measures to be taken in order to install, use, maintain, protect and move them.
- The hazards associated with the work to be carried out.
- The health and safety measures to be taken in accordance with the work to be carried out.
- The types of asbestos and other contaminants, which may be encountered while performing the work.
- The individual and common devices and equipment to be used.
- The measures to be taken in case of emergency, which must include the location of emergency exits.

4.8.4.4 At least once a day the employer must take a reading of the concentration of airborne respirable asbestos fibers in the work area.

4.8.4.5 Upon completion of the work, it is prohibited to dismantle the airtight enclosure or to remove the airtight drop-sheet before the concentration of airborne respirable fibers drops to less than 0.01 f/cc of air.

4.8.4.6 Other measures to be taken by the employer even when using an outside contractor to perform asbestos work include isolation of the work area to prevent building contamination, which can be achieved by the following:

- At the beginning and end of each shift, ensure that the airtight containment is in good condition.
- Air vents of the building ventilation system must be sealed off from the work area before the work begins and kept sealed during the work.
- Materials containing asbestos must be wetted before and during removal work unless this procedure constitutes a danger which cannot be eliminated by another means

4.8.4.7 A locker area must be provided in a separate room and a shower located between the locker room and the work area must also be provided. The work area and work clothes locker room must be sealed from the rest of the building with an airtight enclosure which must have exhaust ventilation equipped with a HEPA filter. The ventilation system must provide at least 4 air exchanges per hour and put the area under a negative pressure between 0.001 and 0.004 KPa.

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4.9 Specifications for Consultants Monitoring for “High Risk” Asbestos Removal

4.9.1 Air monitoring and inspections of the site must follow the following procedures:

- A thorough inspection must be performed once the enclosure is constructed, prior to the start of any contaminated work. This also includes a background air sample. No work can begin until the inspector has given their approval.
- Daily air monitoring (to be analyzed by PCM) must be performed during contaminated work both inside and outside the enclosure.
- Daily inspections of the work site (during contaminated work) must be performed. This includes that the enclosures are in good condition; the negative pressure is adequate (between 0.001 and 0.004 KPa) as well as ensuring that the proper work practices (outlined in the construction code) are carried out by the contractors performing the removal. If any of these conditions are not met, the inspector may cease work until the repairs or modifications are complete.
- Daily inspection reports must be submitted before the start of the next workday and must include the results of the air monitoring. These reports must be given to the Project Manager and the Consultant.
- Upon completion of work, it is prohibited to dismantle the airtight enclosure until a final visual inspection is performed and a final clearance test is taken and analyzed by PCM.
- The report from the final clearance test must also be submitted as soon as possible after the clearance test to the mentioned people.
- The air concentration of airborne respirable asbestos must be less than 0.01 fibers per cubic centimeter of air. A total of 5000 – 6000 liters of air must be sampled. If, at any time, the contractors or employees are at risk due to the work being performed, the Project Manager or Consultant has the right to halt the work performed until such time as the situation is rectified.

4.10 Education and Training

4.10.1 The control of asbestos exposure can be achieved by following the procedures prescribed by the regulations. However, these procedures are only as effective as the person carrying them out. It is therefore essential that before a worker undertakes work liable to emit asbestos dust, he/she is trained and informed of the risks, prevention methods and safe working methods. The asbestos awareness training must also be provided to employees whose work activities may contact Asbestos Containing Materials or Presumed Asbestos Containing materials, but do disturb the ACM or PACM during their work activities.

4.10.2 The training program shall be conducted in a manner which the employee is able to understand.

4.10.3 The employer shall ensure that each employee is informed of the following:

- The health effects associated with asbestos exposure
- The relationship between smoking and exposure to asbestos producing lung cancer
- The quantity, location, manner of use, release, and storage of asbestos, and the specific nature of operations which could result in exposure to asbestos

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- The engineering controls and work practices associated with the employee's job assignment
 - The specific procedures implemented to protect employees from exposure to asbestos, such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment to be used
 - The purpose, proper use, and limitations of respirators and protective clothing, if appropriate
 - The purpose and a description of the medical surveillance program required by paragraph (l) of this section
 - The content of this standard, including appendices
- 4.10.4 Different levels of training may be necessary for different groups of workers. Three levels may be identified:
- 4.10.5 Level 1: Awareness Training – Technicians working in and around asbestos materials. For example, fixing a light fixture in a ceiling covered with fireproofing ACM. Topics should include:
- Background information on asbestos
 - Health effects of asbestos
 - Locations of ACM in buildings
 - Recognition of ACM damage and deterioration
 - Proper work practices, personal protection
- 4.10.6 Level 2: Special Training – Technicians involved in general maintenance and asbestos material repair tasks. Specific examples include: repair or removal of a small section of damaged thermal insulation, removal of ceiling tiles, or plumbers removing piping. The level of training usually involves more detailed discussions of the topics included in level 1 training as well as the following:
- Asbestos regulations
 - Descriptions of the proper methods of handling ACM, including waste handling and disposal
 - Respirator use, care and fit testing
 - Protective clothing use and handling
 - Hands-on exercises for techniques such as glove bag work and HEPA vacuum use and maintenance
 - Appropriate and proper worker decontamination procedures
- 4.10.7 Level 3: Abatement Worker Training – Technicians who may conduct asbestos abatement. For example, conducting a removal job, constructing an enclosure, or encapsulating surface ACM. This work involves direct, intentional contact with ACM.
- 4.10.7.1 This work will be performed by outside contractors; thus, training for level 3 is not a priority for this program and is the responsibility of the contractor. The asbestos program manager should conduct the training program for level 1.
- 4.10.7.2 An outside consultant will be hired to train level 2 workers. However, the program manager will oversee this training.

4.11 Personal Protection

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4.11.1 While engineering controls are the preferred method of worker protection, there are few engineering control options available for maintenance work. This section discusses two key aspects of personal protection: use of respiratory protection and protective clothing for workers in an asbestos maintenance program.

4.11.2 Respirator Protection

4.11.2.1 The regulations states that NIOSH approved respirators are required for all levels of asbestos work. Respirators must be selected, fitted, used and maintained according to the applicable standards.

4.11.2.2 The requirements of respirator protection are as follows:

- Only half-face and full-face respirators are approved for all types of asbestos work
- Respirators approved for asbestos exposure are required for low risk work
- Respirators with high efficiency filters are required for moderate risk work
- The following describes work requiring a powered air purifying continuous-flow respirator with high efficiency filters, or supplied-air continuous (or demand) flow positive pressure respirator:
 - o Moderate risk work that produces asbestos dust emissions
 - o Work classified as moderate risk, involving amosite or crocidolite
 - o Elevated moderate risk work
 - o High risk work that can be adequately wetted.
- The following describes work requiring a half face or full-face mask with supplied-air continuous-flow positive-pressure. The selection of approved respirators, suitable for the hazard to which the worker is exposed is only one aspect of a complete respiratory protection program. Other elements include written operating procedures for respirator use; outlining personal responsibilities for respirator cleaning, storage and repair; training in proper respirator use and limitations; respirator fit testing; respirator cleaning and care and work site supervision.
- Proper respiratory protection is an integral component of all custodial and maintenance activities involving potential exposure to asbestos. When in doubt about exposure during a work operation, custodial and maintenance workers should be provided with respiratory protection.

4.11.3 Protective Clothing

4.11.3.1 In addition to the use of respirators, some procedures require workers to wear protective clothing, usually; protective clothing is disposable and consists of coveralls, a head cover and foot covers made of a synthetic fabric that does not allow fibers to pass through. This type of clothing prevents worker's regular clothing from becoming contaminated with asbestos fibers.

4.11.3.2 Contaminated clothing should not be taken home, as this might pose a risk to the worker's family members. It is important that workers be properly trained in the use, removal and disposal of protective clothing after use.

4.12 Waste Removal

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4.12.1 Procedures for handling dust and waste containing asbestos after clean up or removal should be performed at regular and frequent intervals as the work proceeds. According to the guidelines, the following procedures should be practiced.

- All ACM waste should be removed rapidly from the workplace
- All waste should be placed in a sealed plastic bag or barrel
- A label must be placed on the container indicating the following:
 - o MATERIAL CONTAINS ASBESTOS
 - o TOXIC BY INHALATION
 - o KEEP CONTAINER TIGHTLY CLOSED
 - o DO NOT BREATHE THE DUST

4.12.2 Along with these requirements, it is recommended that supplementary measures be applied to prevent the surrounding air from being contaminated by asbestos fibers coming from the waste.

4.13 Inspection and Air Monitoring

4.13.1 The Industrial Hygienist or a trained person from Facilities Management at the work site should perform inspections at the time that the work is being performed. This is to determine that the proper work practices are being followed and to ensure adequate control measures are in place.

4.13.2 Inspections should be performed daily and reports should be kept on record.

4.13.3 Air monitoring of breathable asbestos fibers should be done at the end of a project to determine if clean up is adequate, respirable concentrations should be less than 0.01 f/cm³ air. Air monitoring should also be performed outside an enclosure to ensure that asbestos contamination is being contained during the project as well as inside the work area for Type 3 Work.

4.14 Criteria for Determining Abatement Completion

4.14.1 In order to determine if the work has been completed, the following two methods will be used:

- Visual inspection to detect incomplete work and inadequate clean up of the work site
- Final air sampling taken at the conclusion of a project after a visual inspection indicating that all ACM has been removed.

4.15 Periodic Reassessment

4.15.1 A visual inspection of all ACM will be conducted at regular intervals as part of the management program. Combined with ongoing reports of changes in the condition of the ACM made by service workers, the re-inspection should help ensure that any ACM damage or deterioration will be detected and corrective action taken.

4.15.2 The buildings must be re-inspected by the Consultant once every 2 years to reassess the condition of the ACM. A routine check every six months to monitor the condition of the ACM can be carried out by trained maintenance personnel.

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4.15.3 Through re-inspection, it is possible to determine both the relative degree of damage and assess the likelihood of future fiber releases. The use of visual records (photographs) of the ACM over time can be of great value during re-inspections.

4.16 Record Keeping

4.16.1 All the asbestos management documents should be stored in permanent files. These include:

- Survey reports, including results of bulk sample analysis
- Notification statements
- Documentation of worker training
- Inspection and air monitoring reports
- Periodic reassessment reports
- Copies will be made available to any building occupant upon request

4.17 Moderate Risk Work Procedures

4.17.1 These procedures are to be followed by maintenance staff or contract persons performing the following work on friable asbestos materials:

- Removal of any part of a false ceiling, if fireproofing or mechanical insulation debris is on the surface of the false ceiling. This precaution applies to all ceiling spaces.

Note: To determine if moderate risk procedures are required for ceiling entry, the manager or worker can gently lift one side of the tile or access panel, to inspect for asbestos debris.

- If debris is noted, replace the tile and use moderate risk procedures for entry. If no fallen material exists, proceed to enter ceiling and inspect area for debris on other tiles that would require moderate risk procedures.
- Removal of minor amounts of sprayed materials and mechanical insulation containing asbestos during repair, alteration or maintenance is limited to the generation of 0.03 m³ of asbestos debris.

4.18 Repair to Any Amount of Asbestos Mechanical Insulation

4.18.1 Removal of vinyl sheet flooring with an asbestos-containing backing felt.

4.19 Equipment

4.19.1 Equipment required for work must be on site before proceeding. Equipment to be used, includes:

4.19.2 Vacuum – An asbestos approved vacuum (HEPA filtered), equipped with brushes, fittings, etc.

4.19.3 Respirators – Workers within the work area shall wear approved respirators. Respirators and filters will be provided by the employer, and individually assigned to workers. Respirators shall be a half-face piece respirator with high efficiency filters. Respirators must be kept in position throughout the entire time the worker is in the area of the work from the first disturbance of the ceiling tile or asbestos material until the final cleaning of the area and bagging of waste is complete. Filters must be changed after 24-

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hours of wear, or sooner if breathing resistance increases. No person using a respirator shall have facial hair that affects the seal between the respirator and the face.

4.19.4 Protective Clothing – All workers shall wear disposable coveralls with attached elasticized hood. Coveralls should be worn with the hood in place at all times. Coveralls may be vacuumed or wet wiped clean for re-use, for a maximum of 8 hours cumulative wear. Suit and head cover shall remain in place until worker leaves work area or the enclosure is dismantled. Boot covers or dedicated boots are required if footwear cannot be effectively cleaned by wet wiping or vacuuming.

4.19.5 Other Equipment:

- Plastic sheeting (6mm polyethylene) - to erect a total enclosure or to serve as drop sheet
- Wood framing or clips to support polyethylene sheeting, as appropriate to work area
- Tape to fasten plastic enclosure to ceiling or to tape drop sheet to floor; ¾" double-sided tape recommended for attaching polyethylene to T-bar ceiling
- Labeled asbestos waste bag (6mm) – for all asbestos waste, disposable suit, plastic sheeting for disposal, etc.
- Pump sprayer containing water with wetting agent to wet asbestos as necessary; dilute agent 2 oz per gallon of water
- Asbestos warning signs
- Insulation repair supplies (lagging compound, cloth, PVC covers)
- Encapsulating sealer, for brush application

4.19.6 Other Protective Measures:

- Do not eat, drink or smoke in the work area.
- On completing clean up of work area, use vacuum or wet cloth to clean hands, face, respirator and boots. Remove protective equipment and proceed to nearest washroom to wash exposed skin on hands and face.

4.20 Scheduling of Work

4.20.1 Schedule work when occupants are absent. If persons are present, do not start work.

4.20.2 If work above ceiling is required on an emergency basis when area is occupied, have Facilities Manager or Security advise occupants to vacate area until work is complete and clearance is given to return.

4.21 Preparation

4.21.1 Shut down ventilation systems to and from the work area. Seal over all ventilation openings, diffusers, grilles, etc., with plastic tape.

4.21.2 Where practical, clear areas of movable furnishings or equipment. This should include anything that occupants may wish to use during work periods. Any furnishings or equipment not removed shall be adequately covered and sealed using 6mm polyethylene and tape. The intent of the protection is to provide an airtight envelope to protect the articles from airborne dust or splashed debris.

4.21.3 Post signs or barrier tape to indicate asbestos hazard and requirement for protective clothing for anyone entering the space.

4.21.4 For small rooms, cover walls with plastic such that the complete room becomes the work area. For larger rooms, erect an enclosure constructed of 6 mm polyethylene of

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suitable dimensions to enclose the work area and scaffolds and ladders required to gain access. If a suspended ceiling is present, the enclosure shall extend to the ceiling line. The enclosure shall be as airtight as conditions permit including the provision of a double overlapping flap at the entrance. The floor of the work area shall be a layer of 6 mm polyethylene sealed to the plastic walls of the enclosure.

4.21.5 Don protective clothing and respirator prior to removing ceiling tile or disturbing pipe jacketing or sprayed fireproofing.

4.22 Execution

4.22.1 To remove fireproofing or textured plaster, saturate using amended water solution, by use of a pump sprayer. Do not remove the asbestos material until the material is thoroughly wetted to the substrate. Do not use water where electrical hazards exist.

4.22.2 To remove pipe insulation, first wet any area of damage, then carefully cut jacket.

4.22.3 Keep insulation surface wetted by mist of water with wetting agent. Remove insulation in large sections and place immediately in disposal bag. After all large pieces have been removed, saturate debris on mechanical equipment and clean all exposed surfaces with abrasive pads, sponges, cloths etc.

4.22.4 To repair pipe insulation, mist any exposed insulation to wet surface and apply lagging paint and canvas or PVC jacketing as required.

4.22.5 For removal of suspended ceiling tiles (where fallen asbestos exists on top of tiles by inspection or prior knowledge), remove the first tile carefully and vacuum all surfaces.

4.22.6 Vacuum the upper surface of each subsequent tile prior to removal. Store tiles in the work area.

4.22.7 Remove dust and loose friable material likely to be disturbed in the process of doing the work, with a HEPA vacuum or by damp wiping.

4.22.8 When asbestos material is removed, all pieces should be placed directly into 6mm polyethylene bags as they are removed. Avoid dropping material to the floor wherever possible. After bulk removal is complete, wet wash the exposed surface.

4.22.9 Frequently, and at regular intervals during the work, clean up dust and waste in the work area by wet mopping, placing in disposal bags, or by HEPA vacuuming.

4.22.10 After completion of removal, seal exposed ends of fireproofing, texture plaster, or mechanical insulation with heavy layer of encapsulating sealer. Apply sealer coat to surfaces from which asbestos material was removed.

4.22.11 At completion of work, decontaminate equipment, tools and materials used in the work area by wet cleaning or HEPA vacuum.

4.22.12 Dispose of drop sheets and enclosures by wetting the polyethylene, then folding into disposal bags. Do not reuse drop sheets or enclosures.

4.22.13 Before leaving work area, decontaminate shoes and protective clothing by using HEPA vacuum or damp wiping. When protective clothing is to be disposed of, it shall be decontaminated as above and placed in labeled bags. Workers shall vacuum all exposed skin, suit and respirator, and proceed to nearest washroom to wash hands and face.

4.23 Removal of Asbestos-Containing Sheet Flooring

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4.23.1 Remove binding strips or other restrictive moldings. Workers shall wear air-purifying respirator fitted with high efficiency filter, and coveralls at all times.

4.23.2 Make series of cuts 100 mm to 200 mm (4" to 8") apart through top layers and about halfway through felt backing, parallel to wall.

4.23.3 Start at end of room furthest from door and pry up corner strip, separating top sheet from backing layer. Pull top layer back upon itself slowly and evenly, and half backing and top layers should pull free. After it is removed, roll up strip face out into tight roll, tape or tie securely, and place into asbestos waste receptor. Wet the asbestos felt underlay remaining on floor as soon as exposed.

4.23.4 Continue with successive strips. Avoid walking on exposed asbestos felt. Seal asbestos waste receptors when filled. Remove maximum of three strips before wet scraping exposed felt underlay.

4.23.5 Remove remaining adhered underlay by wet scraping. Soak area with water applied by sprayer. Allow water to penetrate felt. Scrape off remaining material. Maintain material wet by applying more water. Place scrapings in asbestos waste receptor.

4.23.6 Continue this procedure alternately removing top sheets and then wet scraping felt, three strips at a time. Be careful not to walk on stripped floor.

4.23.7 When whole floor has been cleaned of asbestos felt, allow it to dry and vacuum up any dirt with a HEPA vacuum or wet mop. Do not dry sweep. Dispose of the mop head as contaminated waste.

4.23.8 Thoroughly clean tools and equipment with a damp cloth before being put back into regular service. Dispose of cloth as contaminated waste.

4.24 Transport and Disposal

4.24.1 Place waste into asbestos labeled disposal bag, seal with tape, clean the bag, and place into a second clean bag, also to be sealed with tape. Use a barrel, fiber drum, or cardboard or wooden box in place of the second bag when the asbestos waste material is likely to tear the inner bag. Seal the rigid outer container.

4.24.2 Provide storage area for holding minor amounts of asbestos waste in sealed containers. Containers shall be labeled and assigned exclusively for asbestos waste.

4.24.3 When waste is removed from site, collect copies of the waste transportation document from the disposal firm. For work performed by a contractor, the contractor will complete and transfer copies of a waste transportation document. Waste generated by building staff will be stored in a secure location until sufficient accumulates for a waste pick-up, or until High Risk work is carried out within the building.

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MSP-010 ELECTRICAL SAFETY & CONTROL OF HAZARDOUS ENERGY PROCEDURE

1.0 PURPOSE

1.1 This procedure provides guidelines for working around electricity.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** personnel and those contractors expected to follow **AIRDE** procedures.

2.2 This procedure also establishes minimum requirements for locking out and tagging switches, valves, circuit breakers, and other energy controlling devices when their operation could cause harm to a worker or damage equipment.

3.0 RESPONSIBILITY

3.1 The Supervisor is responsible for directing work activities in compliance with this procedure where the use of the danger tag and lock-out device is required to eliminate injuries to personnel or damage to equipment/systems. It is the responsibility of all Supervisors of employees performing such operations to instruct their employees as to the content of this procedure and periodically follow up to assure compliance with this procedure.

4.0 PROCEDURE

4.1 Definitions

4.1.1 Accidents involving electrical, mechanical, and/or pressurized equipment and systems have occurred in the construction industry due to incomplete planning of the work or task to be performed (failure to lock and tag out equipment and systems). Work performed on temporary electrical services and pressurized pipelines is as equally important from the standpoint of the use of the danger tag and lock procedures as permanent plant equipment and systems.

4.1.2 Danger Tag-Electrical – The tag is attached to a switch, circuit breaker, and other electrical controlling devices to warn others that the equipment and/or system has been isolated from its power source (de-energized) and that employees are working on the equipment or system. The Danger Tag-Electrical placed on equipment and systems is not to be removed by anyone other than the person whose signature is on the tag and the equipment and system is not to be operated with the tags in place.

4.1.3 Danger Tag-Mechanical – The tag is attached to valve handles, all applicable circuit breakers switches, and other operating mechanisms to prevent manipulation or operation of mechanical equipment and pressurized systems when work is being performed on same. It shall also be used to secure valves between operational and non-operational sections of a system. All Danger Tags-Mechanical shall be numbered in sequential order,

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and the letter M shall identify that the danger tag is to be used for MECHANICAL tagging only.

4.1.4 Danger Tag Log – Is a form that is completed by the Tagging Coordinator from the information supplied to him by users of danger tags.

4.1.5 Caution Tags - May be used to inform personnel of special precautions or instructions relative to safe and proper operation of equipment. This tag is not to be used to prevent equipment and systems from being operated.

4.1.6 Competent Person – A worker, who is adequately qualified, trained, and has sufficient experience, to safely perform work without or with minimal supervision. A competent person shall have a ticket/accredited program and experience as per local provincial/state requirements.

4.2 Basic Requirements

4.2.1 Employees must follow and management must ensure that applicable electrical safety guidelines are implemented, and maintained to prevent electrical shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. Program requirements are listed below.

4.2.2 Safety-related work practices will be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

4.3 Standard Precaution

4.3.1 Prior to working on or near potentially energized/live parts all efforts must be made to de-energize and lock out/tag out the equipment and electrical circuit(s).

4.3.2 Prior to performing any work on exposed live parts (involving either direct contact or by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present, the employees must be advised of the hazard; the electrical systems involved are to be locked out or tagged in accordance to this procedure.

4.3.3 "Overhead lines" – If work is to be performed near overhead lines, the lines shall be de-energized and grounded, or other protective measures shall be provided before work is started. If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

4.3.4 Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

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4.3.5 Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.

4.3.6 Portable ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized parts.

4.3.7 Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping, or other insulating means.

4.3.8 When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

4.3.9 Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts.

4.3.10 If an employee must handle long dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, the employer shall institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.

4.4 General Electrical Procedure Requirements

4.4.1 General

4.4.1.1. All repair, adjustment, diagnostic or load measurement work which must be performed on or near potentially energized circuits or equipment shall follow established procedures and requirements that include the following:

- Only Qualified Employees shall work on or near electrical circuits or live parts (see definition of Qualified Employee). Such persons shall be made familiar with the use of special precautionary techniques, PPE, Insulating & shielding materials and insulated tools.
- Specific requirements for personal protective equipment, insulating or shielding materials, insulated tools/equipment and non-conductive ladders, etc. shall be maintained.
- Requirements for identifying and guarding hazardous conditions and protecting employees from electrical shock, burns or failure of electrical equipment shall be met by the use of signs, tags, barricades or attendants.

4.4.1.2 Tests and inspection criteria to:

- Verify de-energized status
- Ensure integrity of protective equipment and test instruments.

4.4.1.3 Requirements that protective equipment and test instruments and accessories shall be rated and/or

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certified for the circuits and equipment which they will contact and for the environment in which they will be used.

4.5 Overhead Lines and Approach Distances

4.5.1.1 **AIRDE** must contact the power line operator before work is done or equipment is operated within 7.0 meters of an energized overhead power line to determine the voltage of the power line and to establish the appropriate safe limit of approach distance listed under the applicable regulations.

4.5.1.2 **AIRDE** must ensure that the safe limit of approach distance is maintained and that no work is done and no equipment is operated at distances less than the established safe limit of approach distance.

4.5.1.3 **AIRDE** must notify the operator of an energized overhead power line before work is done or equipment is operated in the vicinity of the power line at distances less than the safe limit of approach distances listed under the applicable regulations), and obtain the operator's assistance in protecting workers involved.

4.5.1.4 If the written clearances are unavailable from the power utility, a minimum 5.5 meters shall be maintained.

4.5.1.5 A signal person responsible for giving signals to the operator of equipment or machinery must have an unobstructed view of the operator, signal the operator when the equipment or machinery being operated may come into contact with the electrical line and make all reasonable efforts to notify persons who are not required to be engaged in the work that they are prohibited from entering the worksite, and prevent persons, other than the operator, from touching the equipment or machinery until it is safe to do so.

4.5.1.6 If equipment or machinery comes into contact with an energized overhead electrical line, an employer must ensure that a worker on the equipment or machinery remains on it, or if required to leave it, jumps clear of it, so that no part of the worker's body touches the equipment or machinery and the ground at the same time.

4.5.1.7 A worker shall not cause or permit material to be piled, stored or handled, no scaffold to be erected or dismantled or mobile crane, boom truck or similar equipment to operate in an area where overhead or underground conductors are located which are capable of energizing the material mobile equipment or its load unless **AIRDE** has obtained in writing the voltage and minimum clearance distance required by the power utility.

4.5.1.8 **AIRDE** must ensure that earth or other materials are not placed under or beside an overhead power line if doing so reduces the safe clearance to less than the safe limit of approach distances listed in the applicable regulations. A worker must follow the direction of the employer in maintaining the appropriate safe clearance when working in the vicinity of an overhead power line.

4.5.1.9 When workers are required to work in an area where overhead or underground electrical conductors are located, the employer shall be responsible for maintaining the minimum clearance distance and ensuring that no material or equipment is allowed to be handled or operated within the minimum clearance specified.

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4.5.1.10 A person shall not operate a mobile crane, boom truck or similar equipment without having first completed a safety training program on power line hazards as prescribed by the commission.

4.5.1.11 When **AIRDE** personnel are working in an elevated position near overhead lines or have equipment elevated, the person and the longest conductive object he/she may contact cannot come closer to any unguarded, energized overhead line than specified below:

- For voltages to ground 50kV or below – minimum 10 ft. Clearance
- For voltages to ground over 50kV – minimum 10 ft. clearance plus 4 inches for every 10kV over 50kV.

4.5.1.12 NOTE: For voltages encountered with overhead power lines, objects which do not have an insulating rating for the voltage involved are considered conductive.

4.5.1.13 A person shall not operate a mobile crane, boom truck or similar equipment without having first Any vehicle or mechanical equipment capable of having structure parts elevated near energized overhead line of 50kV or less must be operated so that a clearance of 10 ft. is maintained. If the voltage is greater than 50kV, the clearance must be increased 4 inches for every 10kV. The following conditions may warrant these clearance requirements:

- If the vehicle is in transit with its structure lowered, the clearance from 50kV or less overhead lines may be reduced to 4 feet. If the voltage is greater than 50kV, the clearance must be increased 4 inches for every 10kV.
- If adequately rated insulating barriers are installed to prevent contact with the lines and are not part of or an attachment to the vehicles or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

4.5.2 Adequate Lighting

4.5.2.1 Additional electrical procedures shall be maintained, if applicable, for the following tasks:

- Working near overhead lines by Qualified Employees (precautions to include ground personnel).
- Work in confined spaces or areas having limited workspace.
- Handling conduit or other conductive material in and around energized conductors or circuit parts.
- Cleaning and housekeeping performed on or in proximity to energized parts.
- By-passing electrical safety interlocks

4.5.2.2 Note: Procedures shall be developed which address working on or near 48 volt DC circuits which involve high amperage. Burns and other injuries can occur from the unanticipated arcing of these systems.

4.6 Training

4.6.1 An employee whose work requires them to work on or near exposed parts of electrical circuits operating at 50 volts or more to ground shall be trained in and familiar with safety-related work practices/procedures that pertain to their respective job assignments.

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4.6.2 Employees who face a risk of electrical shock but who are not qualified persons shall be trained & familiar with electrically related safety procedures.

4.6.3 Training shall include but not be limited to:

- Electrical Safety Related Work Practices/Procedures:
- Procedures which apply to specific tasks identified as applicable
- Clearance distances
- Safe use of equipment such as:
- Portable electric power equipment
- Grounding-type equipment, precautions regarding plug-in equipment
- Electric power and lighting circuits
- Operation of circuit protection devices, and test and inspection procedures for instruments and equipment
- Safeguards for personal protection:
- Use, inspection and maintenance of personal protection and protective tools and equipment
- Use of signs, tags, barricades and attendants
- Each Qualified Employee must also be trained and familiar with:
- Skills and techniques necessary to distinguish exposed live parts from other electrical parts
- Skills and techniques to determine the nominal voltage of exposed live parts
- Clearance distances required for specified voltage ranges and work practices for overhead power lines, if applicable

4.7 Other Requirements

4.7.1 Procedures and schedules shall be established for inspection, testing/certification and maintenance on the following equipment/systems:

- All insulating and grounding systems
- Portable power equipment
- Personal protective equipment, (per American National Standards Institute and American Society of Testing Materials).
- Protective devices on generating and distribution systems.
- Unqualified personnel shall not position themselves or the longest conductive object he or she may possess closer to any unguarded, energized overhead line than the following distances.
 - Ten feet: Voltages to ground 50kv or below
 - Ten feet plus four inches for every 10kv over 50kv
- Qualified Employees who have to work in the vicinity of overhead power lines must follow minimum specified approach distances and shall receive additional training. The AIRDE Mechanical Services Managing Director or designee shall be contacted if additional assistance is required.
- Live parts under 50 volts do not need to be de-energized if there is no increased potential exposure to electric burns or to explosion from electric areas.

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4.7.2 Note: Procedures shall be followed which address working on or near 48-volt DC circuits which involve high amperage. Burns and other injuries can be incurred from the unanticipated arcing of these systems.

4.8 Personal Protective Equipment (PPE)

4.8.1 Employees working in areas where the potential contacts with exposed electrical sources are present and likely, will be provided and shall use Personal Protective Equipment (PPE). The following rules apply to the use and care of PPEs:

- PPEs shall be used where contact with exposed electrical sources are present and likely.
- PPEs shall be designed for the work being performed and environment in which it is used.
- PPEs shall be visually inspected and/or tested before use. Any defects or damage shall be replaced, repaired or discarded.
- In cases where the insulating capabilities of the PPEs may be damaged during the work, a protective outer cover, such as leather, must be used.
- Employees shall wear non-conductive head protection wherever there is a danger of injury from electrical burns or shock from contact with exposed energized parts.
- Employee shall wear protective eye/face equipment whenever there is a danger from electrical arcs or flashes or from flying objects resulting from an electrical explosion.

4.9 Electrical Equipment

4.9.1 General

4.9.1.1 This procedure outlines the policy on all electrically powered tools and equipment to protect employees from electrical shock.

4.9.2 Temporary Lighting

4.9.2.1 Temporary lights shall be equipped with guards to prevent accidental contact with the bulb.

4.9.2.2 Working spaces, walkways, and similar locations shall be kept clear of cords.

4.9.2.3 Portable electric lighting in moist or other hazardous locations (drum, tanks, vessels, pipes, etc.) shall be operated at a maximum of 12 volts.

4.9.3 Cords and Portable Tools

4.9.3.1 All extension cords, portable electric tools, and equipment shall be of three-wire type.

4.9.3.2 Portable tools should have trigger lock devices removed.

4.9.3.3 Flexible cords shall be used only in continuous lengths without splice unless the insulation is equal to the cable being spliced and wire connections soldered.

4.9.3.4 Cable passing through work areas shall be covered or elevated.

4.9.3.5 Worn or frayed electrical cables shall not be used.

4.9.3.6 Extension cords shall not be fastened with staples, hung from nails, or suspended by wire

4.9.4 Disconnecting Means

4.9.4.1 Disconnecting means shall be located or shielded so that employees will not be injured.

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- Boxes for disconnecting means shall be securely fastened to the surface upon which they are mounted and fitted with covers.

- Boxes and disconnecting means installed in damp or wet locations shall be waterproof.

4.9.5 CGI

4.9.5.1 Ground fault circuit interrupters are to be used on 120-volt, single phase 15 and 20-ampere outlets in line with cord on all temporary wiring receptacles.

4.9.5.2 **AIRDE** will establish and implement an assured equipment grounding conductor program on construction sites covering all cord sets, receptacles which are not a part of the building or structure, and equipment connected by cord and plug which are available for use or used by employees.

4.9.5.3 This program shall comply with the following minimum requirements:

- A written description of the program, including the specific procedures adopted by the employer, shall be available at the jobsite for inspection and copying by the Assistant Secretary and any affected employee.

- **AIRDE** will designate one or more competent persons (as defined in 1926.32(f)) to implement the program.

4.9.5.4 GFCI's are installed to protect people from shock hazards. System and equipment grounding provide protection for the electrical system and equipment and considerable protection against shock in most situations.

4.9.5.5 However, there is a need for a more sensitive device to protect people from shock in the more hazardous locations where electrical equipment must be used (i.e., extension cords for lighting, power tools at outdoor job sites or wet locations). The GFCI's are designed for this purpose.

4.9.5.6 Ground faults can damage equipment. This costs money. But should a person be a part of this unintended path, the result could be injury or death.

4.9.5.7 Only 50 milli amperes or 0.0033 of the current required to open a 15-ampere circuit breaker or fuse, can be fatal.

4.9.5.8 A GFCI can help prevent harm to people in situations like these.

4.9.5.9 All 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection.

4.9.5.10 Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters.

4.9.5.11 May use portable plug-in GFCI boxes which can be moved from one receptacle to another and moved from job site to job site. (For the US) -The OSHA Standard is interpreted to mean that employees may use portable plug-in GFCI boxes which can be moved from one receptacle to another and moved from job site to job site.

4.9.5.12 Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external

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defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage.

4.9.5.13 Equipment found damaged or defective shall not be used until repaired.

4.9.5.14 The following tests shall be performed on all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded:

- All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.
- Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

4.9.5.15 **AIRDE** will not make available or permit the use by employees of any equipment which has not met the requirements of this program.

4.9.6 Disconnecting Means

4.9.6.1 Disconnecting means shall be located or shielded so that employees will not be injured:

- Boxes for disconnecting means shall be securely fastened to the surface upon which they are mounted and fitted with covers.
- Boxes and disconnecting means installed in damp or wet locations shall be waterproof.

4.9.7 GFCI

4.9.7.1 Ground fault circuit interrupters are to be used on 120-volt, single phase 15 and 20-ampere outlets in line with cord on all temporary wiring receptacles.

4.9.7.2 **AIRDE** will establish and implement an assured equipment grounding conductor program on construction sites covering all cord sets, receptacles which are not a part of the building or structure, and equipment connected by cord and plug which are available for use or used by employees.

4.9.7.3 This program shall comply with the following minimum requirements:

- A written description of the program, including the specific procedures adopted by the employer, shall be available at the jobsite for inspection and copying by the Assistant Secretary and any affected employee.

- **AIRDE** will designate one or more competent persons (as defined in 1926.32(f)) to implement the program.

4.9.7.4 GFCI's are installed to protect people from shock hazards. System and equipment grounding provide protection for the electrical system and equipment and considerable protection against shock in most situations.

4.9.7.5 However, there is a need for a more sensitive device to protect people from shock in the more hazardous locations where electrical equipment must be used (i.e., extension cords for lighting, power tools at outdoor job sites or wet locations). The GFCI's are designed for this purpose.

4.9.7.6 Ground faults can damage equipment. This costs money. But should a person be a part of this unintended path, the result could be injury or death.

4.9.7.7 Only 50 milli amperes or 0.0033 of the current required to open a 15-ampere circuit breaker or fuse, can be fatal.

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4.9.7.8 A GFCI can help prevent harm to people in situations like these.

4.9.7.9 All 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection.

4.9.7.10 Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters.

4.9.7.11 May use portable plug-in GFCI boxes which can be moved from one receptacle to another and moved from job site to job site. (For the US) -The OSHA Standard is interpreted to mean that employees may use portable plug-in GFCI boxes which can be moved from one receptacle to another and moved from job site to job site.

4.9.7.12 Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage.

4.9.7.13 Equipment found damaged or defective shall not be used until repaired.

4.9.7.14 The following tests shall be performed on all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded:

- All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.
- Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

4.9.7.15 **AIRDE** will not make available or permit the use by employees of any equipment which has not met the requirements of this program.

4.9.8 Portable GFCI Boxes

4.9.8.1 Portable GFCI's will not protect the use against shock hazard from:

- Defects or faults in the electrical supply to the interrupter
- Personal contact with both circuit conductors from the interrupter

4.9.8.2 NOTE: DO NOT USE A PORTABLE GFCI WHEN WATER IS LIKELY TO ENTER THE CASE.

4.9.9 Operating Procedures

4.9.9.1 Test portable GFCI's before a tool's power plug is inserted into unit:

- Plug into GFCI cord "into" power outlet.
- Push the "Reset" button to energize.
- Push the "Test" button. Reset button should pop up. If this does not occur, do not use until malfunction is corrected.
- Push "Reset" button to re-energize the GFCI for use.

4.9.9.2 CAUTION: GFCI's must be returned to the manufacturer for service.

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4.10 Electrical Equipment Inspection and Repairs

4.10.1 Extension Cords, Drop Lights, Portable Hand Tools (Drills, Saws, Grinders, etc.)

4.10.1.1 If any electrical equipment is in need of repair, it is the Supervisor's responsibility to turn it in to the shop for the needed repairs. The shop will make the necessary repairs or replace the equipment if warranted.

4.10.1.2 The shop will make all necessary repairs to cords and equipment. No repairs should be made on electrical equipment other than by a competent electrical repairman.

4.10.1.3 It is the responsibility of each Supervisor who has the equipment under his control to establish adequate measures to ensure that the equipment is returned to the shop when a piece of equipment is reported damaged or when no longer needed for the job.

4.10.1.4 Prior to issuing any portable electrical tools or equipment, the shop should check the tool or equipment to ensure that it is safe to use at that time.

4.10.2 Office Electrical Equipment (Water Coolers, Electrical Heaters, Air Conditioners, etc.)

4.10.2.1 The shop will inspect all electrically operated office equipment periodically. This includes fans, typewriters, calculators, water coolers, electrical heaters, air conditioners, etc.

4.10.2.2 Any equipment found to be defective will be taken out of service and tagged "do not use".

4.10.3 Grounding of all Equipment

4.10.3.1 Upon installation of any electrical power service to any apparatus or device, grounding circuits will be run, attached, and inspected.

4.11 Safety Lock-out/Tag-out

4.11.1 Introduction

4.11.1.1 The purpose of this lock and tag out procedure is to prevent injury and/or death to personnel by requiring that certain precautions be taken before servicing or repairing equipment. This includes shutting "off" and "locking out" the electrical power source of the equipment.

4.11.1.2 Locking and Tagging is required while any employee is exposed to contact with parts of fixed electric equipment or circuits which have been de-energized, the circuits energizing the parts shall be locked out or tagged or both.

4.11.1.3 On pneumatic and hydraulic systems, the pressure must be released and lines either disconnected or double blocked (with bleed) or blinded, and locked out, if possible. In addition, a DANGER, "Do Not Use", "Do Not Open" or "Do Not Operate" tag is to be placed at the power sources and valves of all equipment being serviced.

4.11.2 General

4.11.2.1 All personnel initiating the lock-out/tag-out procedures must be a competent worker.

4.11.2.2 This procedure covers safety tagging applicable to construction activities involving work on temporary electrical services, facilities, shop equipment, pressurized pipelines and systems used as service lines for construction. This Procedure also covers

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procedures to be used during start-up phases. These procedures will have to be coordinated to meet the overall operations on each jobsite with the approval of construction management and the client.

4.11.2.3 Where tag out is used for energy control, during the periodic inspection we will conduct a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected. At the minimum, the periodic inspection is to be conducted & documented at least annually to ensure procedures & requirements are being followed.

4.11.2.4 This program consists of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start-up or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

4.11.2.5 Energy sources related to this program include: Pressurized piping, gravity pressure, electrical power distribution, stored energy, hydraulic power.

4.11.3 Electrical Work

4.11.3.1 Whenever electrical work is scheduled to be performed on electrical equipment or services, the power source (disconnects, circuit breakers, switches) controlling the electrically powered equipment or systems shall be de-energized. A completed Danger Tag-Electrical shall be attached to the controlling device by the person responsible for de-energizing the system. The Construction Supervisor shall then place his completed Danger Tag-Electrical on the controlling device after it has been placed in an open position (de-energized).

4.11.3.2 Craft-workers required working on the de-energized equipment or systems shall ascertain that the Construction Supervisor's and/or their Supervisor's completed Danger Tag-Electrical is attached to the controlling device or devices before they commence work.

4.11.3.3 In those instances where the controlling devices permit, a lock and tag shall be placed on the device by each employee to ensure that the controlling device is not inadvertently energized while the work is being done.

4.11.3.4 The de-energized equipment or system shall be tested by using a voltmeter on the downstream side of the tagged-out controlling device. If the equipment is wired directly to a power panel box and is energized by turning on the push-button or butterfly switch on the equipment, the power panel box on the downstream side must be tested by using a voltmeter.

4.11.3.5 Conductors and parts of equipment that has not been de-energized but not been locked or tagged out shall be treated as live parts.

4.11.3.6 Lock-out of Electrically Powered Shop Equipment - to provide maximum employee safety, a power disconnect switch shall be installed between the main power supply panel and each piece of electrically driven equipment which is directly connected to the power panel box. (This does not apply to equipment which is equipped with a plug connection, including welding equipment.) This

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disconnect switch should be located in close proximity to the equipment and property identified. Push buttons or butterfly controls of equipment should not be locked out. A short circuit can occur between a locked out push-button and relay resulting in rendering the equipment energized with full power. Some equipment is wired with dual controls and the locking out of one push-button would not render that equipment as being inoperable. After tag and lock-out, try "start" button to be certain disconnect is complete.

4.11.3.7 Whenever maintenance of shop equipment is required, such as changing the blade of a radial arm saw, the craft operator shall ascertain that the controlling device (power disconnect) has been tagged and locked out before the maintenance work commences.

4.11.4 Mechanical Work

4.11.4.1 Whenever work, is scheduled to be performed on mechanical equipment or pressurized systems, the controlling devices, such as circuit breakers, switches, valve handles, and other operating mechanisms, shall be locked and tagged out to prevent the manipulation or operation of such equipment or systems.

4.11.4.2 Those craft workers required to work on equipment or a pressurized system shall ascertain the Field Supervisor and their Supervisor's completed Danger Tag Mechanical is attached to the controlling device or devices before they commence work.

4.11.4.3 In instances where the controlling devices permit, a lock shall be placed on the device by each employee to ensure that the controlling device is not inadvertently energized.

4.11.4.4 The de-energized equipment or system must be checked out or tested to ascertain that the equipment is inoperable or the pressurized system has been drained of its contents on the downstream side. Pressurized systems must then be flushed out with water if liquids are involved or with inert air if compressed gases are involved to prevent harmful exposure.

4.11.4.5 Appropriate air tests shall be conducted whenever pressurized systems have previously contained hazardous gases or liquids; especially should welding and burning operation be involved when the system has been shut down. When valuing of a pressurized system, blanks are preferred with an open drain cock between valves.

4.11.5 Unauthorized Use of Danger Tag

4.11.5.1 The standard **AIRDE** Danger Tag, Electrical or Mechanical, shall be used only for the purpose of identifying a de-energized piece of equipment or system. It is not to be used as a substitute for a defective tag or a caution tag.

4.11.5.2 The unauthorized operation of a controlling device of a de-energized system or piece of equipment which has been tagged-out with a Danger Tag shall be grounds for immediate termination of the involved employee(s).

4.11.6 Use of Danger Tags

4.11.6.1 Danger tags are not to be considered as a positive means of securing equipment, but are to be used in conjunction with locks. Tags will be used only to identify that work is being done on a valve, switch, or piece of equipment when injury or property damage could result from the operation. No work is to be done on any operable equipment until the operation of it is prevented by the use of this procedure.

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4.11.6.2 Danger tags should be used as outlined below:

- Only the standard construction DANGER tags will be used. These may also include either the words "DO NOT USE" or "DO NOT OPEN" depending on the operations at hand.
- All tags are to be securely attached, dated, and signed by the person performing the work.
- Tags should be destroyed immediately on removal except those that are designed to be re used. However, no alterations are permitted.
- No piece of equipment or device should be operated when there is a tag or lock attached, regardless of circumstances.
- No person should ever remove worker's tag or lock. Only the worker who placed the lock and tag on the equipment should remove it.
- It is the responsibility of the Field Supervisor or Supervisor to see that no work is performed beyond the protection of locks and tags that have been installed.
- Workers may place "multi lock" devices on the equipment if other employees or trades are involved. All persons working on the equipment must have their own lock and tag in place.

4.11.7 General Lock-out / Tag-Out Sequence

4.11.7.1 The worker places the tag or lock on all controls to warn others that the equipment is not to be operated. The worker writes the reason on the tag(s), identifies the equipment and dates and signs each tag.

4.11.7.2 The tag or lock must identify:

- Who installed the tag
- Name of equipment isolated
- Contact number or information of person assigned to tag
- Date and time installed.

4.11.7.3 The worker will pull power switches and/or circuit breakers and place a lock-out clip(s) and a lock(s) on the controls to make them inoperative. Other power sources such as air, steam, or hydraulic may require blinding, disconnection, or valve locking.

4.11.7.4 After the worker has tagged and locked the equipment, the equipment should then be tried to assure that it will not operate.

4.11.7.5 All **AIRDE** locks and tags should be installed first and removed last, if possible.

4.11.7.6 When other crafts are required to work on the same equipment, they must place their personal locks and tags on each piece of equipment.

4.11.7.7 All crafts must "try" equipment after installing their personal locks to assure, once again that it will not start.

4.11.7.8 Locks and tags must remain on controls until work has been completed and it is safe to start the equipment. If maintenance or electrical work is to continue into the next shift, persons going off shift shall remove their "personal" lock and leave their tag on the equipment. Persons coming on shift must install their own personal lock(s) and tag(s) if they will be working on the equipment.

4.11.7.9 Upon completion of work, The **AIRDE** Supervisor or the Client's representative responsible for the Lock-out/Tag-out will confirm that no workers are endanger and all

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workers involved are accounted for before the securing devices are removed. Each trade will remove their locks and tags first.

AIRDE locks and tags are to be removed last after it is determined that the area and the equipment and is safe.

4.11.7.10 No equipment should be started by anyone (including bumping to check rotation) without permission from the **AIRDE** Field Supervisor or Supervisor responsible for the equipment.

4.11.7.11 In an emergency or if the worker who installed a lock is not available, a competent worker designated by the by our company or the client may remove the lock only after verifying that no worker will be in danger due to the removal

4.11.8 Other Systems General

4.11.8.1 Appropriate person de energizes, tags, locks, and "tries" the system.

4.11.8.2 Workers performing the work are to place their locks and tags.

4.11.8.3 Workers are to remove their locks and tags when their work is completed and then the appropriate person removes his lock and tags and then re-energizes the equipment.

4.11.8.4 Note: A person may not remove a lock from locked out equipment unless the person is the worker who installed it and the worker ensures that no one will be in danger if it is removed.

4.11.9 Equipment

4.11.9.1 The qualified operator of shop equipment may lock out his equipment to change tools, chucks, blades, and perform similar tasks.

4.11.9.2 A power disconnect switch must be provided for this purpose at or near the equipment unless the equipment can be unplugged.

4.11.9.3 Push button or butterfly controls may not be used for purposes of lock-out.

4.11.9.4 A lock with a tag may be used for this purpose.

4.11.9.5 The above does not apply to any maintenance or repair work that is done by other than the authorized operator. Work or maintenance is not to be performed on equipment until a competent person tests to confirm that it is out of service and the worker can confirm that it is inoperable.

4.11.10 Locks

4.11.10.1 Only individual keyed locks will be used. The key will remain in the possession of the person placing the locks.

4.11.10.2 A master series of locks to be used specifically for lock-out may be provided to each department that requires them. Master keys for the department will remain in the possession of the Safety Coordinator.

4.11.11 Warning

4.11.11.1 Any person who operates a switch or device to which "DANGER" tags are attached or remove a tag without authorization will be subject to dismissal.

4.11.12 Employee Training

4.11.12.1 All employees who are responsible for following this procedure must receive training in the procedure. This includes all employees who perform the following duties: maintenance, repair, or construction personnel, janitorial or clean-up personnel.

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4.11.12.2 Following initial training in lock-out tag-out principals, each employee will receive follow-up training session as needed. Retraining is required when:

- There is a change in job assignment
- There is a change in machines
- There is a change in the energy control procedures
- A new hazard is introduced

4.11.12.3 All training and/or retraining must be documented, signed & certified. Each training session shall include at minimum the following:

- Lecture regarding this procedure including its purpose, scope, and application, recognition of hazardous energy sources, type & magnitude of available energy available, methods & means necessary for energy isolation & control.
- A clear understanding of the Lock-out/Tagged out procedures.
- Visual support materials including but not limited to video or film presentation of "Lock-out Safety Procedures".
- Written quiz to establish the proficiency of the student.

4.11.13 Other Considerations

4.11.13.1 SHUTDOWNS: Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

4.11.13.2 If machinery, equipment, or powered mobile equipment is to be serviced, repaired, tested or adjusted, no worker performs work on the machinery, equipment, or powered mobile equipment until it has come to a complete stop. The operator must lock out, or locked and tagged with a warning tag, the equipment and removed and rendered safe any hazardous conditions, or otherwise rendered the equipment inoperative in a manner that prevents its accidental reactivation and provides equal or greater protection than the protection afforded by lock out tag out.

4.11.13.3 The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

4.11.13.4 The operator and site supervisor will ensure the machinery, equipment or powered mobile equipment is serviced, repaired, tested, adjusted or inspected safely if the manufacturer's specifications require the machinery, equipment or powered mobile equipment to remain operative while it is being serviced, repaired, tested, adjusted, or inspected, or there are no manufacturer's specifications and it is not reasonable practicable to stop or render the machinery, equipment or powered mobile equipment inoperative

4.11.13.5 All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

4.11.13.6 Lock-out or tag-out devices shall be affixed to each energy isolating device by authorized employees.

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4.11.13.7 Lock-out devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position.

4.11.13.8 Tag-out devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

4.11.13.9 Where tag-out devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

4.11.13.10 Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

4.11.13.11 Following the application of lock-out or tag-out devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

4.11.13.12 If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

4.11.13.13 Prior to starting work on machines or equipment that have been locked-out or tagged-out, the authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.

4.11.13.14 Before lock-out or tag-out devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following.

- The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.
- Provisions must be made to ensure for the safe testing of machines when the LOTO devices must be temporarily removed.

4.11.13.15 When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lock-out or tag-out device.

4.11.13.16 Group lock-out or tag-out devices shall be used in accordance with this procedure, but not necessarily limited to, the following specific requirements.

- Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lock-out or tag-out device (such as an operations lock). Within **AIRDE** the work site supervisor holds this responsibility.
- Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lock-out or tag-out of the machine or equipment.
- When more than one crew, craft, department, etc. is involved, assignment of overall job associated lock-out or tag-out control responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection.
- Each authorized employee shall affix a personal lock-out or tag-out device to the group lock-out device, group lockbox, or comparable mechanism when he or she begins work,

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and shall remove those devices when the shift ends or when he or she stops working on the machine or equipment being serviced or maintained.

4.11.13.17 During shift change or personnel changes, there should be specific procedures to ensure the continuity of lock-out or tag-out procedures. These procedures must be documented and available to all employees.

4.11.14 Piping

4.11.14.1 All piping containing harmful substances under pressure must have an isolation system of blanking or blinding, or a double block and bleed isolation system providing 2 blocking seals with an operable bleed-off between the two seals.

4.11.15 Pigging

4.11.15.1 **AIRDE** currently does not perform pigging. If we conduct this process in the future a procedure will be added.

4.11.16 Enforcement / Inspection

4.11.16.1 Due to the severity of injury that could occur while not following these procedures, the company will strictly enforce this policy. The primary responsibility lies with each Supervisor for monitoring performance of their workers. Those employees found to be in violation of this procedure will be subject to the "Disciplinary Policy".

4.11.16.2 All surveys of worker performance shall be documented on the District's "Safety Inspection Report" form. The "inspection" must include the following information.

- Identity of the machine or equipment on which the "Lock Out" procedure was being utilized
- Date of inspection
- Employees included in the inspection
- The person performing the inspection

4.11.17 Records

4.11.17.1 A logbook is to be maintained in a controlled central location. Each Tag number will be listed in the

Log Book. After completion of the job task, the tags will be removed and turned in to the client.

5.0 REFERENCES

- OSHA 29 CFR 1926.417 – Lock-out and Tagging of Circuits
- OSHA 29 CFR 1910.147 – The Control of Hazardous Energy (Lock-out/Tag-out)
- MSF-007 Lock-out Tag out Record Sheet
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MSP-011 FALL PROTECTION PROCEDURE

1.0 PURPOSE

1.1 To provide guidelines for 100% fall protection for all employees against falls from elevations above 6 feet (6ft) when working or moving on a project that requires elevated work.

2.0 SCOPE

2.1 This procedure is applicable to **AIRDE MECHANICAL SERVICES INC.** work sites to prevent injuries from falls.

3.0 RESPONSIBILITY

3.1.1 General

3.1.1.1 All personnel are responsible for wearing fall protection as required. The supervisor is responsible to ensure employees are trained in the use of fall protection before use. Project Management and Supervisors are responsible for implementation, enforcement and supporting this policy to assure compliance by all employees. The Field Supervisor is responsible for enforcing this procedure in all areas where fall protection is required. The Field Supervisor is responsible for monitoring the implementation of this procedure to ascertain fall restraint and fall arrest equipment is in place at the project. In case of a near miss incident/fall: (reference investigation form) Investigation will be conducted by the Managing Director or Managing Director will designate competent person/persons knowledgeable about the type of work involved at the time of the incident.

3.1.2 Specific Responsibilities

3.1.2.1 Project management is responsible to:

- Plan in advance the methods, material and equipment needed for compliance.
- Authorize the necessary action to correct unsafe acts and/or substandard safety conditions reported or observed.
- Establish training programs to acquaint the worker with fall preventative measures and fall protection procedures.

3.1.2.2 Supervisors are responsible to:

- Determine the fall prevention/protection equipment and/or materials needed by employees working in locations above 6 feet (6ft) and assure that the equipment and/or material is available prior to work.
- Ensure that the **AIRDE MECHANICAL SERVICES** Fall Protection Program is explained to each employee before they start work and a means is provided for their active participation.
- Make daily safety inspections of equipment and job activities.
- Instruct employees in safe work practices and methods at the time the employee is given a work assignment.
- See that employees have and use the proper fall protection equipment and tools for the job.

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- Continuously check to see that no unsafe practices or conditions are allowed to exist on the job.
- Each contractor is responsible to provide and execute all work in compliance with this program for their employees.

4.0 PROCEDURE

4.1 Definitions

4.1.1 100% Fall Protection - Workers 6 feet above the floor or ground level shall be protected from the possibility of a fall hazard which could result in injury or death.

4.1.2 Anchorage - a secure point of attachment for lifelines, lanyards, or deceleration devices which is capable of withstanding the forces specified in this procedure.

4.1.3 Approved - (for the purpose of this section) tested and certified by the manufacturer, or any recognized national testing laboratory, to possess the strength requirements specified in this section.

4.1.4 Full Body Harness - a configuration of connected straps to distribute a fall arresting force over at least the thighs, shoulders and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration device.

4.1.5 Competent person - an individual knowledgeable of fall protection equipment, including the manufacturers' recommendations and instructions for the proper use, inspection, and maintenance, and who is capable of identifying existing and potential fall hazards, and who has the authority to take prompt, corrective action to eliminate those hazards, and who is knowledgeable of the rules contained in this section regarding the erection, use, inspection and maintenance of fall protection equipment and systems.

4.1.6 Drop Line - an independent lifeline secured to an upper anchorage for the purpose of attaching a lanyard or a fall protection device. This line must have a tensile strength of not less than 27 kN (low stretch).

4.1.7 Fall-restraint System - an approved device and any necessary components that function together to restrain an employee in such a manner as to prevent that employee from falling to a lower level. When standard guardrail is selected, compliance with applicable sections governing their construction and use shall constitute approval.

4.1.8 Fall distance - the actual distance from the worker's support to the level where a fall would stop.

4.1.9 Hardware - snap hooks, D-rings, buckles, carabiners, adjuster, C-rings, that are used to attach the components of a fall protection system together.

4.1.10 Lanyard - a flexible line of webbing, rope, or cable used to secure a harness to a lifeline or an anchorage point usually 2, 4, or 6-feet long.

4.1.11 Restraint line - a line from a fixed anchorage or between two anchorages to which an employee is secured in such a way as to prevent the worker from falling to a lower level.

4.1.12 Rope grab - a fall arrester that is designed to move up or down a lifeline suspended from a fixed overhead or horizontal anchorage point, or lifeline, to which the harness is attached. in the event of a fall, the rope grab locks onto the live line rope through

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compression to arrest the fall. The use of a rope grab device is restricted for fall restraint applications.

4.1.13 Safety line - see lifeline

4.1.14 Self-retracting lifeline - a deceleration device which contains a drum wound line which may be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which after onset of a fall, automatically locks the drum and arrests the fall.

4.1.15 Shock absorbing lanyard - a flexible line of webbing, cable, or rope used to secure a harness to a lifeline or anchorage point that has an integral shock absorber to reduce the shock to less than 4kN.

4.1.16 Single-action snap hook - a connecting snap hook that requires a single force to open the gate which automatically closes when released.

4.1.17 Snap hook – self-locking type shall have a self-closing, self-locking keeper that remains closed and locked until intentionally unlocked and opened for connection or disconnection only by at least two consecutive deliberate manual actions.

4.1.18 Walking/working surface - (for the purpose of this section) any area whose dimensions are 45 inches or greater in all directions, through which workers pass or conduct work.

4.1.19 Work area - that portion of a walking/working surface where job duties are being performed.

4.1.20 Self-Rescue /Awareness Level Training:

- Situations involving the use of fall protection equipment that will only allow the worker who inadvertently experiences a fall situation to be able to right themselves without the assistance of other workers and no specialized equipment. Worker is conscious and uninjured and working from a secured platform. The fall is less than 25cm.
- Typical situation. Slipping off a working platform while employing the use of fall restraint equipment that limits the fall potential to centimeters.

4.1.21 Assisted Rescue /Operations Level Training:

- Situations involving the use of fall protection equipment that allow the worker to perform duties outside of engineered control fall protection measures who has the potential to experience a fall situation where they are unable to right themselves without the assistance of trained workers and the use of basic rescue equipment. Worker maybe conscious or unconscious, injured/uninjured.
- Typical situation. Experiencing a fall while employing the use of fall protection equipment when working outside of a guardrail. Lanyard deploys fully and worker is unable to right him or herself.

4.1.22 Assisted Rescue/Technical Level Training:

- Situations involving the use of fall protection equipment that allow the worker perform duties outside of engineered controlled environment who has the potential to experience a fall situation in an area (horizontal – vertical) that has been accessed using a double tie-off method and are unable to right themselves without the assistance of trained workers and the use of specialized rescue equipment. Worker maybe conscious/unconscious, injured/uninjured.

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- Typical situation. Experiencing a fall while employing the use of fall protection equipment when working outside of a guardrail. Lanyard deploys fully and the worker is unable to right themselves.

4.1.23 Assisted Rescue/Technical Level Training:

- Situations involving the use of fall protection equipment that allow the worker to perform duties outside of engineered controlled environment who has the potential to experience a fall situation in an area (confined space) that has been accessed under unacceptable atmospheric conditions and cannot right themselves without the assistance of trained workers and the use of specialized rescue equipment. Worker maybe conscious/unconscious, injured/uninjured.
- Typical situation involving the combined use of fall and respiratory protection to access a tank or stack to perform work under stress related conditions. These types of rescues required PPE and associated training above the normal requirement. Rescues may involve vertical/horizontal movement of a conscious/unconscious casualty. In addition, the casualty may be injured or uninjured.

4.2 Planning

4.2.1 General

4.2.1.1 Achievement of 100% fall protection starts with proper planning. Each project and each job being different, planning for each is necessary. Planning should include at a minimum the following:

- Schedules of project materials
- Work sequence
- Employee orientation
- Training
- Inspection and Maintenance
- Rescue training and equipment
- Equipment, material and supplies needed for fall prevention

4.2.1.2 Planning for 100% Fall Protection must be done on an individual project basis. However, the sequence of planning should remain the same for all projects. All equipment and raw materials used for Fall Protection Systems must meet the requirements of the applicable CSA, ANSI, ASTM, or OSHA requirements.

4.2.2 Fall Hazard Analysis

4.2.2.1 An analysis of elevated work begins by individually identifying the fall hazards that can occur during the work tasks. A look at the required work task mobility is important. A job that lacks a set pattern or sequence of movement may necessitate a change to meet the capabilities and limitations of available equipment.

4.2.2.2 Scaffold erection, for example, varies considerably depending on the facilities or structure around which the scaffold is built. An appraisal of each exposure may serve to provide a rationale for reducing the level of risk. Overall, the primary objective would be to minimize the probability of a loss by controlling the most frequent elevated work task with the highest potential severity.

4.2.3 Hazard Control Measures

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4.2.3.1 Once an elevated fall hazard has been recognized and analyzed, an approved control measure must be selected. Exposure to a fall hazard can either be prevented or fall protection equipment can be used to prevent and/or control the fall.

4.2.4 Prevention

4.2.4.1 Preventative measures involve the installation of floors, walls, nets, handrails, ladders and fixed platforms. These measures consist of permanent, passive systems and all require substantial planning effort. The availability of bucket trucks, scissor lifts, and other personnel lifts are increasing. These devices offer a means of access to a workstation or can be used for the installation of a preventative or personal fall protection system. When aerial lifts are used, personal fall protection (safety harness and lanyard) is still required.

4.2.5 Protection

4.2.5.1 When fall prevention is not feasible due to location, or not practical for the work to be done, personal fall protection must be put into place (Level 3 Supervisors). The overall objective is to minimize the potential for the employee to sustain injury due to a fall. It is important to determine how rescue will be accomplished in the event of a fall. Personal fall protection should serve to arrest a free fall. Items required for personal fall protection include but are not limited to: safety harnesses, lanyards, rope grabs, harnesses, vertical and horizontal lifelines and retractable lifelines.

4.2.6 Orientation and Training

4.2.6.1 A personal fall protection system must include not only the device and all the accessories, but also proper orientation and training. Training is the first step to increase awareness and to develop an understanding of the capabilities and limitations of available equipment. Training is the key to making employees aware of how to hook up the proper equipment, once anchor points have been established. Training will determine what additional skills, knowledge or understanding an individual need to perform with efficiency – without incident. An understanding of the equipment and its limitations enables employees to work out simple sequences of moving with protection.

4.2.6.2 **AIRDE** will provide a training program for each employee who might be exposed to fall hazards. Training shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to follow to minimize these hazards.

4.2.6.3 Employers are to have written certification records showing the following:

- Who was trained, when, dates of training
- Signature of person providing training & date employer determined training was deemed adequate

4.2.6.4 Employer shall provide re-training when the following are noted:

- Deficiencies in training
- Work place changes
- Fall protection systems or equipment changes that render previous training obsolete

4.3 Pre-Planning

4.3.1 General

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4.3.1.1 Prior to the start of work in any facility, construction management shall make an initial survey of the facility to determine the types of fall protection, which will be used on the project. A plan will be established to provide safe guards against any fall hazards. **AIRDE MECHANICAL SERVICES** projects require the use of safety harnesses for fall protection.

4.3.2 Fall Protection Work Plan

4.3.2.1 Project construction management shall develop and implement a fall protection work plan including each area of the work place where the employees are assigned and where fall hazards of 3 meters (in Canada) or (6 ft in the US) or more exist and the workers are not protected by guardrails.

4.3.2.2 The Fall Protection Plan should:

- Identify all fall hazards in the work area as the project work progresses.
- Describe the method of fall arrest or fall restraint to be provided.
- Describe the correct procedures for the assembly, maintenance, inspection, and disassembly of the fall protection system to be used.

4.3.2.3 A fall protection plan must specify:

- The fall hazards at the work site.
 - The fall protection system to be used at the work site.
 - The anchors to be used during the work.
 - That clearance distances below the work area, if applicable, have been confirmed as sufficient to prevent a worker from striking the ground or an object or level below the work area.
 - The procedures used to assemble, maintain, inspect, use and disassemble the fall protection system, where applicable.
 - The rescue procedures to be used if a worker falls and is suspended by a personal fall arrest system or safety net and needs to be rescued.
- 4.3.2.4 For off-site locations, a fall protection plan should be developed and implemented prior to commencing work activities.
- 4.3.2.5 The fall protection plan must also ensure that a worker is protected from falling at a temporary or permanent work area if a worker may fall:
- A vertical distance of 3 meters (in Canada) or 6 feet (in US) or more
 - A vertical distance of less than 3 meters (in Canada) or 6 feet (in US) if there is an unusual possibility of injury
 - Into or onto a hazardous substance or object, or through an opening in a work surface

4.3.3 Fall Restraint

4.3.3.1 When employees are exposed to a hazard of falling from a location 3 meters (in Canada) or 6 feet (in US) or more in height, project management shall ensure that fall restraint or fall arrest systems are provided, installed, and implemented according to the following requirements.

4.3.3.2 Fall restraint protection shall consist of:

- Harness attached to securely rigged restraint lines.
- Harness shall conform to CSA/ANSI Standard.
- Type A (in Canada) or Class III (in US) full body harness

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- All safety harnesses and lanyard hardware assemblies shall be capable of withstanding a tensile loading of 5,000 pounds without cracking, breaking or suffering permanent damage.
 - Rope grab devices are prohibited for fall restraint applications unless they are part of a fall restraint system designed specifically for the purpose by the manufacturer and used in strict accordance with the manufacturer and used in strict accordance with the manufacturer's recommendations and instructions.
 - The Field Supervisor shall ensure component compatibility.
 - Components of fall restraint systems shall be inspected by each user prior to each use for mildew, wear, damage, and other deterioration, and defective components shall be removed from service if their function or strength has been adversely affected.
 - Anchorage points used for fall restraint shall be capable of supporting four (4) times the intended load.
- 4.3.3.3 Fall arrest protection shall consist of:
- Full body harness.
 - An approved Type A (in Canada) or Class III (in US) full body harness shall be used.
 - Body harness system or components subjected to a shock load shall be immediately removed from service and shall not be used again for employee protection.
 - All safety lines and lanyards shall be protected against being cut or abraded.
 - Body harness system shall be rigged to minimize free fall distance with a maximum free fall distance allowed of four (4) feet, and such that the employee will not contact any lower level.
 - Hardware shall be drop forged, pressed or formed steel, or made of materials equivalent in strengths.
 - Hardware shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to the attached body harness or lanyard.
 - When vertical lifelines (drop-lines) are used, not more than one employee shall be attached to any one lifeline.
 - Full body harness systems shall be secured to anchorages capable of supporting 17.8 kN per employee.
 - Lanyards shall have a minimum tensile strength of 5,200 pounds.
 - All components of body harness systems whose strength is not otherwise specified in this section shall be capable of supporting a minimum fall impact load of 5,000 pounds applied at the lanyard point of connection.
 - Snap-hooks shall not be connected to loops made in webbing-type lanyards.
 - Not more than one snap-hook shall be connected to any one D-ring.

4.4 Anchors

4.4.1 General

4.4.1.1 The following anchors must be considered when adopting the fall protection plan.

4.4.2 Anchor strength — Permanent

4.4.2.1 A permanent anchor must be capable of safely withstanding the impact forces applied to it and has a minimum breaking strength per attached worker of 16 kilo newtons

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or two times the maximum arresting force in any direction in which the load may be applied.

4.4.2.2 An anchor must be rated at two times the maximum arresting force is designed, installed and used in accordance with the manufacturer's specifications, or specifications certified by a professional engineer.

4.4.3 Anchor strength – Temporary

4.4.3.1 A temporary anchor used in a travel restraint system must have a minimum breaking strength in any direction in which the load may be applied of at least 3.5 kilo-newtons per worker attached:

- Is installed, used and removed according to the manufacturer's specifications or specifications certified by a professional engineer.
- Is permanently marked as being for travel restraint only, and is removed from use on the earliest of the date on which the work project for which it is intended is completed.
- The time specified by the manufacturer or professional engineer.

4.4.3.2 Temporary anchor used in a personal fall arrest system will meet the following criteria:

- Have a minimum breaking strength in any direction in which the load may be applied of at least 16 kilo newtons or two times the maximum arresting force per worker attached.
- Is installed, used and removed according to the manufacturer's specifications or specifications certified by a professional engineer.
- Is removed from use on the earliest of the date on which the work project for which it is intended is completed.
- The time specified by the manufacturer or professional engineer.

4.4.3.3 Duty to use anchors:

- If a worker uses a personal fall arrest system or a travel restraint system, the worker must ensure that it is safely secured to an anchor that meets the requirements of this section.
- A worker must visually inspect the anchor prior to attaching a fall protection system.
- Worker may not use a damaged anchor until the anchor is repaired, replaced or re-certified by the manufacturer or a professional engineer.
- Worker must properly use an anchor connector appropriate to the work.
- A worker must use an anchor connector appropriate to the work, Independence of anchors
- Workers will ensure that an anchor to which a personal fall arrest system is attached is not part of an anchor used to support or suspend a platform.

4.4.4 Wire Rope Sling as Anchor

4.4.4.1 Workers must ensure that a wire rope sling used as an anchor is terminated at both ends with a Flemish eye splice rated to at least 90 percent of the wire rope's minimum breaking strength.

4.5 Fall Prevention Program Implementation

4.5.1 General

4.5.1.1 All job sites must make maximum use of fall prevention systems such as scaffolds, aerial lifts, personnel hoists, ladders and stairways.

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4.5.1.2 When conventional fall protection is not used; these locations must be identified and classified as controlled access zones.

4.5.2 Fall Prevention Systems

4.5.2.1 Fall Prevention Systems including the following shall be instituted on each and every jobsite as applicable. Some jobs will require the implementation of one or more of the following:

- These systems provide walking and working surfaces in elevated areas which are free from floor openings and are equipped with standard guard rail systems on all open sides and with closure apparatus for ladder openings or other points of access when required. These systems include but are not limited to: scaffolds, aerial lifts (scissor lifts, etc.) and other approved personnel hoisting devices.
- "Standard Railing" systems (Canada): This requirement consists of a top rail approximately forty two inches (42" - 45") above the walking/working surface, a mid-rail at approximately twenty one inches (21") above the surface and a four inch (4") high toe board, and the entire system must be capable of supporting a 200 pound live load in any direction.

4.5.3 Temporary Work Platforms and Walkways

4.5.3.1 Employees working from temporary work platforms or traveling on temporary catwalks must have their safety lanyard secured at all times to a structure or lifeline capable of supporting 5400 pounds impact loading.

4.5.3.2 Every temporary work platform or walkway must be provided with a safe means of access/egress which allows employees to be hooked up at all times. Rope grabs or retractable lifelines must be used to achieve fall protection while ascending or descending to temporary work platforms or walkways.

4.5.4 Personnel Lifts / Hoisting / Devices

4.5.4.1 Workers on a boom elevating work platform, boom-supported aerial device, or telescopic forklift truck work platform must use a personal fall arrest system. Employees riding in or working from lifts must secure their safety lanyard to the lift basket at all times.

4.5.4.2 Lifting devices must be placed on solid level surfaces so as to reduce the possibility of overturning.

4.5.5 Sky-Climbers and Spiders

4.5.5.1 Employees riding in or working from these devices must be provided an independent lifeline and rope grab to which their safety lanyard must be secured.

4.6 Controlled Access Zones

4.6.1 Controlled access zones and their use will conform to the following provisions:

- When used to control access to areas where leading edge and other operations are taking place the controlled access zone will be defined by a control line or by any other means that restricts access.
- When control lines are used, they will be erected not less than 6 feet (1.8m) nor more than 25 feet (7.7m) from the unprotected or leading edge, except when erecting precast concrete members.

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- When erecting precast concrete members, the control line will be erected not less than 6 feet (1.8m) nor more than 60 feet (18m) or half the length of the member being erected, whichever is less, from the leading edge.
- The control line will extend along the entire length of the unprotected or leading edge and will be approximately parallel to the unprotected or leading edge.
- The control line will be connected on each side to a guardrail system or wall.
- When used to control access to areas where overhand bricklaying and related work are taking place:
 - o the controlled access zone will be defined by a control line erected not less than 10 feet (3.1m) nor more than 15 feet (4.5m) from the working edge.
 - o the control line will extend for a distance sufficient for the controlled access zone to enclose all employees performing overhand bricklaying and related work at the working edge and will be approximately parallel to the working edge.
 - o Additional control lines will be erected at each end to enclose the controlled access zone.
 - o Only employees engaged in overhand bricklaying or related work will be permitted in the controlled access zone
- Control lines will consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:
 - o Each line will be flagged or otherwise clearly marked at not more than 6 feet (1.8m) intervals with high-visibility material.
 - o Each line will be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1m) from the walking/working surface and its highest point is not more than 45 inches (1.3m) from the walking/working surface.
 - o Each line will have a minimum breaking strength of 200 pounds (.88kN).

4.7 Safety Monitoring Systems

- 4.7.1 If a controlled access zone is not being used a safety monitoring system must be put in place.
- 4.7.2 Safety monitoring systems and their use will comply with the following provisions:
- **AIRDE** will designate a competent person to monitor the safety of other employees and will ensure that the safety monitor complies with the following:
 - o the safety monitor will be competent to recognize fall hazards.
 - o the safety monitor will warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner.
 - o the safety monitor will be on the same walking/working surface and within visual sighting distance of the employee being monitored.
 - o the safety monitor will be close enough to communicate orally with the employee.
 - o the safety monitor will not have other responsibilities which could take the monitor's attention from the monitoring function.
 - Mechanical equipment will not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operation on low-slope roofs.

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- No employee, other than an employee engaged in roofing work (on low-sloped roofs) or an employee covered by a fall protection plan, will be allowed in an area where an employee is being protected by a safety monitoring system.
- Each employee working in a controlled access zone will be directed to comply promptly with fall hazard warnings from safety monitors.

4.8 Crane Hoisted Personnel Baskets / Platforms

4.8.1 Use of these devices must comply with the safety procedures set forth in the **AIRDE MECHANICAL SERVICES**. Safety Manual and applicable regulations.

4.9 Fall Protection

4.9.1 General

4.9.1.1 Employees traveling or working in elevated areas 3 meters (in Canada) or 6 feet (in US) or more above ground level or adjacent surface where a fall exposure exists must make use of personal fall protection in securing their safety lanyard at all times to a structure, lifeline or approved fall arresting device capable of supporting 17.8 kN (in Canada) and 5400 pounds in US.

- Fall protection equipment such as lanyards, rope grabs, lifelines, etc. must be inspected on a regular basis for damage and/or deterioration. Defective equipment must be removed from service and destroyed or repaired.
- Fall protection equipment that has been subjected to a shock load must be removed from service.
- Fall protection equipment and systems must not be used for any other purpose other than employee safe guarding.

4.9.2 Safety Harnesses and Lanyards

4.9.2.1 Lanyards must be the double locking type and must not exceed 2 meters (in Canada) or 6 feet (in US) in length. A two-lanyard system must be used when necessary. (i.e. to pass obstacles)

4.9.2.2 Safety harnesses and lanyards not furnished by **AIRDE MECHANICAL SERVICES** must be inspected and approved by the site supervisor prior to use.

4.9.2.3 Safety harnesses must be of the approved type with a double "D" ring.

4.9.3 Lifelines

4.9.3.1 Lifelines must be capable of supporting 6000 pounds (in Canada) or 5400 pounds (in US).

4.9.3.2 Lifelines must not be used for any purpose other than fall protection.

4.9.3.3 Anchor points for lifeline must be capable of supporting 17.8 kN (in Canada) or 5400 pounds (in US).

4.9.3.4 Static line must be of half inch (1/2") wire rope cable as a minimum.

4.9.3.5 Static lifelines should be placed to provide hook up points at least waist high for employees and be equipped with vertical supports at least every 9m.

4.9.3.6 Horizontal lifelines must be of three-eighths inch (3/8") wire rope cable as a minimum and must be secured on each end by at least two (2) cable clamps.

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4.9.3.7 Horizontal lifelines should be placed to provide hook up points at least waist high for employees.

4.9.3.8 Vertical lifelines must have a tensile strength of no less than 27 kN.

4.9.3.9 Vertical lifelines must be of five-eighths inch (5/8") synthetic rope.

4.9.3.10 Vertical lifelines must be used with approved rope grabs designed for use with the diameter of rope being used.

4.9.3.11 Retractable lifelines must be approved for use in fall protection.

4.9.3.12 Retractable lifelines must be secured by means of shackles and/or wire rope slings or synthetic slings.

4.9.3.13 Retractable lifelines must have a rope tag line attached for extending the line to lower elevations whenever necessary

4.9.4 Equipment

4.9.4.1 All fall protection equipment- including full body harnesses, body belts, lanyards, shock absorbers, connectors, carabiners, and snap hooks, fall arrestors, self-retracting devices, descent control devices, life safety ropes, adjustable lanyards for work positioning, rope adjustment devices for work positioning, and wood pole climbing equipment- must meet current CSA/ANSI Standards and Provincial/Federal Standards.

4.9.4.2 All equipment used as part of a fall protection system is must be inspected by the worker before it is used on each work shift. Equipment must be kept free from substances and conditions that could contribute to deterioration of the equipment, and re-certified as specified by the manufacturer.

4.9.4.3 An employer must ensure that equipment used as part of a fall protection system is removed from service and either returned to the manufacturer or destroyed if:

- It is defective.
- It has come into contact with excessive heat, a chemical, or any other substance that may corrode or otherwise damage the fall protection system.

4.9.4.4 Workers must ensure that after a personal fall arrest system has stopped a fall, the system is removed from service. The Supervisor must be notified and the equipment must be tagged and quarantined.

4.9.4.5 NO personal fall arrest system that is removed from service shall be returned to service unless a professional engineer or the manufacturer certifies that the system is safe to use

4.9.5 Training

4.9.5.1 **AIRDE** will ensure that all worker is trained in the safe use of the fall protection system before allowing the worker to work in an area where a fall protection system must be used: (all documentation is of training is verified)

4.9.5.2 This training will include the following.

- A review of current provincial and federal legislation pertaining to fall protection
- An understanding of what a fall protection plan is
- Fall protection methods a worker is required to use at a work site
- Identification of fall hazards
- Assessment and selection of specific anchors that the worker may use
- Instructions for the correct use of connecting hardware

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- Information about the effect of a fall on the human body, including maximum arresting force,
- The purpose of shock and energy absorbers
- Swing fall
- Free fall
- Pre-use inspection
- Emergency response procedures to be used at the work site, if necessary
- Practice in inspecting, fitting, adjusting and connecting fall protection systems and components
- Emergency response procedures

4.9.5.3 In addition to the training described in subsection (2), an employer must ensure that a worker is made aware of the fall hazards particular to that work site and the steps being taken to eliminate or control those hazards.

4.10 Medical Emergencies

4.10.1 First Aid Teams

4.10.1.1 There is to be a minimum of 2 persons trained (by an accredited training provider) in Standard First Aid for each office/facility. At a minimum all site supervisors are to be trained in First Aid and CPR. The number of first aid persons required will vary depending on local legislation and client regulations.

4.10.1.2 Names of First Aiders must be posted.

4.10.2 First Aid Supplies

4.10.2.1 Each site/office will have readily accessible to them first aid supplies. These kits must meet at minimum provincial/state requirements, but can be enhanced based on the hazards of the operations. The list of required items is to be documented inside the kit for inventory purposes.

4.10.2.2 First Aid Kits:

- Must be stored in a clean dry location preventing damage or contamination. Any deficiencies must be reported to the supervisor for resolution.
- Must be clearly marked and unobstructed from view
- Unless a tamper seal is placed on the first aid kit:
 - Site: first aid equipment is to be inspected prior to commencement of work to confirm availability and service ability;
 - Building: first aid equipment is to be inspected once per month.

4.10.2.3 Drugs, antiseptics, inhalants, medicines, or proprietary preparations shall not be included in First Aid kits unless specifically approved, in writing, by the Director of HSE&Q or Managing Director.

4.10.2.4 Where the eyes or body may be exposed to hazardous corrosive materials, suitable eye wash station and emergency showers must be available.

4.10.3 Providing First Aid

4.10.3.1 In the event of a medical emergency, the following actions should be taken:

- Notify applicable emergency service, request assistance, and provide the Emergency operator with the following:

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- Name and telephone number;
- Company name and address;
- Time and type of incident;
- Name and quantity of materials released;
- Extent of injuries, if any; and
- Possible hazards to others or the environment;
 - If safe to do so; administer first aid.
 - Stay with the casualty until medical aid arrives.
 - If the injury is minor, the person in charge can make arrangements to bring the casualty to a medical facility.

4.10.4 Review of Emergency Plans

4.10.4.1 Emergency plans must be reviewed quarterly or whenever circumstances have changed that may affect the current emergency response plan. If the plan must be amended, all affected employees must be consulted.

4.11 Rope Access Rescue

4.11.1 All **AIRDE** personnel involved in rope work must be certified by the Industrial Rope Access Trade Association (IRATA) or Society of Professional Rope Access Technicians (SPRAT). They must complete an extensive rope access course which demands that the technician complete rigorous rope rescue training.

4.11.2 **AIRDE** has developed five generic rescue plans. Prior to the commencement of a job, the supervisor must select the appropriate plan needed for rescue. He must review the plan with the technicians prior to conducting the rope work. The plan must be written and attached to the safety talks. They will be reviewed prior to each shift.

4.11.3 In the event of a rope rescue requirement, the Level III Supervisor will be in charge of the rescue. All personnel will take direction from him/her.

5.0 REFERENCES

OSHA 29 CFR 1926.503

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MSP-012 FIRE PREVENTION PROCEDURE

1.0 PURPOSE

1.1 This procedure is developed to provide guidance for fire prevention and proper use of fire extinguishers.

2.0 SCOPE

2.1 The procedure applies to all **AIRDE** personnel, contractors, and subcontractors responsible to follow **AIRDE** procedures.

3.0 RESPONSIBILITY

3.1 All personnel are expected to follow safe work practices for fire prevention.

4.0 PROCEDURE

4.1 Fire Prevention

4.1.1 Wherever the human element exists, the possibility of accidental fire is always present. The best way to fight fire is to prevent it from happening in the first place. Fires do not just happen; they are usually traced to human error. Prevention of fires is the ultimate achievement in fire safety. Fire prevention is everyone's responsibility. If you notice a fire hazard contact your supervisor immediately.

4.1.2 The following fire prevention measures are noted for the purpose of creating a safe environment for occupants and building staff.

4.2 General Hazards

4.2.1 Keep all always, aisles and corridors free from obstructions.

4.2.2 Ensure that all stairwell doors remain closed at all times. They should never be propped open.

4.2.3 Smoking is a major cause of fire deaths. Many fires are related to careless smoking practices. This is a non-smoking facility.

4.2.4 Avoid placing combustible materials directly in contact with an electrical outlet.

4.2.5 Do not hang anything from a fire sprinkler head.

4.2.6 Fire extinguishers shall be readily available.

4.3 Electrical Hazards

4.3.1 Disconnect all electrical appliances with heating elements (e.g. coffee maker) at the end of the workday.

4.3.2 Electrical wiring that is defective, frayed, or cracked must be replaced.

4.3.3 Evidence of electrical arcing in outlets and electrical devices should mean discontinuation of use until a qualified electrician can assess the problem.

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4.3.4 Avoid using extension cords wherever possible. Extension cords are designed for temporary use only. If they are to be used, they should be protected from physical damage. They should never be run under mats or carpets.

4.3.5 If a circuit breaker consistently “trips”, discontinue using the device that is causing the circuit to trip. It must be determined if the device is faulty, or if there is too much current passing through the circuit, or if the circuit wiring is at fault. Only a certified electrician should assess and repair problems in the electrical distribution system.

4.3.6 Circuit breaker panels shall not be covered or obstructed by stored material.
Fire Prevention and Extinguishers.

4.4 Storage Areas

4.4.1 Storage areas should be kept clean and free of rubbish.

4.4.2 Materials should be stacked to ensure stability of the piles.

4.4.3 There should be a clearance of at least 18in. between fire sprinkler heads and stored material.

4.4.4 Light fixtures should be protected by wire guard or cage to prevent accidental breakage of lightbulbs.

4.4.5 Material should not be stored directly touching an electrical outlet.

4.4.6 Electrical equipment and devices should not be operated, or connected to an electrical source in storage rooms.

4.4.7 Doors to storage rooms shall be kept closed at all times.

4.4.8 Flammable and combustible liquids should not be stored in storage rooms used for ordinary combustible materials (e.g. paper, boxes, clothing, linens, etc.).

4.4.9 Hazardous, reactive, or unstable chemicals and substances shall not be stored in storage rooms used for ordinary combustible materials.

4.4.10 Service rooms must not be used for the storage of combustible materials.

4.4.11 Combustible materials shall not be stored under stairwells.

4.5 Flammable and Combustible Liquids

4.5.1 The handling and storage of flammable and combustible liquids are required to comply with applicable requirements of the current National Fire Code (NFC).

- Personnel using hazardous chemicals are required to be familiar with the SDS sheets, which describe the use and handling of chemicals.

- Do not store flammable and combustible liquids with corrosives, oxidizers, reactive chemicals, or compressed gases that they may react with

4.5.2 Flammable and combustible liquids shall be stored in an approved flammable liquid locker and kept away from exits.

4.6 Fire Extinguishment, Control or Confinement

4.6.1 General

4.6.1.1 All employees must receive training on the general use and principles of fire extinguishers use and the hazards associated in incipient stage fire fighting. This will be done through an on-line fire safety orientation to be taken by our employees prior to their initial assignment and at least annually thereafter.

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4.6.1.2 Confining a fire in an enclosed space will keep the fire, smoke and fumes from entering into a means of exit. In many cases this can be accomplished if one remembers to close the door when leaving the fire area.

4.6.1.3 Controlling a fire or preventing its spread, by closing the door, will permit a reasonable period of time necessary for escape from the building.

4.6.1.4 In the event of a fire, judgment may be necessary in deciding which action is appropriate in a given situation.

4.6.1.5 NOTE: The production of noxious fumes in modern buildings makes any attempt at fire fighting extremely dangerous to untrained personnel, particularly if a large amount of smoke is being generated.

4.6.1.6 Fire extinguishment, control and confinement are primarily the responsibility of the Fire Department. Your primary responsibility when you detect smoke or fire is to leave the fire area, taking other occupants with you, close doors behind you, sound the alarm and Dial 911 and notify the fire department of the fire emergency.

4.6.1.7 Note: Some sites will have dedicated emergency numbers, ensure that you know these numbers prior to entering the work site.

4.6.1.8 DO NOT fight fire unless you are trained, properly equipped and confident of your ability to do so life safety is priority. Make sure you have an escape route at all times and a backup person.

4.6.2 Fire Extinguishers

4.6.2.1 The proper use of portable fire extinguishers can extinguish many fires while they are still small. You should be aware, however, that the Fire Department should be notified without delay as soon as any fire is discovered.

4.6.2.2 Portable fire extinguishers are an important part of an overall fire safety program. It is important to keep in mind that the successful use of portable fire extinguishers depends on the following.

- The portable fire extinguishers are properly located and in working order.
- The portable fire extinguishers are of the correct type and size.
- The fire is discovered while still small enough for use of the portable fire extinguishers to be effective.
- The fire is discovered by persons who are ready, willing, trained and able to use the portable fire extinguishers.

4.6.2.3 Also, you should know that portable fire extinguishers are valuable for immediate use on smaller fires. They contain a limited amount of extinguishing material and need to be used properly so that this material is not wasted.

4.6.3 Dry Chemical Fire Extinguishers

4.6.3.1 Most common fire extinguishers in the home.

- They can be used on Class A, B, C, K fires you would find in a kitchen or workshop: combustible solids like wood or paper, combustible liquids like gasoline or grease, and electrical fires.
- The dry chemical works by blanketing the fuel (burning materials) and interrupting the chemical chain reaction at the fuel's surface. To a lesser extent, it dilutes the oxygen content of the air around the fire and absorbs heat.

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- The horizontal range of the dry chemical stream will reach a distance from 5 to 20 feet.
- The approximate discharge time for 10 to 20 pounds of dry chemical ranges from 10 to 25 seconds.
- Disadvantage of ABC, dry chemical fire extinguishers - The multi-purpose chemical is corrosive and damages computers and electronic equipment. The corrosive action may be slow and not evident for several months.

4.6.4 Pressurized Water Extinguishers

4.6.4.1 Pressurized water extinguishers:

- Used for Class "A" fires.
- Water effectively puts out a fire by cooling the fuel (burning combustibles) to a point below the temperature at which the fire can continue to burn or reignite.
- Frequently, it is more effective to create a water spray by putting your finger over the end of the nozzle (as you would with a garden hose).
- The horizontal range of the pressurized water stream will reach a distance from 30 to 40 feet.
- The approximate time to discharge the 2-1/2 gallons of water is one minute.
- Do not use on flammable liquid fire (Class B).
- Do not use on burning appliances that is electrically charged (Class C).

4.6.5 Carbon Dioxide Extinguishers

4.6.5.1 Carbon dioxide extinguishers:

- Used for "B" and "C" fires.
- Carbon Dioxide is a non-flammable gas that extinguishes fire by displacing oxygen, or taking away the oxygen element of the fire triangle.
- CO₂ cylinders are red and range in size from 5 lbs. to 100 lbs. or larger.
- Carbon Dioxide extinguishers are filled with non-flammable carbon dioxide gas under extreme pressure.
- You can recognize a CO₂ extinguisher by its hard horn and lack of pressure gauge.
- The carbon dioxide is also very cold as it comes out of the extinguisher, so it cools the fuel as well.
- Not very effective on Class "A" fires.

4.6.6 Class Fire Extinguishers

4.6.6.1 Class fire extinguishers:

- Used for fires involve combustible cooking media such as oils and grease commonly found in commercial kitchens (K Fires).
- It contains a special wet chemical extinguishing agent that is specially suited for cooking oil and grease fires.
- Reduces the ability of the fire to re-flash.

4.7 Fire Extinguisher Procedures

4.7.1 Before trying to extinguish fire:

- Activate the Fire Alarm System
- Call 911, or site emergency number
- If possible, work with a partner

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- Always have a safe exit route

- Never let the fire come between you and your exit

4.7.2 Procedure to extinguish a fire – The steps for using a fire extinguisher on a fire are (PASS):

- Pull the safety pin
- Aim at the base of the fire
- Squeeze the handles together.
- Sweep the extinguishing agent across the base of the fire

4.7.3 If you feel that you are in danger or you are not sure that you can handle the fire, leave the area immediately and let the Fire Department deal with it.

4.8 Fire Extinguisher Maintenance

4.8.1 Fire extinguishers are to be maintained in accordance with manufacturer's recommendations. They are to be checked monthly and prior to being sent out on any project. This inspection can be done by the Logistics Coordinator or the site supervisor.

4.8.2 All extinguishers will be sent out annually to an outside contractor for an annual maintenance and inspection check.

4.8.3 Quick Chart - Classes of Fire:

4.8.4 Extinguishers are to be of suitable type and size for the relevant fire hazard.

Class A

A fire extinguisher labeled with letter "A" is for use on Class A fires. Class A fires are fires that involve ordinary combustible materials such as cloth, wood, paper, rubber, and many plastics.

Class B

A fire extinguisher labeled with letter "B" is for use on Class B fires. Class B fires are fires that involve flammable and combustible liquids such as gasoline, alcohol, diesel oil, oil-based paints, lacquers, etc., and flammable gases.

Class C

A fire extinguisher labeled with letter "C" is for use on Class C fires. Class C fires are fires that involve energized electrical equipment.

Class D

A fire extinguisher labeled with letter "D" is for use on Class D fires. Class D fires are fires that involve combustible metals such as magnesium, titanium and sodium.

Class K

A fire extinguisher labeled with letter "K" is for use on Class K fires. Class K fires are fires that involve vegetable oils, animal oils, or fats in cooking appliances. This is for commercial kitchens, including those found in restaurants, cafeterias, and caterers.

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MPS 013 FORKLIFT ELEVATED PLATFORM PROCEDURE

1.0 PURPOSE

1.1 To provide guidelines for use of forklifts and other elevated platform equipment.

2.0 SCOPE

2.1 The procedure applies to all **AIRDE** personnel, contractors, and subcontractors and are responsible to follow **AIRDE** procedures. These are only guidelines. Refer to the Manufacturer's operating manual on each type of equipment, due to differences in the equipment used.

2.2 Only designated personnel shall operate machinery covered under this program.

3.0 RESPONSIBILITY

3.1 The Supervisor is responsible for monitoring compliance of this program in the field including ensuring that only designated personnel operate lifting and mobile equipment.

3.2 The Logistics Manager is responsible for compliance in the office warehouses including ensuring that only designated personnel operate lifting and mobile equipment.

4.0 PROCEDURE

4.1 Introduction

4.1.1 Material handling is a significant safety concern. During the movement of products and materials, there are numerous opportunities for personal injury and property damage if proper procedures and caution are not used. This program applies to all powered industrial trucks, including forklifts, platform lift trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines.

4.2 Pre-Qualifications for Powered Industrial Truck Operators

4.2.1 General

4.2.1.1 All candidates for powered industrial truck (PIT) operators must meet the following basic requirements prior to starting initial or annual training.

- Have a driver's license and good driving record.
- No adverse vision problems that cannot be corrected by glasses or contacts.
- No adverse hearing loss that cannot be corrected with hearing aids.
- No physical impairments that would impair safe operation of the PIT.
- No neurological disorders that affect balance or consciousness
- Not taking any medications that affect perception, vision or physical abilities.

4.2.2 Training

4.2.2.1 All operators must complete a certified operating program prior to operating a PIT.

4.2.2.2 Training will be conducted by a 3rd Party Accredited Company which is compliant with local legislation.

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4.2.2.3 At minimum, the training shall consist of two segments including classroom theory and practical evaluation. The training shall cover the mandatory 23 items required under OSHA including, but not limited to:

- Review legislation and fines / penalties relating to act/regulations applicable to local regulations. Forklift, Elevated Platform, Lifting/Mobile Equipment Program
- Outline the responsibilities of Owner, Employer, Supervisors, and Workers.
- Options available to a driver who is asked to perform unsafe work, or an unsafe act.
- Review the classifications of the Industrial Forklifts and highlight differences.
- Pre-shift inspections.
- Stability triangle / trapezoid.
- Centre of Gravity of the load & Centre of Gravity of the truck.
- Capacity, capacity plates (reading & understanding)
- Specific hazards & controls including driving on ramps, visibility, etc.
- How to respond to an emergency situation.
- List specific driving rules.
- Differences between cars vs. PITS
- Refueling/recharging

4.2.2.4 Training will include an evaluation to verify knowledge level.

4.2.2.5 Training shall be valid for three years. If the type of truck changes or the Company believes that the operator requires refresher training due to observed unsafe behaviors, an incident, changed conditions, etc. then refresher training may be required.

4.3 Safe Operating Procedures

4.3.1.1 Only authorized and trained personnel will operate PITs.

4.3.1.2 The operator will perform weekly inspection on the Forklift located in AIRDE buildings. While on external jobs, the operator will conduct pre-trip inspections prior to use. Operators will use the Inspection Form that comes with the PIT. If one is not available, they are to use the generic form attached to this program.

4.3.1.3 Any safety defects (such as hydraulic fluid leaks; defective brakes, steering, lights, or horn; and/or missing fire extinguisher, lights, seat belt, or back-up alarm) will be reported for immediate repair or the PIT will be taken out of service.

4.3.1.4 Operators will follow the proper recharging or refueling safety procedures (as applicable).

4.3.1.5 Loads will be tilted back and carried no more than six inches from the ground. Loads that restrict the operator's vision will be transported backwards.

4.3.1.6 PITs operators will obey site speed limits and slow down on wet floors and going around turns.

4.3.1.7 Operator will sound the horn and use extreme caution when meeting pedestrians, making turns, and cornering.

4.3.1.8 Passengers may not ride on any portion of a PIT. Only the operator will ride PITs.

4.3.1.9 If PITs are used as a man lift, an appropriate man lift platform (cage with standard rails and toe boards) will be used.

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- 4.3.1.10 Aisles will be maintained free from obstructions and wide enough (six-foot minimum) for vehicle operation.
- 4.3.1.11 Lift capacity will be marked on all PITs. Operators will assure the load does not exceed rated weight limits.
- 4.3.1.12 When unattended, PITs will be turned off, forks lowered to the ground, and the parking brake applied.
- 4.3.1.13 All PITs (with the exception of pallet jacks) will be equipped with a multi-purpose dry chemical fire extinguisher.
- 4.3.1.14 Operators must report all accidents, regardless of fault and severity, to the Supervisor.

4.4 Operations

- 4.4.1.1 If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck must be taken out of service until it has been restored to safe operating condition.
- 4.4.1.2 Trucks must not be driven up to anyone standing in front of a bench or other fixed object.
- 4.4.1.3 No person will be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- 4.4.1.4 Unauthorized personnel may not ride on powered industrial trucks.
- 4.4.1.5 Arms or legs may not be placed between the uprights of the mast or outside the running lines of the truck.
- 4.4.1.6 When a powered industrial truck is left unattended, load engaging means must be fully lowered, controls neutralized, power shut off, and brakes set. Wheels must be blocked if the truck is parked on an incline.
- 4.4.1.7 A safe distance must be maintained from the edge of ramps or platforms while on any elevated dock, platform, or freight car. Trucks must not be used for opening or closing freight doors.
- 4.4.1.8 There must be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.
- 4.4.1.9 An overhead guard must be used as protection against falling objects. An overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.
- 4.4.1.10 A load backrest extension must be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.
- 4.4.1.11 PITs must not be parked so as to block fire aisles, access to stairways, or fire equipment.

4.5 Loading

- 4.5.1.1 Only stable or safely arranged loads can be handled. Exercise caution when handling off-center loads that cannot be centered.

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- 4.5.1.2 Only loads within the rated capacity of the truck can be handled.
- 4.5.1.3 Adjust the long or high (including multiple-tiered) loads that may affect capacity.
- 4.5.1.4 Trucks equipped with attachments must be operated as partially loaded trucks when not handling a load.
- 4.5.1.5 A load engaging means must be placed under the load as far as possible. The mast must be carefully tilted backward to stabilize the load.
- 4.5.1.6 Use extreme care when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated is prohibited except to pick up a load. An elevated load may not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, use only enough backwards tilt needed to stabilize the load.

4.6 Elevated Platforms (Specific)

- 4.6.1 These guidelines are applicable to vertically operated elevated work platforms or "Scissors Lifts" and boom mounted, telescoping and rotating, elevating work platforms.
- 4.6.2 Only persons trained in the safe use of these work platforms are authorized to operate these devices.
- 4.6.3 Equipment shall be inspected prior to operation for satisfactory condition, damage and defects. This shall include all operational controls, which shall be in proper functioning condition.
- 4.6.4 Operators shall report all discrepancies to their supervisors.
- 4.6.5 Operators shall consider the job to be performed and shall evaluate the job site location for potential hazards. This equipment shall not be operated within 10 feet of an energized, high voltage source unless danger from accidental contact with that source has been effectively guarded against. The operation of aerial devices/work platforms OVER energized, high-voltage sources of any sort is prohibited at all times.
- 4.6.6 Appropriate measure should be taken to ensure that the job site's surface is stable and will support the equipment and that there are no hazardous irregularities or accumulation of debris which might cause a moving platform to overturn. Survey the route to be traveled, checking for overhead obstructions; traffic; holes in the pavement, ground, or shoulder; ditches, slope of road, etc. Operation of these devices on inclined surfaces shall NOT exceed manufacturers' ratings.
- 4.6.7 Approved safety harnesses, with lanyard, shall be worn when using these work platforms.
- 4.6.8 The safety lanyard shall be securely attached to the boom, basket, tub or platform.
- 4.6.9 Belting-off to an adjacent pole, structure or equipment while working from the basket, tub or platform is NOT PERMITTED.
- 4.6.10 Objects or equipment with the potential of falling from an aerial basket/platform shall be secured with an adequate safety lanyard.
- 4.6.11 The basket, tub or platform shall NOT be loaded beyond its rated capacity.

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4.6.12 Ladders, planks or other objects shall NOT be placed in, or on top of the platform or guard rail to gain greater height. Employees shall NOT sit or climb on the edge of the basket/platform.

4.6.13 Workers shall NOT work from aerial work platforms when:

- Exposed to extreme weather conditions (thunderstorms, heavy rain, extreme heat or cold) unless provisions have been made to ensure protection and safety of the workers.
- Winds exceed 35 km/hour.

4.6.14 Aerial baskets, tubs or platforms shall NOT be supported by, or attached to, any adjacent structures.

4.6.15 Where moving vehicles or pedestrian traffic is present, the work area around the aerial equipment shall be marked by flags, signs, traffic cones or other means of traffic control.

4.6.16 The braking system shall be set when elevating employees. Never leave this equipment unattended if you have stopped it on a ramp, grade or incline.

NOTE: These vehicles will creep if not on a level which can be set to prevent creeping. Avoid stopping on a grade if possible.

4.6.17 Outriggers (if applicable) must be on solid footing and shall be equipped with hydraulic holding valves or mechanical locks at the outriggers.

4.6.18 Operate all controls slowly to ensure smooth platform movement.

4.6.19 Do **NOT** use an aerial device as a welding ground. Do NOT weld on an aerial device without first disconnecting both positive and negative battery terminals. Refer to manufacturer's equipment manual.

4.6.20 Do **NOT** attempt to raise platform/basket beyond its rated maximum height or reach.

4.6.21 Aerial platforms when in operation shall be solely under the control of the operator in the basket. At no time shall the equipment be moved, lowered, or otherwise controlled from the secondary (ground control) panel unless the operator in the basket makes a request that it be done, or the operator is ill or otherwise incapacitated. Switching controls and moving the equipment in any manner without the consent of the operator while the operator is in the basket is prohibited.

4.6.22 Boom-mounted telescoping and rotating aerial platforms shall **NOT** be used as a crane (objects slung below the basket).

4.6.23 When moving scissor lift-type platforms, operators shall first position themselves on board the platform, then conduct all moving operations from that position.

4.6.24 When moving this equipment forward, do not engage the REVERSE switch until the vehicle has come to a complete stop.

4.6.25 Use the REVERSE only as an emergency measure should the equipment continue to crawl after releasing the stop switch.

4.6.26 Use the FORWARD only as an emergency measure should the equipment continue to crawl after releasing the stop switch.

4.6.27 CAUTION: Do not use either of these emergency measures if doing so will endanger anyone in the vicinity.

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4.7 Crane and Overhead Load Moving

- 4.7.1 All **AIRDE** operators shall be trained in the safe work procedures in this program.
- 4.7.2 See MSP-20 for operations near electrical lines.
- 4.7.3 **AIRDE** shall develop written procedures for safely erecting and dismantling a hoist or crane and personnel provided documented training for those procedures.
- 4.7.4 Operating controls shall be plainly marked to indicate the direction of travel.
- 4.7.5 Each hoist shall have the manufacturer's rated load capacity, manufactures name, model, serial number and year of manufacture or shipment date permanently marked or noted clearly, weatherproofed and conspicuously on the equipment and shall be kept legible at all times. The load chart will be issued to the equipment operator, who must have it available at all times when operating the equipment (in the crane cab).
- 4.7.6 If a lifting device is not commercially manufactured, an employer must ensure that it has a plate or weatherproof label permanently secured to it that legibly shows the rated load capacity according to the professional engineer's certification.
- 4.7.7 **AIRDE** shall ensure a copy of the manufactures opening manual for a hoist or crane is readily accessible to the operator and an operator of a hoist or crane is thoroughly trained in and implements the manufacturers recommended operating procedures.

4.8 Prior to Lifting

- 4.8.1 **AIRDE** shall ensure a copy of the manufactures operating manual for a hoist or crane is readily accessible to the operator and an operator of a hoist or crane is thoroughly trained in and implements the manufacturers recommended operating procedures.
- 4.8.2 All loads shall be hooked or slung under the direction of an experienced worker.
- 4.8.3 Prior to operating any equipment the operator must be familiar with all recent entries in its log book.
- 4.8.4 The operator must carry proof of training.
- 4.8.5 Before the start of each shift or use an operator uses a crane or hoist, the operator must inspect the crane or hoist was inspected for that work shift, and the control and safety devices were tested for that work shift to detect any defect, malfunction or hazardous condition.
- 4.8.6 A CO2 or dry chemical fire extinguisher must be immediately available in the cab of each crane or other hoisting equipment.
- 4.8.7 When the operator of a crane or hoist does not have a clear and unobstructed view of the boom, jib, load line, load hook and load throughout the whole range of the hoisting operation, the operator must act only on the directions of a qualified, designated signaler who has a clear view of the things the operator cannot see.
- 4.8.8 Operators of hoisting equipment shall disregard signals from anyone except designated signal persons but in an emergency other worker may give a stop signal.
- 4.8.9 Where the design of a crane is such that the boom may fall over backward, positive boom stops shall be installed in accordance with the manufacturer's instructions.

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4.8.10 **AIRDE** shall develop adequate emergency rescue procedures and communicate these in writing to all workers involved with the hoisting operation.

4.8.11 No worker shall ride or be permitted to ride on loads, hooks or similar equipment unless specifically authorized by his or her supervisor.

4.9 Handling the Load

4.9.1 Side of the Load: The rated capacity of a crane or hoist must not be exceeded, except for rated load test. The working load shall not be exceeded and shall be determined by the original manufacturer of the equipment, a registered professional engineer, or other persons whose qualifications are acceptable to local regulatory requirements.

4.9.2 Attaching the Load: The load shall be attached to the hook by means of slings or other suitable and effective means which shall be properly rigged to ensure the safe handling of the load.

4.9.3 Chain and rope slings shall be free of kinks or twists before use.

4.9.4 Baskets, tubs, skips or similar containers used for hoisting bulk materials shall be loaded so as not to exceed their safe carrying capacity.

4.9.5 The hoist rope shall not be wrapped around the load.

4.9.6 The load shall not be moved without checking the balance and the brakes. Brakes are checked by raising the load a few inches and applying the brakes.

4.9.7 Load Lifting Manual: Safe lifting procedures can be found in the Lifting Handbook located in the operations office as designated for each work site by the Manager.

4.9.8 Safe Lifting: If the operator of a lifting device has any doubts as to the safety of workers in the vicinity of the lift, the operator must not move any equipment or load until the operator is assured that the working conditions are safe. He or she shall report the circumstances to his or her supervisor who then shall be responsible for determining the action to be taken.

4.9.9 Loads will be carried as close to the grade as possible and tag lines shall be rigged as necessary to control swinging of the load.

4.9.10 Prior to moving a load ensure that the travel path of the load is free and clear of any undesirable obstructions.

4.9.11 A suspended load shall not be left unattended by a worker.

4.9.12 Ensure all workers which may be affected by the lift are aware of the hazards and are adequately protected.

4.9.13 **AIRDE** must ensure that work is arranged, if it is reasonably practicable, so that a load does not pass over workers. An operator of a lifting device must not pass the load on the device over workers

unless no other practical alternative exists in the circumstances and the workers are effectively warned of the danger. The operator of a lifting device that is travelling with a load must ensure that the load is positioned as close to the ground or grade as possible.

4.9.14 A person working at a workplace must not stand or pass beneath a suspended load unless the worker has been effectively warned of the danger and the operator of the lifting device knows the worker is under the suspended load.

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4.9.15 Release the load only after the stability of the load has been verified and loads shall be safely landed and supported before unhooking.

4.9.16 If a hoist or crane is designed to be operated with outriggers or other stabilizing devices **AIRDE** shall ensure:

- The outriggers or other stabilizing devices are used in accordance with manufactures instructions.
- Are set on a solid footing or pad.
- Have their controls if any readily accessible to the operator and in a suitable position for safe operation.
- The area around the outriggers or other stabilizing devices is kept free of obstruction.
- There is a minimum clearance of 600mm between any moving part of the crane and any obstacle near the base of the hoist or crane.

4.9.17 Where there is a danger of a worker being trapped or crushed by any moving part of the crane when the crane swings, the area around the base of the crane is barricaded to restrict the entry of workers.

4.9.18 If a crane or hoist will be used to raise or lower workers, **AIRDE** shall develop and implement work practices and procedures that will provide for:

- The safe raising and lowering of the workers.
- Training of the workers in the work practices and procedures.
- Ensure that the hoisting equipment and personnel lifting unit are inspected by a competent person before use and daily when in use.
- Ensure that the competent person records the details of the inspection in the log book.

4.10 Log Book Procedure

4.10.1 A log book shall be set up for each crane with a load capacity of one ton or more, hoist and lifting device. The log book will be kept with the crane or similar hoisting equipment during operation of the equipment and be protected from the environment.

4.10.2 Alberta Operations - **AIRDE** must set up a paper or electronic log book for each lifting device at each work site.

4.10.3 The log book will be readily available at all times to the operator and to another worker concerned with the maintenance and safe operation of the equipment. The operator shall be responsible for recording defects, operating difficulties, the need for maintenance and all maintenance and alteration work performed. If the operator requests, they shall be given a copy of the log book.

4.10.4 The log book for the equipment at a project shall include the greater of the immediately preceding twelve months or the period the crane or similar hoisting device is on the project.

4.10.5 When not being operated the log book will be located in the operations office as designated for each work site by the Manager.

4.10.6 All log book entries shall, on a regular basis, be signed by the person who performs the inspection, maintenance or calibration and review.

4.10.7 The log book will include the following information:

- The date and time any work was performed on the hoist.

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- Length of time in lifting service including hours of service.
- All defects and deficiencies and when they were detected.
- Details on all inspections, examinations, calibrations, checks and tests.
- Repairs or modifications performed or maintenance history.
- The record of certification.
- Details on any incident that may affect the safe operation of the equipment.

4.11 Inspections

4.11.1 Each crane and hoist must be inspected and maintained at a frequency and to the extent required to ensure that every component is capable of carrying out its original design function with an adequate margin of safety and is maintained in good working order. Inspections shall also be conducted at regular intervals as recommended by the manufacturer and by local regulatory requirements.

4.11.2 Records of inspection and maintenance must be kept by the equipment operator and other persons inspecting and maintaining the equipment, for the following types of lifting equipment:

- A crane or hoist with a rated capacity of 900kg (2200 lbs.) or more
- A crane or hoist used to support a worker
- A tower cranes
- A mobile crane, boom truck or sign truck
- A side boom tractor or pipe layer
- A construction material hoist
- A chimney hoists
- A logging truck trailer reload hoist
- Any other type of hoisting equipment specified by local regulatory requirements

4.11.3 The following inspections shall occur at the indicated frequency:

4.11.4 New Equipment: Before being placed in service, new hoisting equipment, or hoisting equipment which has had modifications in the design or has undergone major repairs, shall be inspected and proof tested under the direction of a competent person who shall give the written warranty of the safe capacity of the equipment.

4.11.5 All ropes must be thoroughly inspected before crane is used certified by record of date of inspection, ID of the rope inspected & signature of person performing inspection.

4.11.6 Daily: At the beginning of each shift, the competent operator shall visually inspect:

- The hoist for proper operation and structural elements.
- The limit switches without a load on the hook.
- The hook for deformation and cracks.
- The cable and rigging equipment for excessive wear, broken wires, stretching, kinking, and twisting.
- The load attachment chain for excessive wear, distorted or stretched links.

4.11.7 The following will be tested at the beginning of each shift by the competent operator:

- Limit switches
- Brakes

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- Circuit breakers

- Other safety devices

4.11.8 Whenever anything is wrong or apparently wrong, it shall be reported immediately to the supervisor who then shall be responsible for determining the action to be taken.

4.11.9 Monthly: An inspection and written, signed report must be made by a designated individual at each facility, appointed by the manager, of all components used on or associated with the hoist. Components checked must include:

- Hoist or load attachment
- Chains and their end connections
- Wire rope slings
- Ropes
- Hooks and hook latches
- Motors and brakes
- Push buttons and other electrical equipment
- Hardware, sleeves, bolts, rivets, pins, and drums

4.11.10 Any defects must be corrected before the hoist is used. The report must be dated and signed by the person performing the inspection.

4.11.11 Yearly: Once each year a more detailed inspection must be made of all hoisting equipment at each facility. After completing the annual inspection, a report must be completed and signed by the person performing the inspection and the report will be returned promptly to the Safety Manager.

4.11.12 A mobile crane or boom truck must be inspected at least once every 12 months in accordance with good engineering practice, to ensure it meets the crane or boom truck manufacturer's specifications, the requirements of the applicable design or safety standard, and local regulatory requirements.

4.11.13 A mobile crane or boom truck must not be used after an inspection unless a professional engineer certifies it is safe for use on the basis of that inspection.

5.0 REFERENCES

MSP-20 Electrical Safety & Control of Hazardous Energy Procedure

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MSP 014 HAND TOOL PROCEDURE

1.0 PURPOSE

1.1 To provide guidelines for all employees for the safe use, selection, and maintenance of hand and power when working on a project that requires the usage of power tools.

2.0 SCOPE

2.1 The company has established these guidelines in order to help ensure that all hand and power tools will be in safe working order when needed.

3.0 RESPONSIBILITY

3.1 Supervisors are responsible for monitoring compliance of this procedure. The Supervisor is responsible for quarantining defective tools.

3.2 Every employee is responsible to inspect tools before use. Every employee is responsible to use tools properly and to choose the right tool for the job.

3.3 The Logistics Manager is responsible to ensure defective tools are taken out of service upon return from the field, or as found in the warehouse.

3.4 The OPERATIONS COORDINATOR is responsible for selecting the proper equipment for the job (as required under the scope of work).

4.0 PROCEDURE

4.1 General

4.1.1 All hand and power tools and similar equipment, whether furnished by the employer or the employee, shall be maintained in a safe condition

4.1.2 Prior to using any equipment, it shall be thoroughly inspected for any defects or hazardous conditions that may impair the safe operation of the equipment.

4.1.3 All tools shall be restricted to the use for which they are intended.

4.1.4 The use of cords for hoisting or lowering tools shall not be permitted.

4.1.5 Employees using hand and power tools are exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dust fumes, mists vapors, or gases shall be provided with particular PPE necessary to protect them from the hazard.

4.1.6 When power operated tools are designed to accommodate guards, they shall be equipped with such guards when in use.

4.1.7 Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded if such parts are exposed to contact by employees or otherwise create a hazard. Guarding shall meet the requirements as set forth in American National Standards Institute, B15.1. Guards may not be manipulated in such a way that will compromise its integrity or compromise the protection in which intended.

4.1.8 Unsafe tools are prohibited and shall not be used. The tool should be taken out of services until repaired or replaced. Any tools that are damaged or not in compliance with

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manufacturers or Federal/Provincial Regulations requirements will be tagged unserviceable and placed in a quarantined area until it is determined that it will be repaired or disposed of.

4.1.9 Any condition that may be hazardous will require that the employee not use the tool and instead report the defect to his supervisor.

4.1.10 Electric power operated tools shall either be of the approved double-insulated type or grounded in accordance with section 18 of this manual.

4.1.11 Before starting machinery, an operator must inspect the machinery for loose parts, loose debris around moving parts, etc... She/he must also ensure that starting the machinery will not endanger the operator or another worker.

4.1.12 While operating machinery, an operator must ensure that its operation will not endanger the operator or another worker.

4.1.13 **AIRDE** has very few pieces of machinery or electrically energized equipment. The two most common pieces we have are the bench grinder and the drill press. There is always a potential for the worker to get his/her clothes or jewelry tangled into the moving parts of the machinery. The piece of equipment can seriously injure a person if proper PPE is not used or the worker's clothing gets caught up in them. In order to prevent injury to the worker will be using this equipment and the worker must:

- Wear clothing that fits closely to the body.
- Not wear bracelets, rings, dangling neckwear, a wristwatch or similar articles.
- Have head and facial hair that is short or confined and cannot be snagged or caught.

4.2 Preventative Maintenance

4.2.1 It is the policy of this company to maintain all company tools and equipment in a condition that will maximize the safety of all persons at the workplace. None rope related equipment will be inspected in accordance to the "Manufacturer's specifications". Rope and rope accessories must be inspected in accordance to the Industrial Rope Access Trade Associations (IRATA) guidelines and procedures' and must also meet the minimum requirement in accordance to "Manufacturer's specifications".

4.2.2 To accomplish this goal, this policy shall ensure the following components are met:

- Adherence to applicable regulations, standards and manufacturer's specifications.
- Services of appropriately qualified maintenance personnel.
- Scheduling and documentation of maintenance work.
- Certification of specialized equipment is current.

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MSP 015 HAZCOM PROCEDURE

1.0 PURPOSE

- 1.1 The purpose of this document is to set forth guidelines and procedures for the proper handling, storage, and disposal of hazardous substances in order to ensure a healthful and safe environment for all persons engaged in activities at any of the company's locations.
- 1.2 Upon request, this document shall be made available to employees, their designated representative, and authorized, State, or Federal safety officials.

2.0 SCOPE

- 2.1 This procedure applies to all **AIRDE** employees in the US. It is the intent of this document to reflect and incorporate the legal requirements for the different areas **AIRDE** provides a service.

3.0 RESPONSIBILITY

- 3.1 It is the responsibility of the Director of HR to advise new employee of their requirements for training.
- 3.2 The employee is responsible for taking the training/re-training in accordance with the **AIRDE** training matrix. The Director of HSE&Q is responsible for maintaining the training records.
- 3.3 The OPERATIONS COORDINATOR is to ensure HAZCOM training is completed prior to sending employee to work.
- 3.4 Everyone at **Airde** shares the responsibility and accountability for the implementation of HAZCOM.
- 3.5 The HSE&Q Director will ensure that a written HAZCOM program is developed and implemented at each workplace. It will be maintained on a constant basis to ensure that our employees have the most relevant information for the hazards they are dealing with.

4.0 PROCEDURE

4.1 Legal References

- 4.1.1 It is the intent of this document to reflect and incorporate the legal requirements of: CAL OSHA Section 5194, AB 2185, 2187, and 3377; Federal Hazard Communication Standard CFR1910.1200; and SARA Title III, Emergency Planning and Community Right to Know Act of 1986, as they apply to Hazard Communication Standards.
- 4.1.2 **Airde** will ensure that a written hazard communication program be developed and implemented at each workplace. It will be maintained on a constant basis to ensure that our employees have the most relevant information for the hazards they are dealing with.
- 4.1.3 This HAZCOM program will provide our employees with all relevant information in regards to current SDS, emergency procedures, Labels and warning systems and any other information pertaining to the on-site hazards.

4.2 Site and Site Supervisor

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4.2.1 Each company site, such as a customer facility, or other special facilities, and the company offices, shall be considered a separate site.

4.2.2 Each Field Supervisor shall be made known to employees at each site where hazardous substances are utilized or stored. It is the responsibility of each Field Supervisor and employee to ensure that storage, handling, and disposal of hazardous substances takes place in accordance with the guidelines and procedures set forth in this document.

4.3 Hazard Determination and Disclosure

4.3.1 Hazardous substances are those chemicals that are designated as hazardous by one of the following: the manufacturer; by the Safety Data Sheet; or if they are listed on the "Directors List" of hazardous chemicals, or similar Government List.

4.3.2 Manufacturers and suppliers are required to provide health and safety information to their customers on hazardous substances purchased. This is done through the use of Safety Data Sheets (SDS), which must be provided to the purchaser prior to, or at the time of shipment.

4.3.3 The company will maintain copies of the required SDS for each hazardous substance in the work place and to ensure that these are readily accessible to employees when they are in their work area(s). These chemicals will be identified on the "Hazardous Chemicals" list which will be located with the written HAZCOM Program.

4.3.4 Our company will ensure that an SDS is obtained from the vendor, chemical manufacturer or supplier for each chemical used with the exception to consumer products.

4.3.5 SDS must be current. They must be less than 3 years old or they are invalid.

4.3.6 Any hazardous substance received without the Safety Data Sheet (SDS) should not be utilized until a follow-up request has been sent and an SDS received. If the vendor has not provided the SDS within 25 working days of the request, the local office of CAL/OSHA shall be notified for assistance as specified in the Law.

4.3.7 Only "designated" employees shall have the authority to make purchases involving "hazardous materials". All "designated" company employees who purchase materials shall ensure that vendors and suppliers are notified of the SDS requirement. Open purchase orders shall not include hazardous substances, which by law must be accompanied by a SDS.

4.3.8 The Safety Officer and Field Supervisor will rely on the manufacturer's determination of hazardous material as stated in the information provided on their published Safety Data Sheet (SDS) and the designated government lists of hazardous substances.

4.4 Labels and Other Forms of Warning

4.4.1 Each product that contains hazardous substances must be properly labeled, tagged, or clearly marked with:

- The identity of hazardous substance(s) within.
- Appropriate hazard warnings.
- Manufacturer's name and address.

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4.4.2 Existing labels on incoming containers shall not be removed or defaced unless the container is immediately marked with the information required above.

4.4.3 If existing labels on containers received from suppliers already convey the required information, new labels do not need to be affixed.

4.4.4 Labels will be written in English, for non-English speaking employees, the information will be provided in their language as well.

4.4.5 Hazardous chemicals that are transferred to containers which are intended only for "immediate use" need not be labeled providing that such containers, upon completion of the transfer and use, shall be emptied and devoid of any hazardous residue.

4.4.6 Large containers or other stationary process containers may be labeled with signs or other appropriate written information as long as the container to which the information applies is identified.

4.4.7 Substances that do not have the proper label and/or cannot be identified shall not be used, handled, or stored. In such instances the site coordinator must be notified immediately. The substance must then be identified and properly labeled or removed from the site under the direction of the Safety Officer's office.

4.4.8 Sample of a warning labels:

- NFPA
- Hazardous Materials Information System - HMIS
- DOT Labels

4.5 Employee Information and Training

4.5.1 All employees and new hires (during orientation) shall be provided with effective information and training on hazardous chemicals in their work area. To facilitate this training, Airde has an on-line program which is available through our internal web-based training system.

4.5.2 At each site, department, or area where hazardous substances are utilized or stored, employees shall be provided with information and training on:

- How to handle hazardous materials safely and use personal protective equipment.
- Where to find and how to use Safety Data Sheets (SDS) and the hazardous substances labeling system.
- Where to find and how to use Safety Data Sheets (SDS) and the hazardous substances labeling system.
- Potential physical and health hazards associated with the use of hazardous substances or mixtures.
- Methods and observations used to detect the presence or release of hazardous substances in the work place.
- First aid and emergency procedures to be utilized in the case of spills or accidental overexposure.
- General safety precautions necessary to prevent or minimize exposure to hazardous substances.
- Throughout each site, employees shall be informed whenever any temporary activity involving the use of hazardous materials is to take place. In such cases, employees shall be

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informed of the nature of the activity and advised of any necessary precautions or potential hazards to be avoided.

- Employees shall be advised of the location and availability of the company's written Hazard Communication and Control program.

4.5.3 Employees shall be advised:

- Of the right of the employee and/or the employee's physician or bargaining agent to receive information regarding hazardous substances to which the employee may be exposed.
- That the employee is protected against any form of discrimination due to the employee's exercise of the rights afforded to the provisions of the Hazardous Substances Information and Training Act.

4.6 Outside Contractors

4.6.1 Whenever outside contractors, vendors, suppliers, or emergency responders enter or work at a site or department where hazardous substances are stored or utilized, the site coordinator, or Supervisor shall inform them that their employees may encounter hazardous substances while performing their work, and provide the visitors with access to Safety Data Sheets (SDS) and suggested appropriate protective measures.

4.6.2 Further, a site map shall be prepared to identify the location of areas where hazardous materials are stored or in use. The site map shall be made available to emergency responders and shall be provided upon request, or at the site coordinator's discretion, to employees of outside contractors, vendors, or suppliers.

4.6.3 Whenever it becomes necessary for an employee to perform an unfamiliar, non-routine task, which involves exposure to or utilization of a hazardous substance, the job Supervisor shall ensure that the employee receives appropriate safety and hazard awareness training prior to the work.

4.7 Storage of Hazardous Substances

4.7.1 To the maximum extent possible, all poisons, acids, and flammable chemicals shall be stored separately from all other substances, preferably in designated storage areas or cabinets that are approved for the type of exposure anticipated.

4.7.2 The site coordinator shall schedule periodic inspections to ensure that all hazardous substances on the site are appropriately labeled and stored.

4.7.3 Chemicals and substances utilized in maintenance, and which are particularly vulnerable to incompatibility and possible adverse reaction or accident due to improper storage, should be minimized. To the maximum extent possible, for storage purposes, chemicals and substances should be separated into organic and inorganic groupings and further sorted into compatible families within the two major groupings.

4.8 Hazardous Wastes Disposal Procedures and Regulations

4.8.1 Federal, state, and local environmental regulations require strict control of the handling, storage, and disposal of all materials identified as being hazardous or toxic to human health or the environment. Once such materials have been used within the

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operations, specific restrictions and procedures apply as to their disposal. The following procedures shall be carried out at all sites that generate hazardous waste:

- No hazardous waste may be dumped in drains, sewers, dumpsters, or onto the ground. The only exception is small quantities of some chemicals may be disposed of by drain or dumpster, in accordance with local Sanitation District rules or OSHA guidelines or the Safety Data Sheet (SDS).
- The Safety Officer's office shall be the contact point for all information regarding disposal of hazardous materials. It will arrange for removal (a minimum of quarterly, or as required by law) of hazardous waste by a licensed hazardous waste hauler as needed.
- Hazardous wastes designated for disposal or treatment must be removed from the site by a licensed hazardous waste hauler. Arrangements for any hazardous materials disposal MUST be made through the Safety Officer's office.
- For removal, send an inventory sheet to the Safety Officer's office with name, quantity, and location of hazardous materials.
- When hazardous waste is disposed of from a given site, a manifest list must be prepared by the hauler. Each list must identify the name and amount of each material for disposal.
- A copy of the Environmental Protection Agency (EPA) manifest list and any related documents MUST be forwarded to the Safety Officer's office as soon as they are completed. The ORIGINAL shall be kept on file.
- After the waste has been deposited at an approved dumpsite, another copy of the manifest will be returned to the Safety Officer's office to document proper disposal and site location.
- Each site coordinator shall be responsible for keeping an on-going Hazardous Waste Disposal Manifest File, with copies of all information sent to the Safety Officer's office for the master file. As provided by law, the site Disposal Manifest File is subject to regular inspection by the local HEALTH DEPARTMENT. Appropriate fines may be levied for noncompliance.

4.9 Disclosure Procedure for Emergency Responders and Emergency

4.9.1 Response Plan for Hazardous Spills

4.9.1.1 Compulsory Federal Law (SARA Title III) provides that counties adopt ordinances mandating that businesses or persons using, handling, or storing hazardous materials provide information regarding the location, type and health risks of such materials to emergency responders such as fire department and paramedics.

4.9.1.2 To comply with SARA Title III, the company will provide the designated area agencies the Hazardous Chemical Inventories and Emergency Response Plans. Currently the law applies only to businesses or persons using, storing or handling hazardous materials where:

4.9.1.3 THERE IS AN ESTIMATED TOTAL YEARLY USE IN EXCESS OF 55 GALLONS OF LIQUIDS, 500 POUNDS OF SOLIDS, OR 200 CUBIC FEET OF GASEOUS SUBSTANCES. ONCE THE COMPANY HANDLES THIS AMOUNT OF PRODUCT, IT IS NECESSARY TO DETERMINE HOW MUCH WASTE IS THEN BEING GENERATED. IF IT IS NECESSARY TO RECYCLE OR DISPOSE OF WASTE THROUGH A LICENSED WASTE HAULER, RECYCLER, ETC., THEN THE COMPANY

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MUST BECOME LICENSED AS A GENERATOR OF HAZARDOUS WASTES.

4.9.1.4 Each site coordinator shall maintain an inventory of all hazardous chemicals, the quantities, and the Safety Data Sheets. The updated inventories shall be reviewed on a monthly basis.

4.9.1.5 The Safety Officer's office shall assist in coordinating the program.

4.9.1.6 Copies of Safety Data Sheets (SDS) for all hazardous substances to which employees may be exposed are kept in the Office. As outlined in the company's Hazard Communication Program, the Safety Officer will be responsible for obtaining and maintaining the data sheet (SDS) system for the company.

4.9.1.7 The Safety Officer will review incoming data sheets for new and significant health and safety information. The Safety Officer will see that any new information is provided to employees as necessary.

4.9.1.8 The Safety Officer will review the new SDS's for completeness. If a SDS is missing or incomplete, a new SDS will be requested from the manufacturer or distributor, as applicable. If the Company does not receive the required SDS within the 25-day period mandated under law, the Safety Officer will write to CAL/OSHA as stipulated in the regulations to notify them that the company has met the legal requirements outlined.

4.9.1.9 We shall maintain in the workplace copies of the required Safety Data Sheets for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s). (Electronic access, microfiche, and other alternatives to maintaining paper copies of the Safety Data Sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options.):

4.9.2 Obtaining SDS Forms

4.9.2.1 Obtaining SDS forms requires the following steps.

- SDS Request Letter
 - Follow up Letter if SDS is not received
 - Follow up Letter if SDS is incomplete
 - Letter to CAL/OSHA Reporting Non-Compliance
- 4.9.3 Sample Letters (Instructions for obtaining Safety Data Sheets)

4.9.3.1 Sample Letter 1 – SDS Request Letter

(Chemical Company or Distributor name and address)

RE: SDS for (products)

Dear Sirs: Please send a copy of your Safety Data Sheet (SDS) for the product listed above. The SDS is needed for compliance with the State of California "Hazard Communication" regulation under Section 5194 of Title 8, California Code of Regulations (T8CCR). Please send the SDS to our Safety Officer at the following address:

(Safety Officer name and address) If this product does not require an SDS, please notify us in writing that it meets the exemption, or that it contains no hazardous material as defined in the CAL/OSHA regulations. If this/these product(s) have any special container labels, we would appreciate receiving a sample label(s). If you have any questions regarding our request, please contact our Safety Officer immediately. Sincerely, Logistics Department.

4.9.3.2 Sample Letter 2 – SDS Not Complete, Follow-Up Letter

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(Chemical Company or Distributor name and address)

RE: SDS for (products)

Dear Sirs: Thank you for responding to our request of (date).

We have received the SDS requested. However, it did not contain the information required by GISO Title 8, Section 5194. We are returning the SDS sent to us by your firm. We have highlighted those areas in question for your review. Should you have any questions, please contact us immediately.

Sincerely, Logistics Department

4.9.3.3 Sample Letter 3 – Reporting Non-Compliance, Letter to CAL/OSHA

Dr. John Howard, Chief CAL/OSHA 45 Fremont Street, Room 1200 San Francisco, CA 94105

RE: SDS Request

Dear Sirs: In order to comply with the requirement to have Safety Data Sheets (SDS) in our company,

we requested the SDS for the following product(s) as stipulated in GISO Title 8, Section 5194: As indicated in the enclosed correspondence, non-compliance still exists for the following reason: (circle the one applicable)

A. Did not furnish the SDS

B. SDS sent without the required information.

C. Other. Sincerely, Logistics Department

4.10 Safety Data Sheets (SDS)

4.10.1 General

4.10.1.1 Valuable information for the safe use, handling and disposal of chemical materials on the jobsite may be obtained from the manufacturer or supplier in the form of a Safety Data Sheet (SDS). Each SDS describes the physical and chemical properties of one chemical material or substance. It also provides information for first aid treatment and special personal protection, procedures for cleanups, and precautions for storing and handling that are appropriate to the material.

4.10.1.2 The Safety Data Sheet is designed to inform the user of the properties of the material and to suggest proper controls for protecting employees, property and the environment against injury or damage. The data sheet also helps the user set up and maintain appropriate controls so that he can avoid preventable accidents.

4.10.1.3 Below is an outline of the contents of a Safety Data Sheet.

4.10.2 Section I: Manufacturing Identification

4.10.2.1 Name, address and phone number of the manufacturer. Material and trade names, chemical family and other designations. Pay particular attention to the EMERGENCY TELEPHONE NUMBER. Should an emergency occur, this information should be readily available. The date the SDS was prepared is important because you should always refer to the most recent SDS for accurate information. Not only does new information on chemicals become available with time, but also product formulas change.

4.10.3 Section II: Hazardous Ingredients

4.10.3.1 Hazardous ingredients and their percent (%) concentrations in the material, as well as their toxicity; also, hazardous mixtures of other substances.

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4.10.4 Section III: Physical Data

4.10.4.1 Properties such as boiling point, vapor pressure and density, solubility in water, evaporation rate, percent volatiles, and characteristic appearance and odor.

4.10.5 Section IV: Fire and Explosion Hazard Information

4.10.5.1 Properties such as flash point (method of ignition), auto ignition temperature, and lower and upper limits in the air. This information is very important for materials used near sources of ignition or within poorly ventilated spaces. Also, means of extinguishment and special procedures for firefighting.

4.10.6 Section V: Health Hazard Data

4.10.6.1 Threshold limit value (TLV), effects of overexposure, and first aid treatment for eye or skin contact and inhalation. This information offers a guideline for monitoring exposure during use or handling.

4.10.7 Section VI: Reactivity Data

4.10.7.1 Stability of the material and related conditions to avoid. Other materials that are incompatible. Hazardous decomposition products and hazardous polymerization with related conditions to avoid. This information outlines conditions of use and storage under which the material will remain stable, as well as likely conditions that could cause a dangerous chemical reaction.

4.10.8 Section VII: Spill or Leak Procedures

4.10.8.1 Recommended action for safe clean-ups and for final disposition without posing a hazard to people, property, or the environment.

4.10.9 Section VIII: Special Protection Information

4.10.9.1 Suggestions covering the need for ventilation, respiratory protection, eye protection, gloves, and other protective equipment during exposure to the material.

4.10.10 Section IX: Special Precautions

4.10.10.1 Information on safe storage and handling to avoid hazardous reactions, and Department of Transportation classification.

4.10.11 Glossary of SDS Terms

4.10.11.1 Information sheets, such as Safety Data Sheets for hazardous or toxic substances contain words that may be unfamiliar. The following explanation of terms will help you to understand the SDS.

4.10.11.2 ACGIH: Abbreviation for the American Conference of Governmental Industrial Hygienists, a private organization of occupational safety and health professionals. ACGIH recommends occupational exposure limits for numerous toxic substances and it updates and revises its recommendation as more information becomes available.

4.10.11.3 CARCINOGENIC: Capable of causing cancer.

4.10.11.4 CEILING LIMIT: The maximum amount of toxic substance allowed to be in workroom air at any time during the day.

4.10.11.5 COMBUSTIBLE: Able to catch fire and burn.

4.10.11.6 CONCENTRATION: The amount of one substance in another substance.

4.10.11.7 DECOMPOSITION: Breakdown of a chemical.

4.10.11.8 DENSITY: How much space a given weight of substance takes up. Gold is a very dense substance because a small piece of it weighs a lot. Styrofoam is not very dense

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because it weighs very little but takes up a lot of space. The density of a substance is usually compared to water, which has been given a density value of 1. Substances denser than water (which sink in water) have a density greater than 1; substances that float on water have a density of less than 1.

4.10.11.9 DERMAL: By or through the skin.

4.10.11.10 EXPLOSIVE LIMITS: The amounts of vapor in air sufficient to form explosive mixtures. Explosive limits are expressed as LOWER EXPLOSIVE LIMITS and UPPER EXPLOSIVE LIMITS; these give the range of vapor concentrations in air that will explode if heated. Explosive limits are expressed as a percentage of vapor in the air.

4.10.11.11 FLAMMABLE: Catches on fire easily and burns rapidly.

4.10.11.12 FLAMMABLE LIMITS: See EXPLOSIVE LIMITS

4.10.11.13 FLASH POINT: The lowest temperature at which the vapor of a substance will catch on fire, and then go out, if heat is applied. Provides an indication of how flammable a substance is. Not to be confused with IGNITION TEMPERATURE.

4.10.11.14 HEALTH HAZARD: Anything that can have a harmful effect on health under the conditions in which it is used or produced. There can be both ACUTE and CHRONIC health hazards.

4.10.11.15 IGNITION TEMPERATURE: The lowest temperature at which a substance will catch on fire and continue to burn. The lower the ignition temperature, the more likely the substance is going to be a fire hazard.

4.10.11.16 INFLAMMABLE: Same as FLAMMABLE.

4.10.11.17 INGESTION: Swallowing.

4.10.11.18 LC50: The concentration of a substance in air that causes death in 50% of the animals exposed by inhalation. A measure of acute toxicity.

4.10.11.19 LD50: The dose that causes death in 50% of the animals exposed by swallowing a substance. A measure of acute toxicity.

4.10.11.20 mg/kg: A way of expressing dose: milligrams (mg) of a substance per kilogram (kg) of body weight. Example: a 100 kg (220 pound) person given 10,000 mg (about 0.02 pounds) of a substance would be getting a dose of 100 mg/kg (10,000 mg/100 kg).

4.10.11.21 mg/m: A way of expressing the concentration of a substance in air: milligrams (mg) of substance per cubic meter (m) of air.

4.10.11.22 MILLIGRAM: One-thousandth of a gram.

4.10.11.23 MUTAGENIC: Capable of changing cells in such a way that future cell generation is affected. Mutagenic substances are usually considered suspect carcinogens.

4.10.11.24 NIOSH: Abbreviation for the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services. NIOSH does research on occupational safety and health questions and makes recommendations to OSHA.

4.10.11.25 ODOR THRESHOLD: The lowest concentration of a substance's vapor, in the air, that can be smelled. Odor thresholds are highly variable depending on the individual who breathes the substance and the nature of the substance.

4.10.11.26 OXIDIZER: Any substance that reacts violently with oxygen or that gives off large amounts of energy in a chemical reaction.

4.10.11.27 PEL: Permissible Exposure Limit: means the same as TLV. PEL is often used in

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OSHA Standards instead of TLV.

4.10.11.28 PH: A measure of how acidic or caustic (basic) a substance is on a scale of 1-14. Ph 1 indicated that a substance is very acidic; Ph 7 indicates that a substance is neutral; and Ph 14 indicates that a substance is very caustic (basic).

4.10.11.29 PPM: Parts per million: Generally used to express small concentrations of one substance in a mixture.

4.10.11.30 REACTIVITY: The ability of a substance to undergo change, usually combining with another substance or by breaking down. Certain conditions, such as heat and light, may cause a substance to become more reactive. Highly reactive substances may explode.

4.10.11.31 SOLUBILITY: The amount of a substance that can be dissolved in solution, usually water.

4.10.11.32 SUSPECT CARCINOGEN: A substance that might cause cancer in humans or animals, but has not been proven to do so.

4.10.11.33 TERATOGENIC: Capable of causing birth defects.

4.10.11.34 TLV: Abbreviation for Threshold Limit Value (TLV). The average 8-hour occupational exposure limit. This means that the actual exposure level may sometimes be higher, sometimes lower, but the average must not exceed the TLV. TLV's are calculated to protect most workers for a working lifetime.

4.10.11.35 TOXIC SUBSTANCE: Any substance that can cause acute or chronic injury to the human body, or that is suspected of being able to cause disease or injury under some conditions. Many toxic substances are chemicals or chemical mixtures, but there are other kinds of toxic substances as well (bacteria and viruses, for example).

4.10.11.36 VAPOR: The gas given off by a solid or liquid substance at ordinary temperatures.

4.10.11.37 VAPOR DENSITY: The density of the gas given off by a substance. It is usually compared with air, which has a vapor density set at 1. If the vapor is denser than air (greater than 1) it will sink to the ground; if it is less dense than air (less than 1), it will rise.

4.10.11.38 VOLATILITY: A measure of how quickly a substance forms vapors at ordinary temperatures. Vapor pressure is a measure of volatility. The lower the vapor pressure the lower the volatility.

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MSP 016 HOUSEKEEPING & SANITATION PROCEDURE

1.0 PURPOSE

1.1 This procedure outlines the minimum requirements for housekeeping and sanitation. The purpose of maintaining a certain degree of orderliness or housekeeping is to:

- Ensure the work area is clean and safe before starting a job.
- Reduce the opportunities for fires to start.
- Minimize tripping hazards.
- Contribute to the efficient way of conducting business.

2.0 SCOPE

2.1 This procedure applies to all **Airde** projects.

3.0 RESPONSIBILITY

3.1 The Director of HSE&Q is responsible for developing a written housekeeping procedure and for monitoring and administering this procedure.

3.2 The Field Supervisor is responsible for reviewing the project's written Housekeeping Policy and for monitoring its implementation during site visits. The Field Supervisor is responsible for ensuring that the necessary steps are taken to comply with this procedure.

4.0 PROCEDURE

4.1 General

- 4.1.1 All work areas must be kept clean and should be cleaned after the task is completed.
- 4.1.2 Oily rags and similar combustible materials should not be allowed to accumulate and are to be disposed in approved clean/dirty containers. Rags should be stored in closed, metal containers. Combustible packing materials should be disposed of promptly and safely.
- 4.1.3 Extension cords, welding leads, air hoses, and ropes should not be left on a working platform or passageway. All cords, ropes, etc. should be suspended from the top of the handrails, or on the sides of the main way whenever possible.
- 4.1.4 Trash barrels, or 55-gallon drums marked "Trash Only", should be placed at various locations around the work site so that employees can dispose of trash properly. Containers must be emptied often to prevent strong winds from blowing trash onto the work site.
- 4.1.5 Tower platforms should be kept clean to prevent tripping hazards.
- 4.1.6 All wash areas should be kept clean and orderly. Drains must also be kept clean of debris to prevent clogging.

4.2 Training

4.2.1 Upon hire and periodically thereafter, all employees will receive training in the importance of maintaining a clean and orderly job site. It is the goal of **AIRDE** to maintain

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each job site in a presentable manner for the customer as this is one area which we are graded during their inspections.

4.3 Records

4.3.1 Records of housekeeping infractions will be maintained as part of the overall job site inspection program.

5.0 REFERENCES

OSHA 29 CFR 1926.25 (US ONLY)

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MSP 017 HYDROGEN SULFIDE PROCEDURE

1.0 PURPOSE

1.1 The purpose of this program is to ensure that all of our employees, contractors and the general public are protected from potential exposure to dangerous levels of hydrogen sulfide (H₂S) gas.

2.0 SCOPE

2.1 This program applies to all worksites which may contain H₂S such as refineries, pipelines, oil rigs, sour crude wells, field maintenance sites, tank batteries and wells and other production operations for which our employees may be employed.

2.2 These are sites where hydrogen sulfide is or could be present at concentrations of 10 ppm or greater in the breathing zone. For entry into confined spaces where H₂S may be present, please refer to the Confined Space Entry Program.

3.0 RESPONSIBILITY

3.1 The company and contractors will ensure the necessary equipment is available to test and warn for the presence of dangerous levels of hydrogen sulfide, measure its concentration, indicate wind direction and ventilate the work areas.

3.2 The company and contractors will establish and maintain written operating procedures required to work safely in known or suspected hydrogen sulfide environment.

3.3 Supervisors shall ensure that this procedure is implemented and enforced.

3.4 Employees and contractors shall follow this established program.

3.5 When required, qualified safety professionals will provide technical assistance.

4.0 PROCEDURE

4.1 Location of H₂S

4.1.1 Location where a worker may be exposed to H₂S includes but is not limited to:

- Wellheads or wellbores
- Piping systems
- Vessels
- Tanks
- Production facilities
- Pits and low spots
- Sour spills

4.2 AIRDE Training Program

4.2.1 All AIRDE personnel who are required to work in a potential H₂S environment must have training in the following areas:

- Hazards and characteristics of H₂S and sulfur dioxide (SO₂).
- Toxicity and properties of H₂S and SO₂.
- Use of H₂S detection devices.
- Use and limitations of respiratory protection equipment.

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- Symptoms of exposure.
 - First-aid procedures and equipment.
 - Use of the “buddy system” and emergency rescue procedures.
 - H₂S monitoring systems, alarms and contingency plans
- 4.2.2 All personnel who may enter a known or suspected hydrogen sulfide area shall complete a H₂S refresher course annually. Those who have not been working in this environment for several years must conduct this training prior to entering site.
- 4.2.3 All training shall be documented.
- 4.2.4 All individuals will receive Visitor Indoctrination prior to entering a known or suspected hydrogen sulfide environment.
- 4.2.5 Compliance with federal, provincial, state and local regulations shall be adhered to.

4.3 Health Affects

4.3.1 Some of the health effects associated with H₂S exposure include, but is not limited to:

- Irritating to eyes and respiratory tract
- Conjunctivitis, pain, and photophobia may persist for several days
- Coughing, pain in breathing, pain in nose and throat
- Repeated exposure causes headache, dizziness and digestive disturbances
- Collapse and death

4.4 Code of Practice

4.4.1 A code of practice is required for work sites where there may be more than 10 kg of hydrogen sulfide present as a pure substance, or in a mixture in a concentration over 0.1% by weight and at least 10 kg of hydrogen sulfide in aggregate.

4.4.2 The code of practice should include:

- Company policy and persons responsible for the code of practice
- Safe work procedures
- Required personal protective equipment
- Worker training requirements
- Emergency procedures and designated emergency personnel

4.5 Properties of H₂S

Properties Description Physical State

- Normally encountered as a gas.

Color

- Colorless – No visible sign of H₂S to warn you of its presence.

Odor

- Smells like “rotten eggs” – Impairs your sense of smell at low concentrations

Vapor density

- Slightly heavier than air (1.19 compared to 1.0 for air).
- In gas mixtures, it will be present whenever the gas mixture is found.
- Gas mixtures may be heavier or lighter than air, depending upon their vapor density and temperature compared to the ambient atmosphere (i.e. usually air).

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• In its pure state, or as a high proportion of gas mixture, it may flow or settle into low-lying areas, such as pits, trenches and natural depressions.

Flammability

- Flammable – Burns with a blue flame and gives off Sulphur dioxide (SO₂) gas
- SO₂ is also hazardous and irritates the eyes and the respiratory system. Explosive when mixed with air, depending upon the proportions.

Solubility

- Dissolves in water, oil, sludge, emulsions, well fluids and molten Sulphur.
- H₂S may be released when liquids are agitated, depressurized or heated.

4.6 H₂S Toxicity Levels H₂S Exposure Possible Health Exposure Less than 1 ppm

- You can smell it.

10 ppm

- No known adverse health effects for most people.
- Respiratory protection is required beyond this level.

20 – 200 ppm

- Eye and respiratory tract irritation and loss of smell.
- Headache and nausea.

200 – 500 ppm

- Above effects, but sooner and more severe.
- Loss of breathing and death within hours.

500 – 700 ppm

- Affects the central nervous system.
- Loss of reasoning, loss of balance, unconsciousness and breathing stops within minutes.

700 and above

- Immediate loss of consciousness.
- Permanent brain damage and death if not rescued immediately.

4.6.1 Note: The concentration of H₂S that is considered to be IDLH (Immediately Dangerous to Life and Health) is 100 ppm.

4.6.2 All employees are to refer to the latest SDS when they suspect that they will be working in an H₂S environment.

4.7 Personal Protective Equipment (PPE)

4.7.1 On many sites our personnel will be required to wear personal monitors which specifically detect H₂S. When this is the case, all personnel must receive up to date training on the device that they are provided.

4.7.2 The Short-Term Exposure Limit (STEL) for H₂S is 15 ppm (ref: ACGIH TLV & BEI Book 2008). No worker may be exposed to any concentration exceeding the STEL unless they have been provided with the appropriate respiratory protection.

4.7.3 The only approved type of breathing apparatus for protection from H₂S in the petroleum industry is type that maintains positive air pressure in the face piece. This type of apparatus provides the user with a supply of safe breathing air.

4.7.4 Two kinds of approved air supplying apparatuses are:

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- Self-Contained Breathing Apparatus (SCBA)
 - o the air cylinder must have a 30-minute rating of quality breathing air
 - o the quality of air must meet applicable standards i.e. CSA.
 - o When in use the cylinder must be fully opened to allow a full and continuous flow of air from the cylinder.
 - Supplied Air Breathing Apparatus (SABA)
 - o Must always be equipped with an escape cylinder (for escape purposes only).
 - o the quality of air must meet applicable standards i.e. CSA.
- 4.7.5 Note: The accepted industry practice is to wear breathing apparatus any time a risk of exposure exists.

4.8 Detection Devices

4.8.1 It is very dangerous to trust your sense of smell to detect the presence of H₂S. There are devices specifically designed to detect the presence and concentration of H₂S. Learning how to use these devices properly will reduce the risk of being exposed to hazardous levels of H₂S. It may even save your life!

4.8.2 The two most common detection devices are:

- Electronic H₂S Monitors – The purpose of these devices is to protect your safety by warning of presence of hazardous gas.
 - o Sophisticated electronic devices used to measure concentrations of H₂S and other hazardous gases.
 - o Can provide continuous readings.
 - o May be capable of monitoring more than one gas.
 - o They provide very accurate readings if working properly.
 - o These units are designed to continuously monitor gas levels.
 - o Contains a sensor which detects the presence of H₂S, usually the alarm activation is pre-set to when the concentration of H₂S reaches 10 ppm.
- Detection Tube Devices.
 - o They work by drawing a sample through a tube filled with a chemical that reacts to the presence of H₂S by changing color
 - o the accuracy of detection tubes may vary by up to +/- 25% of the true gas concentration depending on their make or model.
 - o Accuracy can be affected by:
 - ☐ Condition of pump
 - ☐ Age of tube (check expiration date)
 - ☐ Temperature
 - ☐ Operating procedures
 - ☐ Storage conditions
 - ☐ Interference from other airborne contaminants

4.9 Initial Response Strategy

4.9.1 Up to this point you have been advised about the properties of H₂S, where it is found, exposure limits and toxicity levels.

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4.9.2 But what you do when you encounter an H₂S release? Without this knowledge, you could be in very serious danger.

4.9.3 There are seven steps you should take if you encounter an H₂S release:

4.9.4 **SEVEN – STEP INITIAL RESPONSE STRATEGY**

4.9.5 **EVACUATE** – get to a safe area immediately

- Move upwind if release is downwind of you
- Move crosswind if release is upwind of you
- Move to higher ground if possible

4.9.6 **EVACUATE** – get to a safe area immediately

4.9.7 **ALARM** – Call for help (i.e. Man Down!), sound bell, horn, or call by radio

4.9.8 **ASSESS** – Do a head count. Consider the hazards

4.9.9 **PROTECT** – Put on breathing apparatus before attempting rescue. Use the “buddy system” (Method of entry into an environment accompanied by at least one individual who keeps within eyesight at all times.)

4.9.10 **RESCUE** – Remove victim to safe area

4.9.11 **REVIVE** – Apply CPR and First Aid as required

4.9.12 **MEDICAL AID** – Arrange transport of victim to medical aid. Provide information to Emergency Medical services (EMS)

5.0 REFERENCES

OSHA 29 CFR 1926.25 (US ONLY)

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MSP 018 LADDER SAFETY PROCEDURE

1.0 PURPOSE

1.1 To provide guidelines for all employees for the safe use, selection, and maintenance of ladders when working on a project that requires elevated work.

2.0 SCOPE

2.1 This procedure is applicable to all **AIRDE** work sites for the proper use, selection and maintenance of ladders.

2.2 This procedure shall apply to all **AIRDE** personnel.

3.0 RESPONSIBILITY

3.1 Supervisors are responsible for monitoring compliance of this procedure.

3.2 Every employee is responsible to inspect ladders before use. Every employee is responsible to use ladders properly and to choose the right ladder for the job. All **AIRDE** personnel are responsible for the implementation of this program.

3.3 The Supervisor is responsible for quarantining defective ladders.

3.4 The Logistics Manager is responsible to ensure defective ladders are taken out of service upon return from the field, or as found in the warehouse.

4.0 PROCEDURE

4.1 Use and Application

4.1.1 All ladders shall be inspected daily and those which developed defects shall be withdrawn from service for repair or destruction and shall be tagged or marked "Danger, Do Not Use." Improvised repairs shall not be made.

4.1.2 Workers are not to use a ladder to enter or leave an elevated or sub-level work area if the area has another safe and recognizable way to enter or leave it.

4.1.3 Ladder rungs, cleats, and steps shall be parallel, level, and uniformly spaced when the ladder is in position for use.

4.1.4 All ladders shall be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one quarter of the assembled length of the ladder (i.e., the length along the ladder between the foot and the top support).

4.1.5 Portable metal ladders shall not be used in the vicinity of electrical circuits in places where they may come in contact with them. Portable metal ladders shall be legibly marked with signs reading "CAUTION Do Not Use around Electrical Equipment," or equivalent wording. Only non-conductive ladders are to be used around energized or potentially energized equipment.

4.1.6 Ladders shall be stored in such a manner as to provide ease of access or inspection, and to prevent danger of an accident when withdrawing a ladder for use. Ladders, when not in use, shall be stored at a location where they will not be exposed to the elements, but where there is good ventilation. Wood ladders shall not be stored near radiators, stoves, steam pipes, or other places subjected to excessive heat or dampness. Rungs shall be kept free of grease and oil.

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4.1.7 Sectional ladders shall not be used by more than one man at a time, or with ladder jacks and scaffold planks.

4.1.8 The ladder should be placed at a 4:1 ratio when placed against a structure. Ensuring the base of an inclined portable ladder is no further from the base of the wall or structure than 1/4 of the height to where the ladder contacts the wall or structure.

4.1.9 The ladder side rails shall extend at least 1 m above the upper landing surface, platform or parapet if the ladder is used as a means of access to the platform, landing or parapet. When ladders are not able to be extended then the ladder shall be secured at its top to a rigid support.

4.1.10 Ladders are to be placed on a sturdy and stable, level surface. Portable ladders shall be tied, blocked or otherwise secured to prevent displacement.

4.1.11 The top rest for the ladder shall be rigid and shall have ample strength to support the applied load. Ladders shall not be placed in front of doors unless the door is blocked open, locked or guarded. They shall not be placed on boxes, barrels or other unstable bases to obtain additional height.

4.1.12 When ascending, working upon or descending the ladder, the user shall face the ladder.

4.1.13 Personnel are not to carry anything in their hands that may cause them injury in case of a fall.

4.1.14 The use of ladders with hooks attached, to be hung on or over a parapet wall or other projection, shall not be permitted in window cleaning.

4.1.15 No employee shall be permitted to stand on or work from the top 3 rungs, steps, or cleats, of a portable ladder unless the manufacturer's specifications allow the worker to do so.

4.1.16 Ladders shall not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.

4.1.17 Ladders shall be used solely for the purpose for which they were designed.

4.1.18 No ladder shall be used where the base of the ladder is above grade unless there is a safe means of access to the base and adequate fastenings to prevent the ladder from slipping or falling.

4.1.19 Ladders shall not be used on scaffolds to gain additional height.

4.1.20 Ladders shall be maintained free of oil, grease, and other slipping hazards.

4.1.21 NOTE: Tops of self-supporting ladders shall not be considered as a rung.

4.2 Specifications

4.2.1 All ladders (metal, wooden, plastic reinforced, fiberglass, etc.) shall comply with the requirements of the applicable standard dependent on the ladder to be used.

4.2.2 Wooden ladders shall not be painted.

4.2.3 All ladders shall be equipped with non-slip bases suitable to the bearing surface.

Middle and top sections shall not be used as bottom sections unless the user equips them with non-slip bases:

4.3 Ladders

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4.3.1 All portable ladders shall be at least Type 1 heavy duty ladders and shall be designed and constructed in accordance with applicable specifications.

4.3.2 All special purpose portable ladders ordered or purchased after January 1, 1993, shall have a permanent and durable label containing the following information:

- Manufacturer's Name;
- Date of Manufacturer;
- Type and/or Duty Rating;
- Approval Certification

4.4 Inspection of Ladders

4.4.1 Ladders shall be inspected by a competent person for visible defects on a periodic basis and after any occurrence that could affect their safe use.

4.4.2 Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components, shall either be immediately marked in a manner that readily identifies them as defective, or be tagged with "Do Not Use" or similar language, and shall be withdrawn from service until repaired.

4.4.3 Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split rails, or corroded components, shall be withdrawn from service until repaired. The requirement to withdraw a defective ladder from service is satisfied if the ladder is either:

- Immediately tagged with "Do Not Use" or similar language.
- Marked in a manner that readily identifies it as defective.
- Blocked (with a plywood attachment that spans several rungs).

4.5 Fixed Ladders

4.5.1 All fixed ladders installed before the effective date of these orders and after June 1, 1972 shall meet the specifications contained in the American National Standards Institute (ANSI) A14.3 56 and those installed after July 1, 1992 shall meet the specifications contained in ANSI A14.3 84, for ladders a fixed safety requirement, which is hereby incorporated by reference.

4.6 Protection from Deterioration

4.6.1 Metal

4.6.1.1 Metal ladders and appurtenances shall be painted or otherwise treated to resist corrosion and rusting when location demands. Ladders formed by individual metal rungs imbedded in concrete, which serve as access to pits and to other areas under floors, are frequently located in an atmosphere that causes corrosion and rusting. To increase rung life in such atmosphere, individual metal rungs shall have a minimum diameter of 1 inch or shall be painted or otherwise treated to resist corrosion and rusting.

4.6.2 Wood

4.6.2.1 Wood ladders, when used under conditions where decay may occur, shall be treated with a nonirritating preservative, and the details shall be such as to prevent or minimize

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the accumulation of water on wood parts. Wood ladders shall not be painted but may be coated with a clear sealant after inspection has assured that all requirements of 3278 have been met.

4.6.2.2 NOTE: Paint does not act as a wood preservative.

4.6.3 Combined Materials

4.6.3.1 When different types of materials are used in the construction of a ladder, the materials used shall be so treated as to have no deleterious effect, one upon the other.

4.6.4 Landing Platforms

4.6.4.1 When ladders are used to ascend to heights exceeding 20 feet (except on chimneys), landing platforms shall be provided for each 30 feet of height or fraction thereof, except that, where no cage, well, or a ladder safety device is provided, landing platforms shall be provided for each 20 feet of height or fraction thereof. Each ladder section shall be offset from adjacent sections. Where installation conditions (even for a short, unbroken length) require that adjacent sections be offset, landing platforms shall be provided at each offset. [See Ladder Safety Devices below].

4.6.4.2 Where an employee has to step a distance greater than 12 inches from the center line of the rung of a ladder to the nearest edge of structure or equipment, a landing platform shall be provided. The minimum step across distance shall be 2 ½ inches.

4.7 Ladder Safety Devices

4.7.1 Ladder safety devices may be used on tower, water tank, and chimney ladders more than 20 feet in unbroken length in lieu of cage protection. No landing platform shall be required in these cases. All ladder safety devices such as those that incorporate life belts, friction brakes, and sliding attachments shall meet the design requirements of the ladders which they serve.

4.8 Design Considerations

4.8.1 All ladders, appurtenances, and fastenings shall be designed to meet the following load requirements:

- The minimum design live load shall be a single concentrated load of 200 pounds. The number and position of additional concentrated live load units of 200 pounds each as determined from anticipated usage of the ladder shall be considered in the design.
- The live loads imposed by persons occupying the ladder shall be considered to be concentrated at such a point or points as will cause the maximum stress in the structural member being considered.

4.9 Training

4.9.1 **AIRDE** will provide training for all employees in the proper use, selection and maintenance of ladders. It is the responsibility of the Site Supervisor to ensure that this program and policy are properly implemented.

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4.10 Records

4.10.1 Ladder inspection records will be maintained on file.

5.0 REFERENCES

CSA Standard CAN3-Z11-M81,

ANSI Standard A14.1-2000,

ANSI Standard A14.2-2000 or

ANSI Standard A14.5-2000

ANSI A14.3 56

ANSI A14.3 84

US - Section 3278, Portable Wood Ladders of the General Industry Safety Orders

US - Section 3279, Portable Metal Ladders of the General Industry Safety Order

US-Section 3280 of the General Industry Safety Orders.

US -Sections 3278 and 3279 of the General industry Safety Orders.

Cal/OSHA Sec. 3277, 3278, 3279, 3280

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MSP 019 LEAD AWARENESS PROCEDURE

1.0 PURPOSE

1.1 This program is intended to supply suitable information about the potential toxic effects of lead and its compounds such that adequate measures can be taken to limit exposures through controls in the workplace.

2.0 SCOPE

2.1 Airde will ensure that all potential sources of lead within our facility(s) or host employers are evaluated. This standard practice instruction is intended to address comprehensively the issues of; evaluating and identifying potential sources of lead, evaluating the associated potential hazards, communicating information concerning these hazards, and establishing appropriate procedures, and protective measures for employees, to include both engineering and administrative controls to help reduce the PEL exposure.

3.0 RESPONSIBILITY

3.1 The Director of HSE&Q is responsible for the administration and implementation of this policy and for overseeing the training of all AIRDE employees.

3.1.1 The on-site Supervisor is responsible for the day-to-day implementation of this procedure on any jobsite. It is the responsibility of the Supervisor to ensure that this program is followed and maintained to the letter or they will be subject to disciplinary action. When working on multi-contractor worksites, the Supervisor shall ensure that the crew is protected from exposure.

3.2 The client is responsible to identify specific locations of possible lead exposure and ensuring signage is posted to warn employees of lead contaminated materials. All employees will abide by these warnings, no exceptions.

4.0 PROCEDURE

4.1 Definitions

4.1.1 Lead means metallic lead and all inorganic lead compounds. Excluded are all organic lead compounds.

4.1.2 Action Level is an OSHA designated level of employee exposure to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 ug/m3), averaged over an 8-hour period (without regard to the use of respirators).

4.1.3 Permissible Exposure Limit (PEL) An employee may not be exposed to lead at concentrations greater than 50 micrograms of lead per cubic meter of air (50 ug/m3), averaged over an 8-hour work day.

4.1.4 Medical Removal Protection Benefits For the purposes of this program, Medical Removal Protection Benefits means that the employer shall maintain the earnings, seniority and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to lead or otherwise limited.

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4.1.5 Employee Exposure that could occur if the employee were not using a respirator.

4.2 Lead Control Program

4.2.1 Lead has been shown to cause a wide variety of health effects. Many of the effects have been known since ancient times, although some of the more subtle effects have been discovered only recently.

4.3 Routes of Entry

4.3.1 General

4.3.1.1 It is important to understand the ways that lead can get into the body. This is referred to as routes of exposure. With lead, there are two main routes of exposure: inhalation and ingestion.

4.3.2 Inhalation

4.3.2.1 This is by far the most important exposure route in construction. Lead may be in the air if dust is created by grinding or similar procedures, or if fumes are created by welding torches. High levels of lead may be present yet not be visible to the naked eye. This airborne material is easily breathed in by any workers in the vicinity. Once inhaled, air follows a pathway from the nose to the windpipe, and then travels to the lungs.

4.3.3 Ingestion

4.3.3.1 Ingestion exposures can happen on the job in surprising ways. Many cases have been documented where workers consumed significant amounts of lead because they handled food and cigarettes before they washed the lead dust off their hands and clothes.

4.4 Where Does Lead Go in the Body

4.4.1 Once in the bloodstream, lead goes with the blood to the kidney. The kidney's job is to purify the blood before it is distributed for use by the rest of the body. However, the kidney is not effective in removing lead; so much of the lead is carried by the bloodstream to other organs of the body, where some of it is stored. Lead can be stored in bones, in organs, such as the liver and kidney, and in fatty tissue. Lead can be stored in the bones for a long time. The total amount of lead stored in the body is called the "body burden." Lead stored in the body can be slowly released over time. It means that the body can continue to be exposed to lead months or years after the original exposure.

4.5 Effects of Lead Exposure

4.5.1 General

4.5.1.1 Toxic effects are typically broken down into two categories: acute (short-term) effects and chronic (long-term) effects.

4.5.2 Acute Affects

4.5.2.1 Acute effects show up relatively soon after serious exposure occurs. Excessive exposure to lead can result in a variety of symptoms, including a metallic taste, stomach

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pain and vomiting, diarrhea, and black stools. Severe exposure can cause nervous system damage, with symptoms such as intoxication, coma, respiratory arrest, and even death.

4.5.3 Chronic Affects

4.5.3.1 Acute effects show up relatively soon after serious exposure occurs. Excessive exposure to lead can result in a variety of symptoms, including a metallic taste, stomach pain and vomiting, diarrhea, and black stools. Severe exposure can cause nervous system damage, with symptoms such as intoxication, coma, respiratory arrest, and even death.

4.6 Medical Treatment of Lead Poisoning

4.6.1 Medical treatment of workers with lead poisoning involves removal from further exposure and sometimes involves administration of special drugs called chelating agents. Chelate is a Latin word for claw, and these drugs work by latching on to lead in the body. The chelating agent is then excreted from the body through the urine. However, the chelating agents also can latch onto other mineral nutrients, such as calcium and manganese, causing the person additional health problems. Consequently, chelating agents must be given under the strict supervision of a doctor.

4.6.2 Chelation is an important tool for ridding the body of excess lead. It does not protect or cure lead inflicted damage to tissues. It does limit the lead available to cause such damage. Keep in mind that Chelation is a last resort. Chelation is a very painful process. The OSHA lead construction standard prohibits the prophylactic use of chelating agents.

4.7 Program Elements

4.7.1 The program consists of the following sections:

- OSHA Lead Standard 1926.6
- Determining Exposure Through Monitoring
- Employee Notification
- Compliance Program
- Engineering Work Practice Controls
- Respiratory Protection Program
- Protective Clothing and Equipment
- Housekeeping Hygiene and Locker Rooms
- Lunch Area
- Administrative Controls
- Ventilation
- Medical Surveillance Program
- Medical and Biological Monitoring
- Examinations and Consultations
- Examination Content
- Protection Benefits
- Employee Notification
- Training
- Signs

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- Recordkeeping
- Exposure Monitoring
- Examinations
- Records Availability

4.8 OSHA Lead Standard 29 CFR 1926.62

4.8.1 The government has designated lead and associated lead compounds as toxic substances. The standard mandates specific responsibilities of an employer and employees regarding the potential hazards associated with exposure to lead. Employers are required to determine through exposure monitoring, when employees may be exposed to lead at regulated levels during operations and take additional measures outlined hereafter to control such exposure.

4.9 Determining Exposure through Monitoring

4.9.1 For the purpose of this program, OSHA considers exposure as that which would occur were the employee not using a respirator. In making this determination, AIRDE is obliged to arrange for the collection of personal air samples to include at least one sample for each shift for each job classification in each work area for at least 7 continuous hours. Full shift personal samples shall be representative of the monitored employee's regular, daily exposure/work assignment. Sample collection may be performed by company personnel trained in sampling instrumentation and techniques or by outside consultants. Initial determination may be limited to a representative sample of exposed employees that AIRDE reasonably believes could be exposed to the greatest airborne concentrations of lead. In addition to monitoring, the following considerations may also contribute to exposure:

- Information, observations, or calculations which would indicate employee exposure to lead.
- Previous measurements of airborne lead contaminants.
- Any employee complaints of symptoms that may be attributed to lead exposure.

4.9.2 Where a determination is made that no one is exposed to airborne lead at or above the Action Level of 30 ug/m³, AIRDE shall create a written record of such determinations. Records shall include the date of sampling, location within the workplace, the name and social security number of each employee monitored, brief description of job task and analytical results. If initial monitoring reveals employee exposure to be below the Action Level, measurements need not be repeated and documentation shall be maintained.

4.9.3 Should initial or subsequent monitoring reveal employee exposure to be at or above the Action Level but below the OSHA Permissible exposure limit of 50 ug/m³ (PEL), AIRDE shall repeat monitoring at least every six (6) months. AIRDE will continue monitoring at that frequency until at least two consecutive measurements, taken a minimum of seven (7) days apart, are below the Action Level. AIRDE may then discontinue monitoring at that frequency.

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4.9.4 When initial monitoring reveals that employee exposure is above the PEL **AIRDE** shall repeat monitoring quarterly and will continue monitoring at that frequency until at least two consecutive measurements, taken at least seven (7) days apart, are below the PEL, but at or above the Action Level at which time **AIRDE** will repeat monitoring every six (6) months.

4.9.5 Sampling should also be performed whenever there is a change in operations, processes, controls or personnel which may result in exposure to lead.

4.10 Employee Notification

4.10.1 Within five (5) working days of receipt of monitoring results, **AIRDE** will notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to affected employees. When results indicate that the employee exposure, (without regard to respirator use), the Permissible Exposure Limit, **AIRDE** will include a written statement that the Permissible Exposure Limit was exceeded and a description of the corrective action taken or to be taken to reduce exposure below the PEL.

4.11 Compliance Program

4.11.1 This Program is the written document outlining the appropriate measures to be taken to eliminate or minimize exposure through engineering and work practice controls.

4.11.2 Documentation of steps attempted should include:

- A description of each operation in which exposure to lead or its compounds are emitted: e.g. machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices.
- A description of the specific means that are employed to reduce airborne levels, including engineering plans and studies prepared for controlling exposure to lead.
- A report of the technology considered in meeting the Permissible Exposure limit.
- Air monitoring data which documents the source of lead emissions.
- A schedule for implementing the program, including documents like purchase orders for equipment, outside consultants, correspondence, etc.
- A description of appropriate work practices.
- Administrative control schedule, if applicable.
- Other relevant information.

4.11.3 The Program is required to be made available in the workplace for examination to OSHA representatives, affected employee(s), or their authorized representative. Copies of the program may be provided upon written request by an individual to management. The written program should be updated to reflect changing conditions (if any) and the status of the Program. The program will be revised and updated manually.

4.12 Engineering and Work Practice Controls

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4.12.1 Where the employee is exposed to lead above the Permissible Exposure Limit for more than 30 days per year, **AIRDE** will implement engineering and work practice controls (including administrative controls) to reduce such exposure. Whenever the engineering and work practice controls are not sufficient to reduce employee exposure below the PEL, **AIRDE** will nonetheless continue to use them to reduce exposures to the lowest feasible level and supplement controls by the use of respiratory protection.

4.12.2 Where employees are exposed to lead above the PEL less than 30 days per year, **AIRDE** will implement any combination of engineering, work practice (including administrative controls), and respiratory controls to reduce and maintain employee exposure at or below 50 ug/m3.

4.13 Respiratory Protection

4.13.1 Only respirators approved by NIOSH or MSHA shall be provided by **AIRDE** at no cost to employees. When provided, the responsible supervisor/foreman shall assure use of respiratory devices by their affected employees.

4.13.2 Respirator use is required when work practice controls do not reduce employee exposure below the 50 ug/m3 PEL. The respirator shall also be used during the time period necessary to install or implement engineering controls and where engineering and work practices controls are insufficient and in emergencies. The maximum time **AIRDE** may require an employee to use a negative pressure respirator is 4.4 hours per day. Air monitoring results are necessary to determine the appropriate type of respiratory equipment.

4.13.3 Provision of such protection shall be in accordance with **AIRDE** Respiratory Protection Program, OSHA Standard 1910.134, and the table below.

RESPIRATORY PROTECTION FOR LEAD AEROSOLS

Airborne concentration of lead or condition of use

- Required respirator

Not in excess of 0.5 mg/m3

(10 X PEL)

- Half mask, air purifying respirator equipped with high efficiency filters.

Not in excess of 2.5 mg/m3

(50 X PEL)

- Full face piece, air purifying respirator with high efficiency filters.

Not in excess of 50 mg/m3

(1000 X PEL)

- Any powered, air purifying respirator with high efficiency filters

- 1 half mask supplied air respirator operated in positive-pressure mode.

Not in excess of 100 mg/m3

(2000 X PEL)

- Supplied air respirators with full face piece, hood, helmet or suit,

operated in positive pressure mode. Greater than 100 mg/m3, or unknown concentration

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- Full face piece, self-contained breathing apparatus operated in positive pressure firefighting mode.

4.13.4 **AIRDE** will assure that any respirator issued to employees exhibit minimum facepiece leakage and that the respirator is fitted properly. Quantitative or qualitative face fit tests at the time of initial fitting and every six months thereafter is required (per OSHA) since the adequacy of facial seals are dependent upon a number of factors including type, size and condition of a respirator, facial hair, and facial configuration.

4.13.5 A proper face seal must be achieved in order for the respirator's protection to be afforded.

4.14 Protective Work Clothing and Equipment

4.14.1 When an employee is exposed to lead above the PEL or where the possibility of skin or eye irritation exists, **AIRDE** (at no cost to the employee) will provide and assure that the employee uses appropriate protective work clothing and equipment such as, but not limited to.

- Coveralls or similar full body work clothing.
- Gloves, hats and disposable shoe coverlets.
- Face shields, vented goggles, or other appropriate protective equipment which complies with OSHA Standard 1910.133.

4.14.2 Protective clothing is to be provided by **AIRDE** in clean and dry condition at least weekly and daily to anyone that works in atmospheres exceeding 200 ug/m³ as an 8-hour Time Weighted Average (TWA).

4.15 Housekeeping

4.15.1 Work surfaces shall be maintained as free as practicable of accumulations of lead dust. Floors and other surfaces shall not be cleaned by the use of compressed air. Shoveling, wet sweeping and wet brushing may be employed to minimize airborne concentrations. Vacuuming methods may also be used in cleaning small surface concentrations and equipment provided that the bag is an approved HEPA filtration system. Using and emptying vacuums shall be accomplished in a manner which minimizes the dispersion of lead.

4.16 Hygiene and Locker Rooms

4.16.1 **AIRDE** will assure that in areas where employees are exposed to lead above the PEL, food, beverage, and tobacco products shall not be present or consumed, and cosmetics not applied. Employees are to wash hands and face if they come in contact with lead materials.

4.16.2 **AIRDE** will provide clean change rooms for employees that work in areas where airborne lead concentrations exceed the PEL Furthermore, and **AIRDE** will assure that the change rooms are equipped with showers, hygiene facilities separate storage facilities for protective work clothing and equipment and for street clothes to prevent cross-contamination. Employees that work in areas

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where their airborne exposure to lead is above the PEL, shall be required to shower at the end of the work shift. Employees required to shower shall not be permitted to leave the site wearing any work clothing.

4.16.3 **AIRDE** will also provide for the cleaning laundering or disposal of protective clothing and will repair or replace required protective clothing or equipment as needed to maintain its effectiveness. All contaminated protective clothing shall be placed in a closed container in the change room to prevent dispersion of lead dust outside the container.

4.16.4 Containers of contaminated protective clothing and equipment are to be labeled as follows:

– CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE OR FEDERAL Regulations.

4.16.5 **AIRDE** shall prohibit the removal of lead dust from clothing or equipment by blowing, shaking, or any other means which disperses the contaminant into the air.

4.16.6 The laundering service shall be informed in writing of lead contaminated clothing.

4.17 Lunch Area

4.17.1 **AIRDE** will maintain lunchroom facilities which are temperature controlled, under positive pressure, and have a filtered air supply.

4.17.2 **AIRDE** will assure that employees wash their hands and face prior to eating, drinking, smoking or applying cosmetics and assure that employees do not enter the lunchroom facilities with protective work clothing or equipment unless surface lead dust has been removed by vacuuming, wet wiping and other cleaning techniques.

4.18 Administrative Controls

4.18.1 If administrative controls are used as a means of reducing employees TWA exposure to lead, **AIRDE** will establish and implement a job rotation schedule which includes:

- Name or identification number of each affected employee.
- Duration and exposure levels at each job or work station where each affected employee is located.
- Any other information which may be useful in assessing the reliability of administrative controls to reduce exposure to lead.

4.19 Ventilation

4.19.1 When ventilation is used to control exposure, measurements which demonstrate the effectiveness of the system in controlling exposure, such as captive velocity, duct velocity, or static pressure will be made at least every 3 months.

4.19.2 Measurements of the system's effectiveness in controlling exposure will be made within 5 days of any change in work, process, or control which might result in a change in exposure to lead. Should the air from the exhaust ventilation be re-circulated into the workplace, **AIRDE** will assure that the:

- System has a high efficiency filter with a reliable backup filter; and

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- Controls to monitor the concentration of lead in the return air and to bypass the recirculation system automatically if it fails are installed, operating, and maintained.

4.20 Medical Surveillance Program

4.20.1 A medical surveillance program shall be instituted for all **AIRDE** employees that are exposed above the Action Level for more than 30 days per year. All medical examinations and procedures shall be performed by a licensed physician and provided at no cost to the employees.

4.20.2 Medical examinations & procedures shall be performed by or under the supervision of a licensed physician. The medical surveillance is provided without cost to the employees.

4.20.3 Biological Monitoring shall be provided in the form of blood sampling and analysis for lead and zinc protoporphyrin (ZPP), levels to all affected employees on the following schedule:

- At least every 6 months.
- At least every two months for each employee whose last blood sampling and analysis indicated a blood level at or above 40 ug/100 g of whole blood. This frequency shall continue until two consecutive blood samples and analyses indicate a blood lead level below 40 ug/100 g of whole blood.
- At least monthly during the removal period.
- Whenever results of a blood lead level test indicate that an employee's blood lead level exceeds 40 ug/100 mg the numerical criterion for medical removal. A follow-up blood test will be provided within two (2) weeks upon receiving the first results.
- **AIRDE** shall remove an employee from work having an exposure to lead at or above the action level (30 ug/m3) on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

A "final medical determination" means the outcome of multiple physician review.

4.20.4 NOTE: An employee may return to his/her former job status when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

4.21 Examinations and Consultations

4.21.1 **AIRDE** shall make available medical examinations and consultations to each employee in accordance with the following schedule:

- At least annually for each employee for whom a blood sampling test conducted at any time during the preceding 12 months indicated a blood lead level at or above 40 ug/100 g.
- Prior to assignment for each employee being assigned for the first time to an area in which airborne concentrations of lead are at or above the Action Level.
- As soon as possible, upon notification by an employee either that the employee has developed signs or symptoms commonly associated with lead intoxication, that the

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employee desires medical advice concerning the effects of exposure to lead on the ability to procreate a healthy child, or that the employee has demonstrated difficulty in breathing during a respirator fitting test or during use.

- As medically appropriate for each employee either removed from exposure to lead due to a risk of sustaining material impairment to health, or otherwise limited pursuant to a final medical determination.

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4.22 Medical Examination Content

4.22.1 Medical examinations shall include the following elements:

- A detailed work history and a medical history, with particular attention to past lead exposure (occupational and non occupational), personal habits (smoking, hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and neurological problems.
- A thorough physical examination with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, and neurological systems. Pulmonary status should be evaluated if respiratory protection will be used.
- A blood pressure measurement.
- Blood sample and analysis which determines blood lead level, hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology, zinc protoporphyrin, blood urea nitrogen; and serum creatinine.
- A routine urinalysis with microscopic examination.
- Any laboratory or other test which the examining physician deems necessary by sound medical practice.

4.22.2 If **AIRDE** selects the initial physician who conducts any medical examination or consultation provided to an employee, the employee may designate a second physician.

- To review any findings, determinations or recommendations of the initial physician.
- To conduct such examinations, consultations and laboratory tests as the second physician deems necessary to facilitate this review.

4.23 Employee Notification

4.23.1 Within five working days after receipt of biological monitoring results, **AIRDE** will notify in writing each employee whose blood lead level exceeds 40 ug/100 g of that employee's blood lead level. Affected employees shall be temporarily removed and provided with Medical Removal Protection Benefits when the employee's blood lead level exceeds this level.

4.23.2 Providing Medical Removal Protection Benefits means that **AIRDE** will maintain the earnings, seniority and other employment rights and benefits of an employee as though the employee had not been removed. Benefits must be provided for a period of up to 18 months per removal occasion.

4.23.3 **AIRDE** shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation. **AIRDE** may condition its participation in, and payment for, the multiple physician review mechanism, upon the employee doing the following, within fifteen days after receipt of the foregoing notification or receipt of the initial physician's written opinion whichever is later.

- The employee informing **AIRDE** that he/she intends to seek a second medical opinion.
- The employee initiating steps to make an appointment with a second physician.

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4.23.4 Should the findings, determinations or recommendations of the second physician differ from those of the initial physician, then **AIRDE** and the employee shall assure that efforts are made for the two physicians to resolve any disagreement. Should a resolution not be reached a third physician shall

be designated through their respective physicians to review all findings and reach his own conclusion.

4.23.5 **AIRDE** will provide an initial physician conducting a medical examination or consultation with the following information:

- A copy of the OSHA regulation for lead including all appendices.
- A description of the affected employee's duties as they relate to the employee's exposure.
- The employee's exposure level or anticipated exposure level to lead and to any other toxic substance(s) is applicable.
- A description of any personal protective equipment used or to be used.
- Prior blood lead determinations.
- All prior written medical opinions concerning the employee in **AIRDE's** possession or control.

4.23.6 **AIRDE** will provide the foregoing information to a second or third physician conducting a medical examination or consultation. Additionally, **AIRDE** will obtain and furnish the employee with a copy of a written opinion from each examining or consulting physician which contains the following information:

- The physician's opinion whether the employee has any detected medical condition that would place the employee at risk of material impairment of the employee's health from exposure to lead.
- Recommended limitations upon the employee's use of respirators, including a determination whether the employee can wear a powered air purifying respirator, should the physician determine the employee cannot wear a negative pressure respirator.
- The results of the blood lead determinations.

4.23.7 **AIRDE** will instruct each examining or consulting physician to:

- Not to reveal either in the written opinion, or in any other means of communication with **AIRDE**, findings including laboratory results, or diagnoses unrelated to the employee's occupational exposure to lead.
- Advise the employee of any medical condition, occupational or non-occupational, which dictates further medical examination or treatment.

4.24 Training

4.24.1 A training program will be established which will assure participation of all employees who are subject to exposure to lead at or above the Action Level or for whom the possibility of skin or eye irritation exists prior to the time of initial job assignment.

4.24.2 Lead awareness training is required at time of hire, during orientation or before initial assignment in areas where lead is suspected. The training program will be repeated at least annually for each employee and **AIRDE** will assure that each employee is informed for the following. All training shall be documented.

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- Content of the OSHA Lead Standard and its appendices.
 - Specific nature of operations which could result in exposure to lead above the Action Level.
 - The purpose, proper selection, fitting, use, and limitations of respirators.
 - The purpose and a description of the Medical Surveillance Program and the Medical Removal Protection Program, including information concerning the adverse health effects associated with excessive exposure to lead; with particular attention to the adverse reproductive effects on both males and females.
 - Engineering controls and work practices associated with the employee's job assignment;
 - Content of any compliance plan in effect.
 - Instructions to employees regarding the use of chelating agents to remove the amount of lead absorbed in body tissue and that such drugs may not be used at all except under the direction of a licensed physician.
- 4.24.3 The OSHA standard and its appendices shall be made readily available to all affected employees.

4.25 Signs

4.25.1 The following warning signs will be posted in each work area where the PEL is exceeded:

- WARNING
- LEAD WORK AREA
- POISON
- NO SMOKING OR EATING

4.26 Record Keeping

4.26.1 Documentation of efforts undertaken to reduce lead exposure and comply with the OSHA standard are essential to maintain for **AIRDE**.

4.27 Exposure Monitoring

4.27.1 Monitoring shall only be performed by adequately trained personnel. All records pertaining to monitoring will be maintained on file. Such records shall include:

- The date(s), number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable.
- A description of the sampling and analytical methods used and evidence of their accuracy.
- Information about analysis can be supplied by the laboratory upon request.
- The type of respiratory protective devices worn by employees (if any).
- Name, social security number, and job classification of the employee(s) monitored and of all other employees whose exposure the measurement is intended to represent.
- Environmental variables that could affect the measurement of employee exposure.

4.27.2 All monitoring records shall be maintained for at least 40 years or for the duration of employment, plus 20 years whichever is longer.

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4.28 Medical Examinations

4.28.1 **AIRDE** will establish and maintain an accurate record for each employee subject to medical surveillance. This record shall include:

- Name, social security number, and description, the duties of the employee.
- A copy of the physician's written opinion.
- Results of any air exposure monitoring done for that employee and the representative exposure levels supplied to the physician.
- Any employee medical complaints related to exposure to lead.

4.28.2 **AIRDE** shall keep or assure that the examining physician keeps the following medical records:

- Copy of the medical examination results including medical and work history.
- Description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information.
- A copy of the biological monitoring results.

4.28.3 **AIRDE** will establish and maintain an accurate record for each employee removed from current exposure to lead composed of:

- Name, social security number of the employee.
- The date on each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to his/her former job status.
- A brief explanation of how each removal was or is being accomplished.
- Statements with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

4.28.4 **AIRDE** will maintain each medical record for at least 40 years or the duration of an employee's employment plus 20 years, whichever is longer.

4.29 Records Availability

4.29.1 **AIRDE** shall make records available upon request that are required to be maintained to OSHA representatives for examination. A copy of the record may be provided upon a formal written request from OSHA and authorization from the office management.

4.29.2 Such records shall be provided to employees or authorized representatives upon submission of **AIRDE** Medical Records Release Form to management.

5.0 REFERENCES

OSHA 29 CFR 1926.62

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MSP 020 MOTOR VEHICLE PROCEDURE

1.0 PURPOSE

1.1 This program is designed to address specific actions to be taken by all personnel who drive **AIRDE** vehicles or driving personal vehicles as **AIRDE** business. **AIRDE** personnel must take responsibility for their own driving habits and operate vehicles in a safe professional manner. Only authorized person/persons will be given permission to drive any **AIRDE** company vehicle and agree to all responsibilities of safe driving. Any violations of **AIRDE** protocol or state driving regulations/laws will be subject to disciplinary action and up to termination.

2.0 SCOPE

2.1 These vehicle safety guidelines apply to all **AIRDE** operations. This document covers **AIRDE** employees and contractors and shall be used when operating any owned, leased, rented or personal vehicle while on **AIRDE** business.

3.0 RESPONSIBILITIES

3.1 The Director of HSE&Q is responsible for the administration and implementation of this policy and for overseeing the training of all **AIRDE** employees.

3.2 All Authorized Drivers are to report any and all incidents minor, major, or life-threatening accidents or situations.

3.2 The Managing Director, Operations Coordinator and Supervisors:

- Must ensure that laws, regulations, and codes related to motor vehicle operation, registration and maintenance are followed.
- Will take reasonable measures to evaluate road, traffic and weather conditions when employees are required to travel.
- Will ensure that maintenance and inspections of Company Vehicles occur on a regular basis and records are kept in accordance with the maintenance and operation requirements.
- All Authorized Drivers have completed the requirements included in this program.
- All employees have access to this program.
- Any person assigning drivers to vehicles must use the Authorized Driver Database (Quick base) to determine eligibility to drive.
- Investigate and report all incidents involving a motor vehicle and forward all incident reports to the Director of HSE&Q.

3.3 The Operations Coordinator:

- Is responsible for maintaining the Authorized Driver Database for **AIRDE** including Authorized Driver Database maintenance for any driver license changes, infraction point assignments, and if warranted restricted vehicle usage.

3.4 Authorized Drivers:

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- Driver must comply with federal, provincial, state, and local traffic laws and regulations at all times. Costs for violations of traffic laws are the direct responsibility of the employee.
- Drive for road and weather conditions. Slow down or get off the road when conditions deteriorate.
- There is “zero” tolerance for “ROAD RAGE” Incidents. Drive in a courteous manner at all times. If threatened by other motorists, report incidents to local law enforcement authorities and notify Operations Coordinator.
- Laws regarding sharing the road with cyclists varies across the United States. There is “zero” tolerance for passing cyclists at a distance < 3 feet; or 6 feet if pulling a trailer. Where local and state legislations require a greater distance, or changing lanes completely; local laws will supersede this procedure. If it is not possible to pass and maintain the prescribed safe distance, wait until it is safe to pass.
- Stop driving and contact your supervisor or manager immediately if conditions are unsafe or place you in a high-risk condition.
- Operate Company Vehicles in a safe and courteous manner.
- Report any physical condition, including fatigue, or the use of medications that may prevent you from driving safely prior to operating a Company Vehicle or driving on Company business.
- Take preventive measures to minimize theft and vandalism of Company Vehicles and equipment. Always remove valuables from vehicles unless they are parked in a secured facility.
- All seated occupants must wear seatbelts and no persons will ride in a vehicle in a standing position or unsecured position (i.e. truck bed). All workers are prohibited from having any part of their body outside of the vehicle while the vehicle is in motion.
- Maintain a current, valid driver’s license in your possession at all times when driving a Company Vehicle. The license must be valid for the class of vehicle being driven. If there is a change in the status of a driver’s license, the driver must notify their supervisor and inform them of the all changes, immediately.

3.6 Passengers:

- Passengers must remain alert and communicate with the driver.
- Passengers are to get out of the vehicle and be a spotter in backing situations.
- Non-employees, including family members, are not authorized to drive Company Vehicles. Non-employees may only ride with employees if permission is specifically given by the employee’s supervisor or manager.

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returned to **AIRDE**.

4.0 PROCEDURE

4.1 Definitions

- 4.1.1 Authorized Driver – **AIRDE** employee or contractor who is permitted to drive Company Vehicles in accordance with this Program. Only Authorized Drivers may drive company vehicles or equipment (i.e. forklifts).
- 4.1.2 Company Vehicle – A motor vehicle that is owned rented or leased by **AIRDE** or a personally-owned vehicle while used for Company business. All vehicles shall have adequate ventilation, effective lighting, heating, cooling and more than one means of exit.
- 4.1.3 Contractor – A company or person who is contracted by **AIRDE** to perform work on behalf of **AIRDE** in some capacity.
- 4.1.4 Incident – A vehicle “incident” or collision event that has or the potential of property loss and / or personal injury.
- 4.1.5 Preventable Vehicle Collision - The driver involved failed to exercise reasonable precaution to prevent the incident. Final decisions on preventable incidents shall be made by the **AIRDE** Managing Director.

4.3 Occasional Drivers

- 4.4.1 Occasional Drivers (driving no more than twice a week on company business) can drive if ALL the following conditions are met:
- All personnel who operate a vehicle for **AIRDE** must have a valid driver’s license for the Class Type of vehicle being driven.
 - The distance travelled is less than 200km (125 Miles) each way.
 - There is no unusual risk in road conditions. (Icy, blizzard, heavy rain, mud etc.).

4.4 New Hire Employee

- 4.5.1 1-30 Days - Prohibited from driving **AIRDE** company vehicle. “Exceptions handled by HSE&Q Director.”
- 4.5.2 30-60 Days - Allowed driving company vehicle when accompanied by an experienced authorized driver with less than four **AIRDE** assigned driving points.
- Must have completed the Smith Driver Training.
 - MVR / Abstract check produces less than four **AIRDE** points.
 - Signed Driver’s Agreement form.
- 4.5.3 60 Days + - Authorized to drive as per the **AIRDE** Fleet Safety Program.
- Experienced new hires may drive at the discretion of the HSE&Q Director provided that: Employee has completed Smith Driver Training.
 - Employee completes a driver evaluation with a Smith trained evaluator.
 - Motor Vehicle Record (MVR) / Driver’s Abstract check produces less than four **AIRDE** assigned driving points.

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4.5 Personal and “Necessary Use”

4.5.1 Authorized Drivers may use Company Vehicles during out-of-town projects for “Necessary Use” where the vehicle is the only means of transportation. If there are any questions concerning this use contact the Supervisor. “Necessary use” includes driving for meals, supplies, laundry, etc. Use of a Company Vehicle to pick up or transport alcohol is prohibited. This document remains the property of AIRDE and is not to be copied or communicated for use by any other party without the written approval of AIRDE management. The Management Representative has the responsibility and authority to distribute, maintain and/or recall any and all copies of this document. On such revision, all controlled copies of this document are to be updated with the appropriate revisions provided and the obsolete copies prevented against use, or returned to AIRDE.

4.5.2 Vehicles assigned full-time to an individual employee may be driven for personal use as follows:

- The Authorized Driver assigned to the vehicle is the only person who may drive the vehicle.
- Authorized Drivers must have written permission from their Operations Coordinator for any personal use of Company Vehicles.

4.6 Suspended License

4.6.1 If a Motor Vehicle Record (MVR) / Driver’s Abstract check the status check reveals that a person’s license has been suspended or revoked the driver’s authorization status will be changed to NO. If an Authorized Driver’s license is suspended or revoked, driving privileges will be immediately suspended. Knowingly driving a Company Vehicle with a suspended license is grounds for disciplinary action.

4.7 Operating a Vehicle

4.7.1 A certificate of registration and proof of insurance documentation must be carried in all vehicles.

4.7.2 All employees shall maintain insurance coverage in force for any personal vehicle used on Company business

4.7.3 Vehicles shall be driven with headlights on at all times. This action increases other drivers’ ability to see your vehicle and greatly reduces the odds of being involved in a traffic incident. “Make Sure They See You”.

4.7.4 The driver and passengers will follow all local, state/province, and federal laws, including Department of Transportation regulations and codes (if applicable), while operating or riding in an AIRDE vehicle.

4.7.5 Employees shall use seat belts at all times while the vehicle is in motion.

4.7.6 Riding in the bed of a pickup truck is prohibited.

4.7.7 No employee shall enter/exit a vehicle while it is in motion.

4.8.8 Driving under the Influence of Alcohol or Drugs - An employee may not drive a vehicle if they have consumed alcohol or prescription or over-the-counter medication that may impair or otherwise affect their ability to drive.

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4.7.9 Illegal drugs are not allowed in Company Vehicles at any time.

4.7.10 Use of radar/laser detection and/or jamming devices is prohibited in all **AIRDE** owned, leased, rented or in vehicle where personnel are being reimbursed for mileage.

4.7.11 Due to concerns relating to the ability of the driver to focus the appropriate amount of attention to driving, Cell phone operation or any other hand held device (GPS, iPod, game, texting etc.) by the driver is not allowed while the vehicle is in motion. Hands Free speakerphones can be used. Hands free operation is still distracting use caution and if in city limits pulls the vehicle over to a safe location to use the phone. If there is a passenger in the vehicle, have the passenger take the call.

4.7.12 Certain clients prohibit the use of cell phones at any time while on their sites or assigned to their jobs. The client rules regarding vehicle operation will supersede the rules of this program unless they are assessed to be less stringent.

4.7.13 Smoking is not permitted in Company Vehicles. This document remains the property of **AIRDE** and is not to be copied or communicated for use by any other party without the written approval of **AIRDE** management. The Management Representative has the responsibility and authority to distribute, maintain and/or recall any and all copies of this document. On such revision, all controlled copies of this document are to be updated with the appropriate revisions provided and the obsolete copies prevented against use, or returned to **AIRDE**.

4.7.14 Fatigue can affect drivers as severely as alcohol consumption and presents a dangerous condition. No person is permitted to operate a vehicle after working a period of 16 hours (in this case “work” includes driving time for that day) without a rest period of at least eight hours. Exceptions shall be made ONLY by the HSE&Q Director. Exceptions should be rare; sleeping accommodations should be made for proper rest prior to driving again. Authorized Drivers may alternate driving duties; however, napping in the passenger seat is not considered a rest period, and the above limits apply.

4.7.15 Supervisory personnel will assist in determining the safe condition of an **AIRDE** vehicle. No person is allowed to approach, work on or under the raised body of a vehicle without the vehicle being adequately supported with “jack” stands.

4.8 More Vehicle Procedures

4.9 Passenger Safety

4.9.1 All personnel riding in a vehicle that is owned/leased/rented by **AIRDE** or personnel being reimbursed for mileage by **AIRDE**, must wear a seat belt at all times. The driver has the responsibility of ensuring that all passengers are wearing seat belts.

4.9.2 The number of passengers carried in a vehicle must be strictly limited to the number of functioning seat belts. All personnel must remain seated at all times while the vehicle is in motion.

4.9.3 Transporting hitchhikers is prohibited.

4.10 Instructions for Driving on Unpaved Roads

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4.10.1 Serious injuries and even fatalities have occurred while driving on unpaved roads. There are a variety of situations that may affect the precautions that will need to be taken. Each operation must assess its own individual situation and take the appropriate steps to eliminate driving hazards, while using the following information as a guide:

- Vehicles must be driven with headlights on at all times.
- Seat belts must be worn at all times while driving or riding in vehicles.
- A vehicle must not pass other vehicles when dusty conditions are present.
- Vehicles must not follow other vehicles at a distance that would put them vehicle inside the “dust trail” of the vehicle in front of them, which significantly reduces the driver’s visibility.
- Other items such as: terrain, type of vehicles, number of vehicles, type of load, weight of load, vehicle speed, etc., must be taken to consideration.

4.11 Parking of Vehicles

4.11.1 Vehicles if reasonably practicable must be parked away from the congested areas.

4.11.2 Whenever possible, drive the vehicle through the spaces so that the vehicle may be driven forward to exit the space. Where pull-through techniques cannot be utilized, operators of motor vehicles should back into the parking spot.

4.11.3 Any time backing is required a spotter shall be used.

4.11.4 If weather conditions warrant leaving the engine running, the vehicle must be in “park” or out of gear (standard shift vehicles) with emergency brake set.

4.11.5 If the driver is alone, attempt to get assistance from a co-worker if possible. If no spotter is available: This document remains the property of AIRDE and is not to be copied or communicated for use by any other party without the written approval of AIRDE management. The Management Representative has the responsibility and authority to distribute, maintain and/or recall any and all copies of this document. On such revision, all controlled copies of this document are to be updated with the appropriate revisions provided and the obsolete copies prevented against use, or returned to AIRDE.

- Get Out and Look (GOAL). Walk around the vehicle, observe and plan for any vehicles or structures that may be in the way of the planned backing maneuver.
- Unless prohibited, sound the horn just prior to moving. This will help to alert others to your intentions.
- Move slowly out of the spot and continuously check for other vehicles coming from both directions.
- Vehicles must not be left running when a vehicle is parked in an enclosed space (i.e. closed garage, shop or warehouse). Vehicles otherwise left unattended must have the engine off, in gear or park and emergency brake applied.

4.12 Cargo/Materials Handling

4.12.1 While vehicles are being unloaded/loaded with materials, the engine must be off, in gear or

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park and the emergency brake set. When large loads are being unloaded/loaded with the assistance of a mechanical lifting device, such as: forklift, crane, etc., the vehicle wheels must be chocked and personnel should move a safe distance away from the vehicle being unloaded/loaded to avoid exposure to dropped objects.

4.12.2 A driver must ensure that cargo transported by a commercial vehicle is contained, immobilized or secured so that it cannot leak, spill, blow off, fall from, fall through or otherwise be dislodged from the vehicle, or shift upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is adversely affected.

4.12.3 Materials, goods, tools or equipment carried in a portion or compartment of a vehicle in which workers are riding must be located and secured to prevent injury to the operator or workers.

4.12.4 If materials, goods, tools or equipment are regularly carried in a worker transportation vehicle there must be a designated area in the vehicle for transporting these items.

4.12.5 Personnel must not jump down from vehicle beds.

4.12.6 Personnel required to transport dangerous goods must complete the TDG Course. They must keep their wallet certificate with them.

4.13 Refueling Vehicles

4.13.1 Vehicle engines must be off before refueling begins. Smoking is not permitted during the refueling process. Note: Due to concerns surrounding the potential for cellular phones to cause the ignition of gas vapors, cellular phones must not be worn or used during refueling of gas-powered vehicles.

4.13.2 Vehicles must not carry large quantities of extra fuel unless the fuel is stored in an approved container and properly labeled and secured.

4.14 Safety Equipment

4.14.1 All **AIRDE** owned/leased vehicles must be equipped with a suitable fire extinguisher (i.e. BC class) and a first aid kit. Vehicles used in extreme weather conditions (hot or cold) must be equipped with the necessary survival equipment, communications equipment, ice scraper, this document remains the property of **Airde** and is not to be copied or communicated for use by any other party without the written approval of **AIRDE** management. The Management Representative has the responsibility and authority to distribute, maintain and/or recall any and all copies of this document. On such revision, all controlled copies of this document are to be updated with the appropriate revisions provided and the obsolete copies prevented against use, or returned to **AIRDE**. shovel, water, abrasive material (i.e. sand, kitty litter, grit), flares, jumper cables, blankets, candles, matches, extra clothing, non-perishable food, etc.

4.15 Preventative Maintenance

4.15.1 Establishment of a preventive maintenance program for all company vehicles is essential. Log sheets will be maintained on all vehicles so that maintenance, as well as

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repairs made from noted defects, vehicle mileage (owned and rented), etc. are recorded. These records will be made available to the Logistics Manager.

4.16 Vehicle Inspection

- 4.16.1 Each vehicle or piece of equipment shall be inspected on a daily basis by the operator before and after operation.
- 4.16.2 This daily inspection will be a basic walk around looking for damage or leaking fluids. Oil levels and other fluid levels will be checked on a weekly basis unless the vehicle is being assigned to a job. If the vehicle is being assigned to a job, a full walk around inspection and fluid check must be conducted prior to departure.
- 4.16.3 Vehicle Inspection form is to be completed daily for each fleet vehicle. Each operator is responsible for the safe condition of the equipment.
- 4.16.4 Any vehicle having steering or brake problems is not to be operated until repairs have been made by a mechanic. Any other unsafe conditions are to be reported to the operator's Supervisor as soon as possible for immediate repair.

4.17 Rentals

- 4.17.1 Any rental unit valued at over \$50k additional insurance from the rental company is required.
- 4.17.2 Auto rentals are covered by our corporate Commercial General Liability policy but only for 30 days. Any rental that is longer than 30 days will need to be added to the Automobile Liability Policy.
- 4.17.3 Rental vehicles must be inspected prior to driving from the rental lot. Damages not noted after signing the rental agreement will be the responsibility of the person renting (not AIRDE).
- 4.17.4 Any damages incurred by an individual due to neglect or intentional abuse will be the responsibility of the individual who last inspected and took responsibility of the vehicle.

4.18 GPS Tracking

- 4.18.1 GPS will be installed in all AIRDE owned and/or leased vehicles. The only exceptions are vehicles that never leave a job site (i.e. refineries, no license plate) or vehicles that are being sold within (90) ninety days.
- 4.18.2 Information gathered by GPS may identify drivers who may require defensive/safe driver training, or individual coaching.
- 4.18.3 GPS data may be used as a secondary source of information to verify if violation of company policy has taken place.
- 4.18.4 GPS vehicle identification will be identified by a vehicle unit number and not the driver's name.
- 4.18.5 GPS speeding events shall be tracked using the AIRDE Authorized Driver Database which will trend annotations for possible coaching or training requirements. Retentions of this document remains the property of Aired and is not to be copied or communicated for use by any other party without the written approval of AIRDE management. The

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Management Representative has the responsibility and authority to distribute, maintain and/or recall any and all copies of this document. On such revision, all controlled copies of this document are to be updated with the appropriate revisions provided and the obsolete copies prevented against use, or returned to **AIRDE**. Observations in this database shall be three years in accordance with driver abstract requirements.

4.18.6 GPS data shall be retained for one year by the GPS service provider unless special circumstances warrant retention for a longer period of time.

4.18.7 Instant alert: Exceeding the set threshold limit will generate an "Instant Alert" which will indicate the vehicle, type of vehicle, speed, location, date and time. This alert provides instant information. These alerts are set at 110km in Canada and 75 mph in the US.

4.18.8 Operations Coordinator (or designated monitor) will receive all alerts, review speeding reports and will have primary responsibility for employee communication and observation tracking.

4.18.9 Information collected by the GPS service includes:

- Vehicular assets, locations, mileage, engine hours and maintenance.
- Vehicle alerts/reports including; moving, stationary, speeding, idle, history, route trace, zone entry and exit, and transponder diagnostics.
- Dates and time of vehicle use.
- Real time or historical information will not be disclosed outside of **AIRDE** Group Inc. unless required by law or as permitted under the relevant privacy legislation.

4.18.10 In the event that Manager/Supervisor/Safety feels it is necessary to contact a driver following a received alert, the following steps should be followed to avoid creating a distraction for the driver and, as a result, an unsafe condition:

- First attempt should be to contact a passenger in the vehicle. The communication should be brief to instruct the driver to slow down and to call back when the driver can safely pull off the road.
- Immediately contacting a driver while driving should be limited only to those instances where an immediate reduction in speed is required (i.e. sustained speeds > 30 km (19 Miles) (rural, highway) over the posted speed limit).

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MSP 021 NEW EMPLOYEE ORIENTATION PROCEDURE

1.0 PURPOSE

1.1 The purpose of this procedure is to ensure that new Employees, Sub-Contractors, and General Contractors to understand the expectations for safety while working for **AIRDE** prior to starting work.

2.0 SCOPE

2.1 This procedure applies to all new Employees, Sub-Contractors, and General Contractors hired by **AIRDE**.

3.0 RESPONSIBILITY

3.1 The Operations Coordinator or their designate is responsible for ensuring the HSE&Q and Managing Director are notified of new employees requiring orientation.

3.2 When employees are hired remotely, the Supervisor or Operations Coordinator is responsible for providing the safety orientation.

4.0 PROCEDURE

4.1 Site Orientation

4.1.1 New employees will receive a site safety orientation, no later than the first workday on the job site. The HSE&Q Representative or Supervisor will provide the general safety orientation with consideration to client specific requirements. All required certifications, training, and expiration dates are to be verified prior to project start.

4.1.2 ALL Sub contractors/General Contractors are required and will be pre-qualified to show safety metrics/documents TRIR (total recordable incident rate), EMR (Workman's compensation claims), DART (Days away, Restricted or Transferred), Fatality rate will be used as criteria in selecting a Sub-contractor/General Contractor. **AIRDE** will conduct a post-job safety review on all Sub-Contractors and General Contractors (Post-Job Safety Performance review to be completed on separate form MSF-004 Safety Job Work Plan).

4.2 General Orientation

4.2.1 General

4.2.2 Employee responsibilities for safety:

- All employees are required, as a condition of employment to develop and exercise safe work habits in the course of their work to prevent injuries to themselves and their fellow workers.
- Immediately report to their Superior, all accidents, near misses and injuries, no matter how minor occurring within the course of their employment.
- Cooperate and assist in investigation of incidents to identify correctable cause and to prevent re occurrence.
- Promptly report to their Supervisor all unsafe actions, practices, or conditions they observe.

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- Become familiar with and observe approved safe work procedures during the course of their work activities.
 - Keep work areas clean and orderly at all times.
 - Avoid engaging in any horseplay and avoid distracting others.
 - Obey all safety rules and follow published work instructions.
 - Wear personal protective equipment when working in hazardous operations area, and/or as required by the Supervisor.
 - Inspect all equipment prior to use and report any unsafe conditions to their immediate Superior.
 - Submit any suggestions for incident prevention to their Superior, which may assist in improved working conditions or work practices.
- 4.2.2.1 Use of Company Equipment:
- The company has established guidelines for the use of special equipment including vehicles, heavy equipment, forklifts, etc. Only trained and authorized employees are permitted to operate these and other large equipment.
- 4.2.2.2 First Aid Equipment:
- First Aid supplies are kept on site and/or in the job office. Should you have an injury, no matter how minor, report it to your Supervisor immediately. With minor injuries, it is important to reduce the potential of infection or complications that are more serious by reporting the incident immediately.
 - Note: The first aid log must be filled in whenever any item is removed from the First Aid Kit.
- First Aid Responders:
- o All employees are encouraged to become first aid trained as a benefit to themselves and their families.
- 4.2.2.3 Personal Protective Equipment (PPE):
- Safety Glasses: it is a company policy that all employees wear safety glasses. Prescription glasses are required to meet applicable CSA/ANSI Standards.
 - Helmets are to be worn on all jobsites within the work area (chin straps to be secured at all times). Note that climber's helmets may not meet ANSI or CSA standards.
 - When working on jobsites, it is mandatory that employees wear applicable CSA/ANSI approved footwear.
 - Hearing Protection: is required to be worn on job locations where the noise level exceeds the permissible levels. The Supervisor or company will supply hearing protection equipment as needed. Follow the manufacturer instructions for the proper use, fit, and sanitation requirements.
 - Respiratory Protection: Many jobs require the use of respiratory equipment and require that the employee be clean shaven with all facial hair removed.
- 4.2.2.4 Special Clothing:
- Some jobs may require special work clothes, coveralls, or rain gear. The company will normally provide these items. Your Supervisor will inform you of these requirements when the occasion arises.
- 4.2.2.5 Employee Conduct:

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- **AIRDE** has established and endorsed various rules and regulations for the safety of their employees. However, sometimes it is necessary to impose sanctions or restrictions on an employee who is not following proper work procedures, safety procedures or other elements of company policy.

- It is the Supervisor's responsibility to hold the employee accountable for their performance.

4.2.2.6 Drug and Alcohol Policy:

- The company has established a Drug and Alcohol Procedure for the protection of its workforce and resources. No one is permitted on a jobsite who may be using, selling, or handling alcohol or drugs. This includes misuse of prescription medications. Employees suspected of being "under the influence" are subject to search and screening.

- Clients often have their own Drug and Alcohol programs and their requirements will be followed accordingly.

4.2.2.7 Fit for Duty:

- Employees are expected to be "Fit for Duty" at all times. An employee may not be "Fit for Duty" under the following circumstances:

- o Impaired or under the influence of alcohol, drugs and/or prescription medications

- o Affected by limitations from any work or non-work-related injuries that hinder you from your duties

- o Any physical or mental issues which may affect your ability to perform your assigned duties.

- You are expected to report any concerns with being "Fit for Duty" with your Supervisor.

4.2.2.8 Safety Meeting:

- Each Supervisor shall hold a safety meeting at the start of each job or at a scheduled interim if applicable (includes all employees hired by **AIRDE** as well as Sub-Contractors and General Contractors)

- The company considers safety meetings an important aspect of safety communication. Employees are encouraged to assist in communicating safety issues with their Supervisor at this time, if they have not already done so.

4.2.2.9 WHMIS / HAZCOM:

- The use of hazardous chemicals is required for some jobs. Some customer jobsite locations may even manufacture chemicals that are hazardous.

- All employees are required to participate in WHMIS/HAZCOM Training, depending on legislation requirements, to inform employees on how to safely work with and around hazardous chemicals.

4.2.2.10 Special Chemical Hazards:

- Certain chemicals used or manufactured on a jobsite are "extremely hazardous". Most employees will not be exposed to them during normal operations or work. Your Supervisor will provide you with special information to safely handle these chemicals should it be necessary that an employee work with the chemicals or on equipment that is exposed to them.

- These chemicals include: Hydrogen Sulfide (H₂S), Asbestos, or Benzene.

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- Each of these chemicals is a known or suspected carcinogen, and is regulated (i.e. ACGIH, NIOSH, OSHA or local legislation). Working with these chemicals requires special precautions including requirements, physical examination, use of personal protective equipment, and air monitoring.

4.2.2.11 Confined Space Entry:

- Some jobsites may require an employee to work in an area termed a "confined space". These locations are special in that there are certain procedures and equipment required for the safety of the workers. **AIRDE** has established minimum requirements for any work done in a confined space. Many **AIRDE** customers have similar policies that must be followed. These policies and procedures will be reviewed with all workers involved in the job prior to the work beginning.

4.2.2.12 Special Training:

- Special safety training in the use of equipment, new procedures, new equipment, or other may be required periodically. Any employees involved in these jobs or equipment use will be required to complete this special training prior to beginning the job. One example of this is the use of a Self-Contained Breathing Apparatus.

4.2.2.13 Sanitation and Personal Hygiene:

- Employees are encouraged to maintain good personal hygiene, especially after handling hazardous chemicals, paints or coatings, glue or epoxy cements, and other potentially harmful material. Washing facilities are available in various areas for cleaning your hands. Personal protective equipment and gloves may reduce the exposure.
- Jewelry such as rings, earrings, necklaces etc. are not permitted to be worn on a jobsite. Jewelry is considered a safety issue due to lose items having the potential to get caught up in working ropes or ring fingers getting caught up while handling equipment. Note that contact lenses may be prohibited when working with certain chemicals.

4.2.2.14 Safety Rules:

- Immediately report to their Supervisor or superior all accidents or near misses, and injuries, no matter how slight, that occur on the job.
- Cooperate with and assist in the investigation of accidents to identify the causes and to prevent recurrence.
- Promptly report to their Supervisor or superior all unsafe acts, practices, or conditions that they observe.
- Become familiar with and observe safe work procedures during the course of my work activities.
- Keep their work areas clean and orderly at all times.
- Avoid engaging in any horseplay and avoid distracting others.
- Obey all company safety policies and government safety regulations.
- Respect their fellow employees. **AIRDE** has zero tolerance for workplace violence.
- Wear personal protective equipment when working in hazardous areas, and/or as required by their Supervisor.
- Inspect all equipment prior to use and report any unsafe conditions to their supervisor;
- Submit any suggestions for accident prevention, which may assist in improved working conditions or work practices to their immediate superior.

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- Smoke in authorized locations only; Each Region is to designate a smoking area outside the building; this will be within the scope of state or provincial regulations. Signage disclosing “No-Smoking” as well as “Designated Smoking Area” will be erected as appropriate. Maintenance of the shelter is the responsibility of the smokers.
- Not bring onto the jobsite, have in their possession or in their car, any weapons or ammunition of any kind.
- Not have in their possession, use, or introduce any kind of intoxicating liquor or illegal drugs on any customer's property or company work area or facility. All employees must understand that they risk possible discharge for these illegal actions.
- Not come to work under the influence of intoxicating liquor or illegal drugs, and realize that they will not be allowed to start work and will be immediately subject to disciplinary action.

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MSP 022 PERSONAL PROTECTIVE EQUIPMENT PROCEDURE

1.0 PURPOSE

1.1 To ensure that persons working for **AIRDE** are informed of the expectations for Personal Protective Equipment.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** large projects (and any projects or jobs that are located in the process areas of a petrochemical refinery or manufacturing area).

2.2 NOTE: The Safety Program of customers may supersede or take precedence over the details of **AIRDE**'s own Safety Policy and Procedures but in no case shall the governing safety policy and procedures be less than the applicable Federal/Provincial/State Safety Regulations.

2.3 Appropriate standards such as CSA or ANSI shall be complied with accordingly, depending on jurisdiction.

3.0 RESPONSIBILITY

3.1 The Supervisor is responsible for identifying the appropriate PPE for the planned work.

3.2 All personnel are responsible for wearing PPE appropriately, inspecting PPE before use and reporting issues to their Supervisors.

3.3 The Supervisors are responsible for quarantining PPE that is determined unfit for use. The Supervisor is responsible to monitor for compliance.

4.0 PROCEDURE

4.1 General

4.1.1 The use of personal protective equipment for any job, which has an inherent injury potential, is the responsibility of the job Supervisor. The Supervisor should plan ahead prior to beginning the job by analyzing what special personal protective equipment will be necessary to complete the work prior to getting started, then ordering it out at the last minute.

4.1.2 In order to ensure that safe and effective Personal Protective Equipment is being used by our staff; employee owned PPE is not permitted on our sites. All PPE will be provided by **AIRDE** at no cost to the employees. The only exception to this policy is safety boots. Employees are responsible to purchase and provide their own safety boots.

4.1.3 **AIRDE** reserves the right to select and/or approval all personal protective equipment to be issued and used by its employees, visitors, and/or subcontractors, and only such equipment issued or approved will be allowed on its job sites. Failure to comply with this procedure will result in disciplinary action up to and including termination.

4.1.4 Each employee must wear clothing suitable to the job they are performing at all times. Suitable clothing means clothing that will minimize danger from moving machinery, hot or injurious substances such as when welding, and even sunburn during jobs on hot summer days, etc. Individuals with long hair shall wear a cap or net while working around machines.

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4.1.5 Detailed specifications for the design, purchase, and use of all personal protective equipment shall be coordinated with the Operations Coordinator, and the Supervisor of the workers. The company will provide any specialized safety equipment specified as mandatory on hazardous jobs. Employees will be fully accountable for its use and condition. The company will provide ordinary safety hard hats and safety glasses when required.

4.1.6 Where an employment hazard (physical, chemical or a biological health hazard) cannot be eliminated or controlled within safe limits and the wearing or use of PPE by a person in the workplace may prevent an injury or reduce its severity, each person in the workplace shall wear or use the equipment prescribed.

4.1.7 Where it is not reasonably practicable to eliminate or control a health or safety hazard in a work place within safe limits and the use of protection equipment may prevent or reduce injury from that hazard, every person granted access to the workplace that is exposed to that hazard shall use the protection equipment

4.1.8 It not uncommon for our employees to work in petroleum-based environment. The greatest threat is an exposure to a flash fire or an electrical equipment flashover. In order to work in these locations, flame resistant (FR) outerwear must be worn. This could include FR coveralls or shirt and pants. When this hazard exists AIRDE will ensure that our employees wear (FR) outer wear.

4.1.9 When personnel are wearing FR clothing they must ensure:

- They are kept clean as much as possible. If they become saturated with oil, etc.... they must be laundered or turned in for another set.
- Employees must wear inner wear that is flame resistant or made out of natural fibers that will not melt when exposed to heat.
- FR outer wear is inspected by the employee daily for damage. If they are ripped, etc. they must be replaced.

4.2 Mandatory Protective Equipment

4.2.1 When the use of personal protective equipment has been specified for hazardous work, its use will be mandatory as a condition of employment. Supervision, Supervisor and Field Supervisors will be held accountable for employees allowed to work without compliance.

4.2.2 PPE is required by reasons of hazards of processes or environment to protect body parts from inhalation, absorption or physical contact. It is to be maintained in a sanitary and reliable condition.

4.2.3 Enforcement can be made easier by educating employees on the reasons for using or wearing the articles and the possible injuries that can result when the need is ignored.

4.3 Basic Personal Protective Equipment

4.3.1 We must ensure that the following personal protective equipment is available prior to the start of construction activities.

- Head protection

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- Safety harness when working 6’ or higher off the ground, unless working on approved scaffold or structure
 - Lanyards and rope grabs
 - Respiratory protective equipment as dictated by hazard; to include, but not limited to, respirators, hoods, masks, etc.
 - Eye protection as appropriate such as Goggles, Safety Glasses, Face Guards, cutting goggles if welding and burning operations are anticipated
 - Hearing protection
 - Foot guards when contract calls for compacting, jack hammering, etc.
 - Welding hoods lens and gloves
 - Welding jackets and sleeves
 - Full face shields (for operations producing flying chips, particles or sparks)
 - Rubber boots, gloves, etc. (for concrete placing operations, chemical exposure, etc.)
- 4.3.2 The use of PPE must not in itself endanger the worker. Examples of such situations are:
- Safety toecaps in place of protective footwear – a worker wearing toecaps should not be required to do much walking around the work site. The toecaps may create a tripping hazard.
 - A poorly fitting suit worn to prevent exposure to chemicals may not seal well at the wrists and ankles.
 - A face shield covered with dirt and debris may affect a worker’s ability to see clearly.

4.4 Selecting Personal Protective Equipment

4.4.1 A Safe Job Work Plan must be conducted by the Field supervisor to determine what PPE is required. This Safe Job Work Plan must determine if hazards are present or are likely to be present, which necessitate the use of PPE. The supervisor conducting the SJWP must ensure that the document has the Supervisor’s name, signature, date(s) & identification of assessment documents.

4.4.2 If hazards have been identified, employees working in the area must be advised. They will be told what PPE had been selected and why it was chosen. Supervisors are to ensure that the employees are trained in the proper use of the PPE. Employees will sign the “Safety Talk” sheet to verify that they were advised.

4.4.3 Once the correct PPE has been selected, all employees must wear the PPE to protect them for the hazards that have been identified.

4.4.4 PPE is not a one size fits all piece of equipment. Every individual has their own unique body structures, and what may fit one person may not fit another. For these reasons, all PPE must be selected on an individual basis. Each employee must ensure that their PPE fits properly. They must understand how to properly don and doffs each piece of PPE they receive. They must also be made aware on how to clean, inspect and maintain their PPE before they are required to use it.

4.4.5 PPE must be in suitable condition to perform the function that it was designed for. Damage or suspected damaged PPE is not to be used. It is to be tagged and quarantined immediately. The employee must advise the supervisor that their PPE is damaged so suitable replacement can be obtained.

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4.4.6 At any time the employee suspects that there is a problem with their PPE, they are to evacuate the area immediately to a safe location. They must contact their supervisor for new PPE.

4.4.7 Loose clothing, long hair, dangling accessories, jewelry, or other similar items that are likely to be hazardous to the health or safety of an employee in a work place shall not be worn unless they are so tied, covered, or otherwise secured as to prevent the hazard.

4.4.8 Personal Protective Equipment must meet the following requirements:

- Provide desired protection against the hazard to which the worker will be exposed.
- Maximum comfort coupled with minimum weight.
- Minimum restrictions of essential body movement, vision, etc.
- Durability and, when possible, ability to be maintained on the project.
- Manufactured in accordance with accepted standards for performance and materials, i.e., CSA, ANSI and National Institute for Occupational Safety and Health (NIOSH).

4.4.9 When the use of personal protective equipment is necessary, the use of such protection will be mandatory. Failure to use protective equipment when necessary may result in disciplinary action.

4.4.10 The equipment listed below shall be worn when hazards as described exist:

- Protective headwear is needed to protect the head against falling objects, head bumping situations or electrical conductors.
- Goggles, face shield, or safety glasses to guard against airborne debris, dust, flying particles, chips, chemicals, heat, or injurious rays.
- Ear plugs or earmuffs to guard against prolonged exposure to noise exceeding sound tolerance levels defined by law.
- Respirators, gas masks, airline respirators, and self-contained breathing apparatus to protect employees against toxic or abnormal atmospheric conditions.
- Safety footwear: The type of safety footwear will be determined once the hazards are identified.
- Reflective vests to increase employee's visibility while working in or around traffic lanes on jobs in the public streets are mandatory.
- Protective clothing such as gloves, sleeves, aprons, leggings, and full suits to protect against things such as contaminated soils will be required.
- Seat belts to prevent injury when in a company vehicle.
- A safety harness must be used when erecting scaffolds or any time working above 6' (8' Federal) when not on an approved scaffold, platform, or runway that does not meet the Provincial/State or Federal requirements for a standard railing.

4.5 Head Protection

4.5.1 Where there is a hazard of head injury in a workplace, protective headwear that meets the legislative requirements and the CSA/ANSI Standard shall be used. Note: For Rope Access Work and Confined Space rescue work, AIRDE Personnel will; follow the ANSI standards.

4.5.2 All employees must wear approved hard hats at all times when working on construction projects or areas of an existing facility which has been designated as a "Hard

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Hat Area" or any area where there may be a foreseeable danger of injury to a worker's head. This includes visitors, subcontractors, engineers, inspectors, and anyone else who has authorization to be on the project.

4.5.3 Hard hats which have been altered by drilling or cutting will not be permitted, nor will those hat which have been altered by the addition f any items on the outside of the hat other than safety, or site stickers. When it is necessary to use additional personal protective equipment that must be attached to the hard hat, only those hard hats designed for this purpose may be used.

4.5.4 Headband assemblies must be in good condition and should be exchanged whenever they become broken or weakened. The area between the top of the headband and the top of the hard hat should never be used for storage.

4.5.5 When head protection is selected, it must provide ample protection for lateral impact.

4.6 Safety Glasses

4.6.1 If a worker's eyes may be injured or irritated at a work site, the supervisor must ensure that the worker wears eye protection equipment that is approved to the appropriate CSA/ANSI Standard. The eye protection that is selected must be appropriate for the task to be performed. The environmental hazards must also be considered when selecting the appropriate eye protection.

4.6.2 Where there is a hazard of injury to the eyes, face, ears or front of the neck of an employee in a work place, the employer shall provide eye and/or face protectors that meet the appropriate CSA/ANSI Standard.

4.6.3 Prescription safety eyewear may be worn. This eyewear must comply with the appropriate CSA/ANSI Standard.

4.6.4 An employee may wear contact lenses on the job as long as the hazards identified will not subject the employee's eyes to additional risk of injury (such as loose dust, etc.) In situations where a hazard poses an additional risk to the employee's eyes while wearing contact lenses, then the employee must wear appropriate eye protection such as goggles or face shield.

4.7 Foot Protection

4.7.1 Employees are required to wear sturdy work boots that will provide adequate protection against injury to the feet.

4.7.2 When work boots will not provide sufficient protection, the employee will be required to wear approved foot guards.

4.7.3 Employees are encouraged to purchase and wear boots with steel toes, a notched heel, sole penetrating protection, and ankle protection.

4.7.4 When construction projects require the wearing of steel toe safety boots, this is to be enforced.

4.7.5 Tennis shoes, running shoes, light canvas shoes, sandals, etc., are not authorized for wear on construction areas.

4.8 Safety Harnesses, Lanyards and Life Lines

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4.8.1 Fall protection, as required by Federal/Provincial/State and/or the Safety Manual, will be provided for employees.

4.8.2 **AIRDE** shall provide a fall-protection system to any person who works: (a) from an unguarded structure or on a vehicle, at a height of more than 2.4 m (federal) 3 m (provincial) above the nearest permanent safe level or above any moving parts of machinery or any other surface or thing that could cause injury to a person on contact; (b) from a temporary structure at a height of more than 6 m above a permanent safe level; or (c) from a ladder at a height of more than 2.4 m above the nearest permanent safe level where, because of the nature of the work, that person is unable to use at least one hand to hold onto the ladder. Use of belts is not permitted, except under special circumstances - per OSHA.

4.8.3 The components of a fall-protection system shall meet the following the applicable CSA/ANSI standards.

4.9 Limb and Body Protection

4.9.1 In situations where there is a risk to the body or limbs, we will ensure that our employees work wear properly fitting hand, arm, leg or body protective equipment that is appropriate to the task and the worksite hazards identified.

4.9.2 Example:

- Hand and arm protection: Appropriate gloves, wrist protection or sleeved shirts or jackets will be provided to deals with the hazards identified. All PPE must properly fit the worker. Consideration will be taken for: ease of movement of fingers, total protection of exposed area, etc.
- Torso protection: Appropriate PPE for protecting the torso will be selected once the hazards have been determined. All PPE must properly fit the worker. This PPE includes; jackets, aprons, coveralls and full body suits.
- Foot and Leg protection: Appropriate PPE for protecting the feet and legs will be selected once the hazards have been determined. Such PPE may include foot guards, boots, leggings and chaps protect the legs and feet from molten metal or welding sparks.

4.10 Skin Protection

4.10.1 If a hazard has been identified that can harm our employees through skin contact or skin absorption appropriate PPE will be provided to protect our workers from such hazards. **AIRDE** will be responsible for making sure that the worker uses effective and appropriate protective clothing or equipment. Selection for PPE will consider: the toxic properties of the chemical(s) and the ability of the chemical(s) to pass through the skin and affect the worker.

4.11 Hearing Protection

4.11.1 Employees exposed to noise in excess of the Occupational Exposure Limits will have hearing protection provided.

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4.11.2 There are two types of recognized hearing protectors available for use in reducing noise exposure:

- Ear Plugs
- Ear Muffs

4.11.3 In most instances' earplugs are acceptable hearing protectors.

4.11.4 When using earmuffs for hearing protection, they must be disinfected before being issued to another employee.

4.11.5 Employees are to be informed of the hazards associated with the exposure to noise and the purpose and limitations of protective hearing devices. The wearing of this equipment will be mandatory in high noise areas.

4.12 Respiratory Protection

4.12.1 General

4.12.1.1 Since some jobs require the use of respiratory protection, it is important to see, prior to starting the actual phases of the job requiring the respirators that they are:

- On the job and ready for use, in a clean and sanitary condition.
- That personnel who are assigned to the job have had a physical examination and cleared by the doctor to wear the respirators.
- A respiratory protective device shall be selected, fitted, cared for, used, and maintained in accordance with the applicable CSA/ASNIS standards.
- Where air is provided for the purpose of a respiratory protective device, the air shall meet the applicable CSA/ASNIS standards

4.12.1.2 Employees who are or may be exposed to hazardous concentration of gases, vapors, smoke, fumes, mists or dusts will be provided, and required to wear, respiratory protective equipment designed to protect the worker from such concentrations.

4.12.1.3 Employees will use the provided respiratory protection in accordance with the instructions and training received. On projects where the use of such protection is required, initial training in this equipment will be incorporated in the "new hire" safety orientation.

4.12.1.4 When respiratory protective equipment is required to be worn in areas that are contaminated with hazardous substances, excess head or facial hair which prevents effective sealing of the skin will be removed.

4.12.1.5 The wearing of contact lenses during the use of respiratory protection in contaminated atmospheres will be prohibited.

4.12.1.6 Where practicable, the respirators will be assigned to individual workers for their exclusive use.

4.12.1.7 Respirators used routinely will be inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use such as self-contained devices will be inspected once a week and after each use.

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4.12.1.8 Surveillance of work area conditions and degree of employee exposure or stress will be maintained by the Supervisor. There will be regular inspection and evaluation to determine the continued effectiveness of the program.

4.12.1.9 Employees will not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment.

4.12.2 Cleaning of Respirators

4.12.2.1 Respirators will be regularly collected, cleaned and disinfected. Those that are issued for the exclusive use of one worker will be cleaned after each day's use if necessary. Those respirators used by more than one individual will be cleaned and disinfected after each use.

4.12.3 Inspection of Respirators

4.12.3.1 All respirators will be inspected before and after each use. A respirator that is not routinely used but is kept ready for emergency use will be inspected after each use and weekly to assure that it is in satisfactory working condition.

4.12.4 Facial Hair

4.12.4.1 Individuals required to wear breathing devices (respirators) in toxic atmospheres shall be clean-shaven where the mask contacts the face.

4.13 Training

4.13.1 Every person granted access to the workplace that uses protection equipment shall be instructed by the **AIRDE** in the use of the equipment. Every employee who uses protection equipment shall be instructed and trained in the use, operation and maintenance of the equipment.

4.13.2 All employees will receive training in the use and maintenance of personal protective equipment upon hiring and refresher training annually thereafter. Proper training includes at the minimum:

- When PPE is necessary
 - What PPE is necessary
 - How to properly Don PPE
 - How to Doff PPE
 - How to adjust and wear PPE
 - The limitations, care, inspection, and maintenance of the PPE
 - Useful life and disposal of the PPE
 - Inspection of PPE prior to use
 - Not to accept PPE that is damaged or does not fit properly
 - Not to accept PPE that is not attended for the function it was designed for
- 4.13.3 Retraining of the employee is required when the workplace changes, making earlier training obsolete, the type of PPE changes, or when employee demonstrates the lack of use, improper use, or insufficient skill or understanding of how to use the PPE.
- 4.13.4 The employee may be certified to where the PPE. This certification will include the employee's name, the dates of training, and the certification number.

Personal Protective Equipment

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5.0 REFERENCES

Standards: Head Protection

- CSA Standard Z94.1-M1977, Industrial Protective Headwear
- CSA Standard Z94.1
- ANSI Standards Z80.1-1997 and Z89.1-2003

Standards: Eye and Face Protection

- CSA Standard Z94.3-07, Eye and Face Protectors;
- CSA Standard Z94.3-02, Industrial Eye and Face Protectors;
- CAN/CSA-Z94.3-99, Industrial Eye and Face Protectors;
- CSA Standard Z94.3-M1982, Industrial Eye and Face Protectors;
- CSA Standard Z94.3 Industrial Eye and Face Protectors.
- ANSI Z.87.1

Standards: Footwear

- CSA standard Z195-02 Footwear
- CSA Standard Z94.1-92
- ANSI Standards Z80.1-1997 and Z89.1-2003
- CSA Standard Z195-M1984, Protective Footwear

Standards: Fall Protection

- CSA Standard Z259.1-1976, Fall-Arresting Safety Belts and Lanyards for the Construction and Mining Industries (or current version)
- CSA Standard Z259.2-M1979, Fall-Arresting Devices, Personnel Lowering Devices and Life Lines (or current version)
- CSA Standard Z259.3-M1978, Lineman's Body Belt and Lineman's Safety Strap

Standards: Respirators

- CSA Standard Z94.4-M1982, Selection, Care and Use of Respirators
- CSA Standard CAN3-Z180.1-M85, Compressed Breathing Air and Systems

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MSP 023 PHYSICAL EXAMS

1.0 PURPOSE

1.1 To document **AIRDE**'s expectations for physical conditioning and capabilities in order to safely perform their duties.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** employees and contractors who are required to follow **AIRDE**'s procedures. Note that clients may have specific procedures physical exams (Offshore Medicals) which our employers will be expected to follow.

3.0 RESPONSIBILITY

3.1 It is the responsibility of the OPERATIONS COORDINATOR to identify client specific physical examination requirements.

3.2 The Director of HSE&Q is responsible for maintaining the training records.

3.3 The HSE&Q Director is responsible for physical exams required for return to work programs.

4.0 PROCEDURE

4.1 General

4.1.1 Physical fitness of employees is a prime requisite in preventing a significantly large number of personal injuries. An employee's health may be evaluated to ensure that their true physical capability and job assignment is compatible.

4.2 Special Physical Evaluations

4.2.1 Any employee whose physical condition or capabilities, as outlined in the job requirements, constitutes a safety hazard to himself or other employees may be required at the company's expense to undergo a physical evaluation at a company approved facility for the following:

- An inability to do a satisfactory job because of a physical or mental problem.
- Return from an extended absence because of a serious illness or an off the job injury when time lost has exceed 30 calendar days, and the individual is not in a sedentary type position.
- Return from an extended recovery after a serious industrial injury when absence has exceeded 30 calendar days and the individual is not in a sedentary position.
- In these two cases, the employee is required to furnish the company's approved medical facility with a copy of his/her personal physician's RELEASE TO WORK plus a brief report of DIAGNOSIS, TREATMENT and PROGNOSIS. These must be provided at the time of the evaluation.
- Return from resignation or leave without pay status of more than six months duration for those job classifications, which require pre placement physicals.
- Return from resignation or leave without pay status for any duration when the health status of the employee is questionable.

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- An employee transferring to a job that requires greater physical capability and a pre placement physical exam is required.
- An employee who appears to be working while groggy or incoherent.

4.3 Alcoholism

4.3.1 Confirmed alcoholism is acknowledged as a disease and therefore may be treated as any other illness. An alcoholic employee is potentially hazardous to himself and to others, and ignoring his/her problem at the work site is a mistake management and employees must avoid. When the need for diagnosis of alcoholism or drug abuse is indicated, the case should be reviewed with the Director of HR. SUPERVISORS SHOULD NOT ATTEMPT TO DIAGNOSE ALCOHOL OR DRUG ABUSE. Speak to the Director of HR with any concerns you may have regarding a fellow employee.

4.4 Confidentiality of Physical Examination Reports

4.4.1 The results and findings of a physical examination performed at a company approved medical facility, either for pre placement, annual or an evaluation shall be treated as CONFIDENTIAL. Information must not be provided to anyone outside the normal processing agencies involved in hiring, evaluating or extending leaves on an individual without the individual's expressed consent in writing.

4.5 Employment during Absence from Company Duties

4.5.1 An employee who is absent from his/her company duties because of illness or injury must not work outside his/her company employment.

4.5.2 Normally, if an employee is cleared to work off duty by his/her physician, it is possible that he/she could be placed in some company job within the limitations set by the physician. Supervision should make every effort to do this when possible. In the US, authorization may be required by the employer for the employee to receive medical treatment under the Workers Compensation Benefit Coverage by our Insurance Carrier.

4.6 Employee Health Coverage Requirements

4.6.1 All employees and sub-contractors are to be in possession of a valid provincial Medical Services Insurance card. Medical treatment required without a valid MSI card will be the responsibility of the employee or sub-contractor.

4.6.2 When traveling outside Canada on company business, the company will provide travel and flight insurance sufficient to provide immediate emergency medical treatment. All other medical requirements outside the scope of company business will be the responsibility of the employee or sub-contractor.

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MSP 024 PROCESS MANAGEMENT PROCEDURE

01.PURPOSE

2.0 SCOPE

3.0 RESPONSIBILITY

1.1 All refineries and process plants that handle or process hazardous materials are required to implement safety measures that will ensure the safe operation of the facility for the workers, as well as the public. Airde, like all contractors working in these facilities are required to have implemented their own safety program, plus have been trained in the safety measures that affect the work that they may be doing in a PSM environment.

1.2 Several industrial incidents at major process facilities, including the explosion and release of toxic material that killed 20,000 people in India in 1985, have heightened awareness concerning the potential for catastrophic incidents in the petrochemical industries. Those incidents promulgated regulatory agencies to request the industry to assist in putting together a plan to ensure a safe work environment for all employees.

2.1 This guideline is broad in scope and covers process design, process technology, operational and maintenance activities and procedures, non-routine activities and procedures, training programs and all other elements that affect process.

2.2 Most importantly, the guideline affects contractors working on plant sites. The following subjects are part of these requirements:

- Process safety information
- Process hazards analysis
- Operating procedures
- Training (operator and contractor)
- Emergency planning and response
- Contractor Safety Program
- Hot work permits
- Management of change
- Pre-start-up reviews
- Incident investigation
- Mechanical integrity
- Compliance audits

2.3 The PSM guideline clarifies the responsibilities of both the client and the contractor involved in work affecting regulated processes. The guideline also mandates employee participation in the PSM programs, written operating procedures, employee training, pre-start-up review, maintenance of the mechanical integrity of control equipment, and written procedures for managing change.

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2.4 In addition, the guideline requires a permit system for hot work, investigation of incidents, near misses, emergency action plans, compliance audits and trade secret protection.

2.5 **Airde** Management and employees must understand the inherent hazards associated with process systems containing highly hazardous chemicals. **Airde** will ensure that employees assigned to work on process facilities are qualified in their crafts and are fully trained in all aspects of safety.

2.6 Implementation of AIRDE's "Process Safety Management Program" will begin by requesting the client to submit all pertinent information required by the standard to conduct work safely.

3.1 The Client is responsible for providing **Airde** with all data pertaining to any or all technological processes where work is to be performed. Information will include but not be limited to flow diagrams, back flow diagrams, toxicity information, corrosive data, chemical stability and all potential hazards involved. The Client will further provide information on all equipment used in the process, a Process Hazard Analysis (PHA) if appropriate, all temporary changes to the process system and an emergency action plan for the facility.

3.2 The OPERATIONS COORDINATOR is responsible for ensuring that work activities conducted by employees and subcontractors are completed per the requirements of this policy and procedure.

3.3 The Supervisor: is responsible for enforcing the process safety management policy and procedure.

3.4 Each of the above **Airde** representatives will be responsible for the following:

3.5 **Airde** will receive and study all information provided by the client in order to have a complete understanding of the highly hazardous chemical used in the process system. This will ensure the planning of work covers all aspects of safety procedures for chemicals that are detrimental to the health and safety of all **Airde** employees.

This information will then be reviewed with all affected employees. The information will consist of, but not be limited to the following:

- Chemical Toxicity Information
- Permissible Exposure Limits (PEL) of Chemicals
- A Chemicals Physical Data, Reactivity Data, Corrosive Data
- Thermal or Chemical Stability
- Hazardous effects of inadvertent mixing of chemicals

3.6 The Director of HSE&Q is responsible for developing and revising this policy and procedure and shall implement, document and audit its performance. The Director of HSE&Q will assist project management in the planning phase and obtain all Safety Data Sheets regarding chemicals, The Director of HSE&Q Manager will analyze information provided, note all existing potential hazards, have all safety and personal protective equipment available and conduct orientation/training classes for all employees in order to provide a safe working environment.

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3.7 All employees may be required to take the appropriate substance abuse test that complies with AIRDE's and/or the client's requirements prior to start of work. All employees will be trained in this PSM Program and anyone required by the client as appropriate.

3.8 Supervisors are responsible to test all employees to find their level of training and experience for each trade, skill, or craft position. Supervisors will assign helpers to experienced craftsmen to enhance the employee's knowledge and gain experience in their craft and ensure they follow safe work practices. Supervisors will not allow an employee to work in a facility for which he/she has no knowledge or training. Supervisors are responsible to train employees assigned to new work areas in a facility to assure that they all have the knowledge and skills to conduct the work safely. If a Supervisor has the knowledge of an employees' experience in process units and feels confident that they fully understand the procedures, he may, in lieu of training, certify in writing that the individuals have the knowledge and skills to safely carry out the work in accordance with the established procedures.

4.1.1 Catastrophic Release: A major, uncontrolled, emission, fire, or explosion, involving one or more highly hazardous chemicals that present serious danger to employees in the work place.

4.1.2 Facility: The buildings, containers, or equipment, which contain a process.

4.1.3 Highly Hazardous Chemical: A substance possessing toxic, reactive, flammable, or explosive properties as specified by the ACGIH.

4.1.4 Hot Work: Work involving electric or gas welding, cutting, brazing, or similar flame or spark producing operations.

4.1.5 Normally Unoccupied Remote Facility: A facility which is operated, maintained or serviced by employees who visit the facility only periodically to check its operation and to perform necessary operating or maintenance tasks and no employees are permanently stationed at the facility.

4.1.6 Process: Any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities (Note: For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that

4.0 PROCEDURE

4.1 Definitions

a highly hazardous chemical could be involved in a potential release shall be considered a single process).

4.1.7 Standard: The applicable Federal and/or Provincial/State Process Safety Management regulation in effect.

4.2 General

4.2.1 The following procedure is written as a guideline for Process Safety Management of Highly Hazardous Chemicals, and will be adhered to by all Airde employees working in

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process facilities where a high safety standard applies. In the event that requirements of the client differ from this procedure, the more stringent of the two will take precedence.

4.2.2 Airde employees and management must understand and comply with these written procedures that dictate safe working practices in order to minimize or prevent catastrophic results inherent from hazardous environments associated with process plants.

4.2.3 Employees disregarding these written procedures are subject to disciplinary action up to and including termination.

4.3 Process Hazard Information

4.3.1 The Field Supervisor or his designate shall request from the facility owner/operator, as soon as possible, information related to AIRDE's work activities and the process regarding the known potential fire, explosion or toxic release hazards and emergency action plan.

4.3.2 The information provided may include:

- Process Safety Information
- Process Hazard analysis
- Operating Procedures
- Safe Work Practices.

4.4 Process Safety Information

4.4.1 The process safety information provided should pertain to the hazards of the highly hazardous chemical in the process, ethnology of the process, and the equipment in the process including:

- Hazards of the Highly Hazardous Chemicals in the Process
- Toxicity information
- Permissible exposure limits (PEL) or Threshold Limit Values (TLV)
- Physical data
- Reactivity data
- Corrosively data
- Thermal and chemical stability data
- Hazardous effects of inadvertent mixing of different materials that could occur

4.4.2 All above information is found on the Safety Data Sheets (SDS) that shall be obtained from the client.

4.5 Process Hazard Analysis Information

4.5.1 The process hazard analysis information provided should be appropriate to the complexity of the process and should identify, evaluate, and control the hazards involved in the process. The analysis should address:

- Hazards of the process
- Identification of any previous incident which had likely potential for catastrophic consequences in the work place

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- Engineering and administrative controls applicable to the hazards and the appropriate applications detection to provide early warning of releases
- Consequences of failure of engineering and administrative controls
- Facility citing
- Human factors
- Qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees in the work place.

4.6 Safe Work Practice Information

4.6.1 The safe work practice information should be provided for control of hazards during work operations and should include:

- Lock-out/Tag-out
- Confined space entry
- Hot work
- Opening process piping

4.7 Emergency Action Plan

4.7.1 The Field Supervisor shall request from the facility owner/operator information regarding the emergency action plan. This information should be written and cover those designated actions that shall be taken to ensure employee safety from fire and other emergencies.

4.7.2 The emergency action information should contain, as a minimum, the following information:

- Emergency escape procedures and emergency escape route assignments
- Procedures to account for all employees after emergency evacuation has been completed
- The preferred means of reporting fires and other emergencies
- Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under this plan

4.8 Employee Alarm System

4.8.1 The employee alarm system should be distinct and recognizable as a signal to evacuate the work area or to perform actions designated under the emergency action plan. The alarm system information should contain the following:

- Alarm system signals and their meaning
- Methods of reporting emergencies (including use of pull box alarms, public address systems, radios, telephones)
- Emergency telephone locations and emergency telephone number listings
- Procedures for sounding emergency alarms in the work place.

4.9 Safe Work Practices

4.9.1 The Field Supervisor shall assure that each employee and/or subcontractor follows the safety rules of the facility including the safe work practices required for lock-out/tag-

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out, confined space entry, hot work, opening of piping, and control over access into process areas.

4.10 Safe Work Practices

4.10.1 The facility owner/operator shall be advised by the Field Supervisor or Job Supervisor (and any employee should it be necessary) of any unique hazards presented by AIRDE work activities. Any other hazards found during AIRDE work activities must also be reported.

4.11 Sequence of Process Management Program

4.11.1 General

4.11.1.1 The Field Supervisor shall immediately notify the safety director should any Airde project potentially involve the actual management of processes covered under the process safety management guideline. The safety director shall subsequently review project operations and determine the actions required for compliance with the client PSM program.

4.11.2 Employee Training

4.11.2.1 Airde's Commitment to Safe Construction practices and its safety program will be a continuing effort. All employees will receive a client safety orientation. The following subjects are to be included:

- Plant Emergency signals
- Plant Emergency telephone numbers
- Evacuation routes/Assembly areas
- Smoking rules
- Traffic rules
- WHMIS
- Use of vehicles in process plants
- Reporting hazards
- Work permits
- Trenching & Excavating
- Shielding of welding operations
- Highly hazardous chemicals/gases/materials

4.11.2.2 If the work requires, selected employees will receive the following additional training:

- Fire Watch training
- Cascade System/SCBA (Supplied Air Training)
- Rescue
- Competent Person (Trenching & Excavating)
- HAZWOPER (in US)

4.11.2.3 All employees will be given training as required to ensure they understand safe working practices in a process environment.

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4.11.2.4 Individual provincial or client requirements may be used in place of any federal standard providing that they meet or exceed the minimum requirements of the federal regulation.

4.11.3 Safety Meeting

4.11.3.1 Safety meetings shall be conducted by the Field Supervisor, or the Job Supervisor, with their crews initially prior to work start up and weekly on the job to emphasize safety. Meeting discussion topics shall be documented.

4.11.4 Process Hazards Review

4.11.4.1 Each employee shall be instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process taken.

4.11.5 Emergency Action Plan Review

4.11.5.1 The written emergency action plan shall be reviewed by the Job Supervisor with employees to ensure employee safety from fire and other emergencies. This information shall be reviewed prior to conducting activities in or adjacent to the process during the safety meeting.

4.11.6 Construction Operations

4.11.6.1 The Field or Job Supervisor will submit work permits to the client operations personnel for approval.

4.11.6.2 Prior to commencing work, Airde Supervisors will coordinate with client operations personnel to make a Job HAZARD Analysis (JHA) of the work to be performed, if requested. Supervisors will follow the four basic steps in completing the Job Hazard Analysis (JHA).

- Select the job
- Separate job into basic steps
- Identify the hazards
- Control each hazard

4.11.6.3 Utilizing the information on the Job Hazard Analysis (JHA) Worksheet Supervisors will brief their employees on the sequence of the operation, potential Incidents, all known hazards, and safety procedures prior to starting any work.

4.11.7 Incident Reporting

4.11.7.1 All Airde employees will report all potential hazards observed on the job site to their Supervisor. The Supervisor will immediately inform the AIRDE Director of HSE&Q.

4.11.7.2 In the event a hazard will or could become detrimental to the safety of the workers, all employees will immediately evacuate the work area and report the hazard to the client operations personnel and the Airde Director of HSE&Q.

4.11.7.3 In the event of a fire or explosion, all fire watch personnel will attempt to control the fire until help arrives. If the fire is uncontrollable all personnel will immediately evacuate the area. Airde employees will not place themselves or co-workers in jeopardy.

4.11.7.4 Airde employees will not engage in hazardous waste response operations unless they are trained and qualified.

4.11.7.5 "NEAR MISS" INCIDENTS (Near Incident Reporting):

4.11.7.6 Airde employees will regard all "near Incidents" as if they actually caused bodily injury or damage to equipment and will be reported on an Incident report form.

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4.11.7.7 An Incident investigation review will be held as soon as possible to determine the cause and methods to prevent future occurrences. Incident investigation and reporting will be conducted in accordance with procedures found in the **Airde** Safety Manual. The investigation team will be provided training on investigation procedures and evidence collection and preservation.

4.11.7.8 A verbal report followed by a written report of all incidents/Incidents will be submitted to the client safety Manager and copies maintained on file with the **Airde** office.

4.11.7.9 Incidents will be reported to OSHA within 8 hours.

4.11.7.10 The host facility will be informed of all incidents within 24 hours.

4.11.7.11 Following the incident procedure will be reviewed to prevent a recurrence of the incident including follow-up employee training.

4.11.8 Work Permits

4.11.8.1 **Airde** will comply with applicable work permits as required by the client and the Process Safety Management that may be issued by the client. Permits such as the General Work Permit, Hot Work Permit, Confined Space Entry Permit, and Lock out/Tag out are intended to document fire protection requirements, indicate the authorized date(s), identify the process and object to be worked on, and the need (if any) for Personnel Protective Equipment (PPE) to be worn.

4.11.9 Mechanical Integrity/Quality Assurance

4.11.9.1 **Airde** will comply with client procedures in all aspects of testing and inspections on all work related to process. **Airde** will assure all fabrications and equipment used is suitable for process application, and that they are installed properly and consistent with design specifications. All test and inspections shall be documented.

4.11.10 Mechanical Integrity/Quality Assurance

4.11.10.1 **Airde** will comply with client procedures in all aspects of testing and inspections on all work related to process. **Airde** will assure all fabrications and equipment used is suitable for process application, and that they are installed properly and consistent with design specifications. All test and inspections shall be documented.

4.11.11 Trade Secrets

4.11.11.1 Process flow and block diagrams are required to be made available to the contractor in accordance with this standard. The information may be considered a trade secret by the client. In cases where this information is secret, **Airde** management is willing to sign appropriate confidentiality agreement prior to the receipt of the information.

4.11.12 Safety Audits

4.11.12.1 Project management must be prepared for unannounced safety audits by Provincial as well as by the client's safety management team.

4.11.12.2 The **Airde** Director of HSE&Q will assure that all requirements of the **Airde** Safety Program are in compliance including the following records as may be applicable:

- Training records on all assigned employees
- Respirator training records
- WHMIS, Training – Education Records
- First aid logs

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- Incident Reporting – Record keeping
- Weekly safety meeting reports
- Master list of all training conducted
- OSHA Logs (in US).

4.12 Process Safety Management Training Records

4.12.1 General

4.12.1.1 Process safety management employee training documentation shall be maintained that documents each employee has received and understood the required training. Records shall be kept with the identity of the employee, date of training, and the means used to verify that the employee understood the training.

4.12.2 Health and Safety Training Records

4.12.2.1 Health and safety training records shall be established for each employee. These records include:

- Injury and Illness prevention Program training
- Hazardous waste operations and emergency response (WHMIS) training (if applicable)
- Hazard communication training
- Hearing conservation training
- Air purifying respirator fit testing
- Miscellaneous other health and safety meetings
- Copies can be requested to be kept at the jobsite. The employee folder with training information will be kept at the Corporate Safety Office.

4.12.2.2 A copy of any and all test results or competencies will be maintained in the employee's personnel file.

5.0 REFERENCES

The principle organization responsible for regulating process safety is the Occupational Safety and Health Administration (OSHA as well as CAL/OSHA) who issued a Standard and Health Administration (OSHA) who has issued a Standard under 29 CFR 1910.119, "Process Safety Management of Highly Hazardous Chemicals" otherwise known as the PSM requirements. This Standard became Law on May 28, 1992.

29 CFR 1910.1200 and CAL/OSHA Section 5194

There are other regulatory agencies directly or indirectly affecting PSM. Among these are:

- SARA Title III (Community Right-to-know and Emergency Planning);
 - The Clean Air Act;
 - Resource Conservation and Recovery Act (RCRA)
- 5.1.2.4 Federal-OSHA; TITLE 29, Code of Federal Regulations, Section 1910. 119, "Process Safety Management of Highly Hazardous Chemicals."
- 5.1.2.5 Cal-OSHA; TITLE 8, California Code of Regulations, Section 5189, "Process Safety Management"

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MSP 025 Lightning Policy and Procedure

1.0 PURPOSE

This rule provides direction to Supervisors and Employees for addressing the potential danger from thunderstorms and lightning.

2.0 RESPONSIBILITY

Supervisor personnel must be aware of the weather forecast using sources such as NOAA or similar weather forecasting.

Supervisor personnel must use and monitor active storms with lighting proximity applications such as My Lightning Tracker® or similar.

Supervisory staff on-site will determine when the proximity of a lightning or storm threat warrants stand down or other mitigation to eliminate the risk of exposure to the event by using the procedure outlined herein as a bare minimum guide to achieving safe evacuation times.

A supervisor may adjust the evacuation times to assure sufficient time for safe egress.

Supervisory staff on-site will determine appropriate communication methods and ensure the crew understands the required course of action by use of daily JHA and pre work meeting.

Supervisory staff on-site and/or site-specific guidelines will determine a designated safe zone where workers are safe from lightning (eg. in building, truck)

3.0 SCOPE

The development of thunderstorms can produce various severe types of weather such as heavy rain, strong winds, lightning, and hail. If the daily weather forecast suggests that the potential exists for severe weather activity in the worksite area, supervisory personnel should watch for signs of approaching storms throughout the workday and utilize this procedure to implement proper mitigations to assure the safety of all personnel.

4.0 PROCEDURE

4.1 When the daily weather forecast indicates that the potential exists for severe weather activity in the worksite area, supervisory personnel should watch for signs of approaching storms throughout the workday.

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4.2 Reliable tools recommended for watching approaching dangerous weather include but are not limited to:

- NOAA National Weather Service www.weather.gov
- Applications like My Lightning Tracker® or similar, providing alarms at custom distances.
- Visual reference.

4.3 All crew must notify supervisor in event of incoming severe weather as soon as possible.

4.4 Supervisory personnel will use lightning proximity applications as well as weather monitoring applications to help track storm.

Miles to Lightning Strike	Action
10	• Stop Work • Off Ropes • Seek Safe Shelter
20	• Risk Assess • Plan Exit • Egress Time
50	• Initial lightning strike awareness

4.5 When lightning is calculated to be 20 miles in proximity, supervisory personnel will inform field personnel of the potential for lightning in the area.

4.6 If the lightning proximity reaches 10 miles, supervisory personnel will suspend all rope access activities.

4.7 If lightning reaches a proximity of 10 miles, work activities at unprotected elevations will cease and operations will be restricted to indoor, safely grounded operations only.

4.8 If weather conditions worsen, workers will be advised by their supervisor if groundwork activities should be suspended at which time workers will remain in safe zone and monitor the radio for further instruction.

4.9 Supervisor will conduct a headcount of field personnel working on the ground, to ensure that they are aware of the hazards and in a safe area.

4.10 When work is suspended by supervision, workers will remain in the safe zone until a decision is reached regarding the safe return to work.

4.11 Work can be resumed when lightning is greater than 10 miles from the work site, the storm is moving away from the work site and there has been no lightning within this distance for greater than 15 minutes. Supervisory personnel will inform field personnel when it is clear to return to work.

4.12 If it is determined that egress to a safe location will not be immediately possible, supervisors will order personnel to egress with sufficient time to secure their immediate work area and arrive to the safe location prior to lightning reaching the 10-mile limit.

4.13 Personnel must NOT walk over an area subjected to a lightning strike as voltage on the ground is highest in the immediate area and decreases with distance.

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4.14 If personnel must leave a building, plant or machinery in an emergency, jump off and shuffle away to a safe location.

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MSP 026 RESPIRATORY PROTECTION PROCEDURE

1.0 PURPOSE

1.1 To provide guidance for the selection, maintenance and use of respiratory protective equipment in accordance applicable standards.

2.0 SCOPE

2.1 This procedure applies to all **Airde** jobs that require the use of respiratory protection when it is not possible to prevent or eliminate employee exposure to harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, or when effective engineering controls are not feasible, or while they are being instituted.

3.0 RESPONSIBILITY

3.1 OPERATIONS COORDINATOR is responsible to ensure the proper respiratory protection is provided to the crew and that they are fit test as applicable before use.

3.2 The Director of HSE&Q is the Program Administrator and is responsible for ensuring that this procedure is implemented. The Director of HSE&Q will be the company's "qualified person" for this program.

3.3 Each Supervisor is responsible for the implementation and monitoring the Personal Protective Equipment Program and ensuring that the program is in place and is in compliance with this procedure. Each Supervisor is responsible for complying with the procedure as it relates to his/her subordinates.

3.4 All employees expected to wear PPE, are responsible to be clean shaven, as appropriate. Employees are responsible for complying with this procedure, along with the rules and regulations as stipulated, plus the instructions issued by the employee's Supervisor.

4.0 PROCEDURE

4.1 Definitions

4.1.1 The following definitions are important terms used in the respiratory protection standard in this section.

4.1.1.1 Aerosol - A system consisting of particles, solid or liquid, suspended in air.

4.1.1.2 Air purifying respirator - Means a respirator with an air purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air purifying element.

4.1.1.3 Air-regulating valve - An adjustable valve used to regulate, but which cannot completely shut off, the airflow to the face piece, helmet, hood, or suit of an airline respirator.

4.1.1.4 Approved - Tested and listed as satisfactory by the appropriate authorities

4.1.1.5 Atmosphere supplying respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

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4.1.1.6 Canister or cartridge - Means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

4.1.1.7 Confined Space - An enclosure, such as a storage tank, process vessel, boiler, silo, tank car, pipeline, tube, duct, sewer, underground utility vault, tunnel, or pit, having limited means of egress and poor natural ventilation and which may contain hazardous contaminants or be oxygen deficient.

4.1.1.8 Contaminant - A harmful, irritating, or nuisance material that is foreign to the normal atmosphere.

4.1.1.9 Demand respirator means an atmosphere supplying respirator that admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation.

4.1.1.10 Emergency respirator use - Wearing a respirator when a hazardous atmosphere suddenly occurs that requires immediate use of a respirator either for escape from the hazardous atmosphere or for entry into the hazardous atmosphere to carry out maintenance or some other task.

4.1.1.11 Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

4.1.1.12 Exhalation valve - A device that allows exhaled air to leave a respirator and prevents outside air from entering through the valve.

4.1.1.13 Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

4.1.1.14 End of service life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

4.1.1.15 Escape only respirator means a respirator intended to be used only for emergency exit.

4.1.1.16 Face piece - That portion of a respirator that covers the wearer's nose and mouth is a quarter-mask (above the chin) or half-mask (under the chin) face piece or that covers the nose, mouth, and eyes in a full-face piece. It is designed to make a gas-tight or particle-tight fit with the face and includes the headbands, exhalation valve(s), and connections for an air-purifying device or respirable gas source, or both.

4.1.1.17 Face shield - a device worn in front of the eyes and a portion of, or all of, the face, whose predominant function is protection of the eyes and the face.

4.1.1.18 Filter or air purifying element - A media component used in respirators to remove solid or liquid particles from the inspired air.

4.1.1.19 Filtering face piece (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.

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4.1.1.20 Fit factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

4.1.1.21 Fit test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

4.1.1.22 Goggles - A device, with contour-shaped eyecups with glass or plastic lenses, worn over the eyes and held in place by a headband or other suitable means for the protection of the eyes and the eye sockets.

4.1.1.23 Hazardous atmosphere - Any atmosphere, either immediately or not immediately dangerous to life and health, which is oxygen deficient or which contains a toxic or disease-producing contaminant exceeding the legally established Permissible Exposure Limit (PEL) or, where applicable, the Threshold Limit Value (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH).

4.1.1.24 Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

4.1.1.25 High efficiency particulate air (HEPA) filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

4.1.1.26 Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

4.1.1.27 Immediately dangerous to life or health (IDLH) - Means any atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

4.1.1.28 Inhalation valve - A device that allows respirable air to enter a respirator and prevents exhaled air from leaving the respirator through the valve.

4.1.1.29 structural firefighting means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures that are involved in a fire situation beyond the incipient stage.

4.1.1.30 Irrespirable - Unfit for breathing.

4.1.1.31 Loose fitting face piece means a respiratory inlet covering that is designed to form a partial seal with the face.

4.1.1.32 Maximum use concentration (MUC) [Reserved].

4.1.1.33 Negative pressure respirator (tight fitting) means a respirator in which the air pressure inside the face piece is negative during inhalation with respect to the ambient air pressure outside the respirator.

4.1.1.34 Odor threshold limit - The lowest concentration of a contaminant in air that can be detected by the olfactory sense.

4.1.1.35 Oxygen deficient atmosphere - The concentration of oxygen, by volume, below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen, by volume, is less than 19.5 percent oxygen.

4.1.1.36 Permissible Exposure Limit (PEL) - The legally established time-weighted average (TWA) concentration of a contaminant that will not be exceeded.

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4.1.1.37 Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by subsection (e).

4.1.1.38 Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

4.1.1.39 Powered air purifying respirator (PAPR) means an air purifying respirator that uses a blower to force the ambient air through air purifying elements to the inlet covering.

4.1.1.40 Pressure demand respirator means a positive pressure atmosphere supplying respirator that admits breathing air to the face piece when the positive pressure is reduced inside the face piece by inhalation.

4.1.1.41 Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

4.1.1.42 Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

4.1.1.43 Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air purifying device or breathing air source, or both. It may be a face piece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

4.1.1.44 Respirable - Suitable for breathing.

4.1.1.45 Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air purifying device or breathing air source, or both. It may be a face piece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

4.1.1.46 Self-contained breathing apparatus (SCBA) means an atmosphere supplying respirator for which the breathing air source is designed to be carried by the user.

4.1.1.47 Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer - for example, the period of time that an air purifying device is effective for removing a harmful substance from inspired air.

4.1.1.48 Supplied air respirator (SAR) or airline respirator means an atmosphere supplying respirator for which the source of breathing air is not designed to be carried by the user.

4.1.1.49 Tight fitting face piece means a respiratory inlet covering that forms a complete seal with the face.

4.1.1.50 User seal check means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

4.1.1.51 Valve (air or oxygen) - A device that controls the pressure, direction, or rate of flow of air or oxygen.

4.1.1.52 Vapor - The gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

4.1.1.53 Welding helmet - A device designed to provide protection for the eyes and face against intense radiant energy and molten metal splatter encountered in the welding and cutting of metals.

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4.2 Policy

4.2.1 Many substances exist in the industrial environment, which can prove to be harmful to a person's respiratory system and overall health. We at Airde are committed to meeting our moral and legal obligation to protect our employees from these substances and the serious effects they can have.

4.2.2 Some substances can be controlled through engineering techniques, such as ventilation systems. There are, however, situations which known engineering techniques cannot be applied. It is in these situations where respiratory protective equipment becomes necessary.

4.2.3 Airde has established minimum standards for the use of respiratory protection equipment for certain conditions. These minimum standards are detailed below and equipment meeting or exceeding these standards will be used, unless authorized by the Corporate HSE Officer or Owner/Operator.

4.2.4 Medical, respirators, and training required for this Respiratory Protection Program will be provided free of charge to the employee.

4.3 General

4.3.1 General

4.3.1.1 Whenever any job where respirators are necessary to protect the health of company employees at our facility or whenever respirators are required by a client, the company will implement this written respiratory protection program with worksite specific procedures. This program and any worksite-specific program will be updated as necessary to reflect those changes in workplace conditions that affect respirator use. This program is to be evaluated at least annually, and any worksite plan it to be monitored on a continuous basis and changes made immediately as necessary.

4.3.2 Hazard Evaluation

4.3.2.1 (See section IX and XI of this program for detailed requirements) - Every consideration will be given to the use of effective engineering controls to eliminate or reduce exposure to respiratory hazards to the point where respirators are not required; however, when feasible engineering controls are not effective in controlling toxic substances, appropriate respiratory protective equipment will be provided by the company at no charge to the employee.

4.3.2.2 If it is determined that respiratory protection must be used, the company or owner/operator will identify and evaluate the respiratory hazard(s) at the work site. This evaluation will include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the company cannot identify or reasonably estimate the employee exposure, the company will consider the atmosphere to be IDLH.

4.3.3 Respirator Use and Selection

4.3.3.1 (See section VII and VIII of this program for detailed requirements) - All respiratory protective devices will be the type approved by the National Institute for Occupational

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Safety and Health (NIOSH) or acceptable to the U.S. Department of Labor (OSHA) for the specific containment to which the employee is exposed. Respirator previously approved by the Mine Safety and Health Administration (MSHA) are also acceptable.

4.3.4 Employee Education and Training

4.3.4.1 (See section XVI of this program for detailed requirements) - Employees required to use respiratory protective devices because of exposure to toxic substances will do so as a condition of employment. Employees required to use respirators will be properly fitted, appropriately tested, medically screened, and thoroughly trained in their use.

4.4 Respirator Selection

4.4.1 In selecting the correct respirator for a given circumstances, the following factors must be taken in consideration:

4.4.2 Nature of the Hazard - In order to make subsequent decisions, the nature of the hazard must be identified to ensure that an overexposure does not occur. These include oxygen deficiency, physical properties of the hazard, chemical properties of the hazard, physiologic effects on the body, actual concentrations of the toxic substances, the Permissible Exposure Limits (PEL), and the warning properties.

4.4.3 Nature of the Hazardous Operation - For proper respirator selection, it is necessary to know the details of the operations, which require employees to use respiratory devices. These include operation or process characteristics, work area characteristics, materials used, or produced during the process, the employee's duties and actions, and any abnormal situation characteristics that may necessitate alternate respirator selection.

4.4.4 Location of the Hazardous Area - This is important in the selection process so that a backup system may be planned if necessary. Restorable air locations must be known prior to entry into a hazardous area so escape or emergency operations may be planned.

4.4.5 Time Respiratory Protection is Required - The length of time a respirator will have to be worn by an employee is a factor which must be evaluated. This is most pronounced when using SCBA equipment, where, by definition, the air supply is finite. However, time is also a factor during routine use of air-purifying respirators when the employee's breathing and comfort become affected by a clogged filter cartridge that needs changing.

4.4.6 Employee's health - Effective usage of a respirator is dependent on an individual's ability to wear a respirator, as determined by a physician. Most respiratory devices increase physical stress on the body, especially the heart and lungs. Care should be taken to ensure that a medical determination

has been made that an individual is capable of wearing a respirator for the duration of the work assignment. (See medical evaluation procedures - Section XVII of this program)

4.4.7 Work Activity - The type of work activities to be performed while wearing a respirator is vitally important in the respirator selection. The proper respirator will be one, which is least disruptive to the task being conducted yet providing the desired protection.

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4.4.8 Respirator Characteristics - Capabilities and Limitations found in ANSI Z88.2-1980 provide a description of various respirator characteristics, capabilities and limitations.

4.4.9 Protection Factors - The protection afforded by respirators is dependent upon the type of respirator used, seal of the face piece to the face, leakage around valves, and leakage through or around cartridges or canisters. Depending on these criteria, the degree of protection may be ascertained and a relative safety factor assigned. Protection factors are only applicable if all elements of an effective respirator program is in place and being enforced.

4.5 Comfort

4.5.1 Once the type of respirator has been selected that is applicable and suitable for the purpose intended, the selection process should be given consideration to the fit and comfort of the respirator.

4.5.2 The employee should be given the opportunity to select a respirator that provides the most comfortable fit. Since each respirator represents a different size and shape, a respirator that fits better during selection will provide better protection after fit testing. The employee should be shown how to assess a comfortable device and should eliminate those that are obviously ill fitting.

4.5.3 An assessment of comfort should include the following points:

- Chin properly placed
- Fit across nose bridge
- Positioning of mask on nose
- Room for safety glasses
- Strap tension
- Distance from nose to bridge
- Room to talk
- Tendency to slip
- Cheeks filled out
- Hindrance to movement

4.6 Issuance of Equipment

4.6.1 In order to ensure a seal and prohibit items that may affect the seal, the issuance of respirators to employees will be, at a minimum, based on the following considerations:

- A person must have received appropriate, documented training and must have received medical clearance, where applicable.
- A person who has hair e.g., beard growth, mustache, sideburns, stubble, low hairline, bangs, which passes between the face and the sealing surface of the respirator face piece will not be permitted to wear such a respirator.
- A person who has hair, which interferes with the function of a respirator valve(s), will not be permitted to wear the respirator.
- A head covering which passes between the sealing surface of a respirator face piece and the wearer's face will not be permitted.

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- The wearing of a spectacle, a goggle, a face shield, a welding helmet, or other eye and face protective device which interferes with the seal of a respirator to the wearer will not be permitted.
- If scars, hollow temples, excessively protruding cheekbones, deep creases in facial skin, the absence of teeth or dentures, or unusual facial configurations prevent a seal of a respirator face piece to a wearer's face the person will not be permitted to wear the respirator.
- If missing teeth or dentures prevent a seal of a respirator mouthpiece in a person's mouth, the person will not be allowed to wear a respirator equipped with a mouthpiece.
- If a person has a nose of a shape or size that prevents the closing of the nose by the nose clamp of a mouthpiece/nose-clamp type of escape respirator, the person will not be permitted to wear this type of respirator

4.7 Fitting

4.7.1 After the employee has been shown how to assess a respirator, he/she should be shown how to put on a respirator, how it would be positioned on the face, how to set strap tension, and how to determine a proper fit.

4.7.2 The employee should hold each face piece up to the face and eliminate those, which obviously do not give a comfortable or proper fit.

4.8 Familiarization

4.8.1 Once the proper fitting respirator has been selected, the employee should don the device, adjusting the face piece and adjusting the straps. The employee should wear the mask for at least five minutes before taking it off and putting it on several times, adjusting the straps each time to become familiar with the respirator and adept at setting the proper tension on the straps.

4.9 Continuing Respirator Effectiveness

4.9.1 The program administrator and site supervisors are responsible for maintaining and appropriate level of surveillance of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, they and the company will reevaluate the continued effectiveness of the respirator.

4.9.2 The company will ensure that employees leave the respirator use area:

- To wash their faces and respirator face pieces as necessary to prevent eye or skin irritation associated with respirator use; or
- If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece; or
- To replace the respirator or the filter, cartridge, or canister elements.

4.9.3 If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece, the company must replace or repair the respirator before allowing the employee to return to the work area.

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4.10 Procedure for IDLH Atmospheres

4.10.1 Respiratory Equipment will be provided for employee's use against harmful vapors and oxygen deficient atmospheres. They are to be used when engineering controls are not suitable or during emergency situations with potential high exposures.

4.10.2 In the event that the company has a worksite that is an IDLH atmosphere, the program administrator will ensure that:

- One employee or, when needed, more than one employee is located outside the IDLH atmosphere;
 - Visuals, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;
 - The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;
 - The program administrator or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;
 - The program administrator or designee authorized to do so once notified, provides necessary assistance appropriate to the situation;
 - Employee(s) located outside the IDLH atmospheres are equipped with:
 - o Pressure demand or other positive pressure SCBA's, or a pressure demand or other positive pressure supplied air respirator with auxiliary SCBA; and either
 - o Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or
 - o Equivalent means for rescue where retrieval equipment is not required under this section
 - Procedures for interior structural firefighting. In addition to the requirements set forth under this section, in interior structural fires, the company will ensure that:
 - o At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;
 - o At least two employees are located outside the IDLH atmosphere; and
 - o All employees engaged in interior structural firefighting use SCBA's
- 4.10.3 Note 1: One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.
- 4.10.4 Note 2: Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

4.11 Fit Testing Requirements

4.11.1 OSHA requires that respirators be fitted properly, and that they be tested for their face-to-face seal. There are currently two methods acceptable for conducting these tests;

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Qualitative and Quantitative Fit-Testing. The Qualitative method is a fast, easily conducted test that can be performed almost anywhere, while the quantitative method requires the use of bulky test chambers and electronic equipment.

4.11.2 Before an employee may be required to use any respirator with a negative or positive pressure tight fitting face piece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This section specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

- The company will ensure that employees using a tight-fitting face piece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this section.
- The company will ensure that an employee using a tight-fitting face piece respirator is fit tested prior to initial use of the respirator, whenever a different respirator face piece (size, style, model or make) is used, and at least annually thereafter.
- The company will conduct an additional fit test whenever the employee reports, or the company, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.
- If after passing a QLFT or QNFT, the employee subsequently notifies the company, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable; the employee will be given a reasonable opportunity to select a different respirator face piece and to be retested.
- The fit test will be administered using an OSHA accepted QLFT or QNFT protocol. The OSHA accepted QLFT and QNFT protocols and procedures are contained in Appendix A.
- QLFT may only be used to fit test negative pressure air purifying respirators that must achieve a fit factor of 100 or less.
- If the fit factor, as determined through an OSHA accepted QNFT protocol, is equal to or greater than 100 for tight fitting half face pieces, or equal to or greater than 500 for tight-fitting full-face pieces, the QNFT has been passed with that respirator.
- Fit testing of tight-fitting atmosphere supplying respirators and tight-fitting powered air purifying respirators will be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.
- Qualitative fit testing of these respirators will be accomplished by temporarily converting the respirator user's actual face piece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air purifying respirator face piece with the same sealing surfaces as a surrogate for the atmosphere supplying or powered air purifying respirator face piece.
- Quantitative fit testing of these respirators will be accomplished by modifying the face piece to allow sampling inside the face piece in the breathing zone of the user, midway between the nose and mouth. This requirement will be accomplished by installing a

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permanent sampling probe onto a surrogate face piece, or by using a sampling adapter designed to temporarily

provide a means of sampling air from inside the face piece.

- Any modifications to the respirator face piece for fit testing will be completely removed, and the face piece restored to NIOSH approved configuration, before that face piece can be used in the workplace.

4.12 Respiratory Fit Test Procedure

4.12.1 Fit Check

4.12.1.1 When a respirator is first issued to the wearer, they should try a variety of sizes to get a comfortable fit. Next, they should perform a "Fit Check". This can be self-administered and should be done with all air-purifying respirators before entering a hazardous atmosphere. The manufacturer's instructions, which accompany the respirators, should be consulted and followed. The following negative and positive "check" should then be made:

- Negative pressure fit test: the wearer closes off the respirator inlet and inhales. A vacuum and partial inward collapse of the mask should result. If a vacuum cannot be maintained for at least ten (10) seconds, readjust the face piece and try again.
- Positive pressure fit test: the wearer closes off the exhalation valve and breathes out gently. Air will escape through any gaps in the seal between the face piece and the wearers face.

4.12.2 Qualitative or Quantitative Fit Test

4.12.2.1 After each employee has completed his or her initial "fit check" then a "qualified" person should perform a qualitative fit test. This test must include a "test atmosphere" using the recognized qualitative fit-testing procedures utilizing isoamyl acetate, irritant smoke, etc.; or a quantitative fit testing using DOP, NaCl, etc.

4.13 Care and Maintenance

4.13.1 General

4.13.1.1 Personnel involved in respirator maintenance must be thoroughly trained. While on the worksite the Field Supervisor will ensure that the maintenance is conducted. When respirators are returned, the Logistics Coordinator will perform the maintenance.

Substitution of parts from different brands

or types of respirators invalidates approval of the device. Repairs and adjustments should never be made beyond the manufacturer's recommendations.

4.13.2 Cleaning the Respirators

4.13.2.1 Respirators must be cleaned and disinfected after each day's use when they are assigned to one individual or after each use if they are assigned to more than one person. In addition, the following elements are necessary to maintained:

- Respirators issued for the exclusive use of an employee must be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;
- Respirators issued to more than one employee must be cleaned and disinfected before being worn by different individuals;

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- Respirators maintained for emergency use must be cleaned and disinfected after each use; and
- Respirators used in fit testing and training must be cleaned and disinfected after each use.

4.13.2.2 The following procedures are recommended for cleaning and disinfecting respirators:

- If required, remove and discard any filters or cartridges.
- Wash face piece and breathing tube in detergent and warm water (120) or a cleaning/disinfectant solution are available from respirator manufacturers or it can be made by using a solution of water and household chemicals, such as two tablespoons of chlorine bleach to one gallon of water, or one teaspoon of tincture of iodine to one gallon of water. A two-minute immersion of the respirator into either solution is sufficient for disinfection.
- Rinse completely in clean, warm water.
- Air dry in clean air.
- Clean out other parts as recommended by the manufacturer.
- Inspect the valves, head straps, and other parts and replace with new parts if defective.
- Place face piece in a plastic bag or container for storage in an assigned area.
- Insert new filters or cartridges prior to use, making sure the seals are tight.

4.13.3 Storing the Respirator

4.13.3.1 When they are not being used, respirators would be individually sealed in plastic bags and stored at convenient locations in order to protect them against dust, sunlight, extreme temperatures, excessive moisture, or damaging chemicals. They should be stored in such a way that the face piece and exhalation valve are not being distorted.

4.13.3.2 In addition to the requirements above emergency respirators must be:

- Kept accessible to the work area;
- Stored in compartments or in covers that are clearly marked as containing emergency respirators; and
- Stored in accordance with any applicable manufacturer instructions.

4.14 Inspection

4.14.1 Respirators must inspect as follows:

- All respirators used in routine situations will be inspected before each use and during cleaning;
- All respirators maintained for use in emergency situations must be inspected at least monthly and in accordance with the manufacturer's recommendations, and must be checked for proper function before and after each use; and
- Emergency escape only respirators must be inspected before being carried into the workplace for use.
- Respirator inspections must include the following:
 - A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

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- A check of elastomeric parts for pliability and signs of deterioration.

4.15 Self-contained Breathing Apparatus

4.15.1 In addition to the requirements of the above sections, self-contained breathing apparatus will be inspected monthly. Air and oxygen cylinders will be maintained in a fully charged state and will be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The company will determine that the regulator and warning devices function properly.

4.16 Respirators Maintained for Emergency Use

4.16.1 For respirators maintained for emergency use, the company will:

- Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and
- Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information will be maintained until replaced following a subsequent certification.

4.17 Repairs

4.17.1 The company will ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

- Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and will use only the respirator manufacturer's NIOSH approved parts designed for the respirator;
- Repairs will be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and
- Reducing and admission valves, regulators, and alarms will be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

4.18 Breathing Air Quality and Use

4.18.1 This section requires the company to provide employees using atmosphere supplying respirators (supplied air and SCBA) with breathing gases of high purity.

4.18.2 The company will ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

4.18.3 Compressed and liquid oxygen will meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

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4.18.4 Compressed breathing air will meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G 7.1 1989, to include:

- Oxygen content (v/v) of 19.5 23.5%;
- Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;
- Carbon monoxide (CO) content of 10 ppm or less;
- Carbon monoxide (CO) content of 10 ppm or less
- Lack of noticeable odor.

4.18.5 The company will ensure that compressed oxygen is not used in atmosphere supplying respirators that have previously used compressed air.

4.18.6 The company will ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

4.18.7 The company will ensure that cylinders used to supply breathing air to respirators meet the following requirements:

- Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);
- Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and
- The moisture content in the cylinder does not exceed a dew point of 50 DEG.F (45.6 DEG.C) at 1 atmosphere pressure.

4.18.8 The company will ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

- Prevent entry of contaminated air into the air supply system (located in clean area);
- Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 DEG.C) below the ambient temperature;
- Have suitable in line air purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters will be maintained and replaced or refurbished periodically following the manufacturer's instructions.
- Have a tag containing the most recent change date and the signature of the person authorized by the company to perform the change. The tag will be maintained at the compressor.

4.18.9 For compressors that are not oil lubricated, the company will ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

4.18.10 For oil lubricated compressors, the company will use a high temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high temperature alarms are used, the air supply will be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

4.18.11 The company will ensure that breathing air couplings are incompatible with outlets for non-respirable worksite air or other gas systems. No asphyxiating substance will be introduced into breathing airlines.

4.18.12 The company will use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

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4.18.13 Identification of filters, cartridges, and canisters.

4.18.14 The company will ensure that all filters, cartridges and canisters used in the workplace are labeled and color-coded with the NIOSH approval label and that the label is not removed and remains legible.

4.19 Minimum Respiratory Equipment Standards

4.19.1 General

4.19.1.1 The following is a list of respirators, which are designated as the minimum protection for the specified exposure.

4.19.2 Respirators for IDLH Atmospheres

4.19.2.1 The company will provide the following respirators for employee use in IDLH atmospheres:

- A full-face piece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or
- A combination full-face piece pressure demand supplied air respirator (SAR) with auxiliary self-contained air supply.
- Respirators provided only for escape from IDLH atmospheres will be NIOSH certified for escape from the atmosphere in which they will be used.
- All oxygen deficient atmospheres will be considered IDLH.

4.19.2.2 NOTE: If a hazard evaluation has been made which, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II (i.e., for the altitudes set out in the table), then any atmosphere supplying respirator may be used.

4.19.3 Respirators for Atmospheres That Are Not IDLH

4.19.3.1 The company will provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations:

- Assigned Protection Factors (APFs) [Reserved]
- Maximum Use Concentration (MUC) [Reserved]

4.19.3.2 The respirator selected will be appropriate for the chemical state and physical form of the contaminant.

4.19.3.3 For protection against gases and vapors, the company will provide:

- An atmosphere supplying respirator, or
- An air purifying respirator, provided that:
 - o the respirator is equipped with an end of service life indicator (ESLI) certified by NIOSH for the contaminant; or
 - o If there is no ESLI appropriate for conditions at the worksite, the company will implement a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life.

4.19.3.4 The company will describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data:

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4.19.3.5 For protection against particulates, the company will provide:

- An atmosphere supplying respirator; or
- An air purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or
- For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air purifying respirator equipped with any filter certified for particulates by NIOSH.

4.19.4 Table I, Assigned Protection Factors [Reserved]

4.19.5 Table II, Altitude (ft.) Oxygen deficient Atmospheres

4.19.5.1 (% O₂) for which the company may rely on atmosphere supplying respirators:

Less than 3,001.....

16.0 19.5

3,001 - 4,000.....

16.4 19.5

4,001 - 5,000.....

17.1 19.5

5,001 - 6,000.....

17.8 19.5

6,001 - 7,000.....

18.5 19.5

7,001 - 8,000.....

19.3 19.5

*1 Above 8,000 feet the exception does not apply. Oxygen enriched breathing air must be supplied above 14,000 feet.

4.19.6 Other Factors to Consider

4.19.6.1 Other factors to consider in the selection of the type of respiratory protection including the following:

- Welding - not in a confined space where positive ventilation cannot be achieved.
- Welding - in a confined space where positive ventilation cannot be achieved.
- Demolition, earthwork, etc.
- Cleaning with acids or caustics
- Use of solvents or spray painting

4.19.6.2 All others must be evaluated per the guidelines below.

4.20 Respiratory Equipment Stocked

4.20.1 General

4.20.1.1 The above guidelines have been established to assist field management in the proper selection and use of respiratory equipment on the jobsite. This information is intended to ensure that respiratory protection meets or exceeds the requirement of OSHA for any given exposure. However, there may be instances where there are special requirements; either the client may mandate that a different type of respirator be used, or

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after careful re-evaluation by Airde management (Supervisor, Field Supervisor, Corporate HSE Officer) a change in the quality of protection may be necessary.

4.20.1.2 It is also necessary to be familiar with the various SDS (Safety Data Sheet) for any chemicals, or construction products that require the use of respiratory protection.

Generally speaking, the equipment and exposures listed above will cover over 90% of the jobsites that are a part of Airde operations.

4.20.2 Respiratory Hazards

4.20.2.1 You must first identify and evaluate the hazards present before you can select the right respirator. Respiratory hazards come in the form of dusts, fumes, mists, vapors, and gases. The hazard comes from the presence, or in cases of oxygen, the lack of a material. A respiratory hazard is a hazard when a material can enter the body by being inhaled and cause illness or bodily damage.

4.20.2.2 The types of respiratory hazards to which workers may be exposed to workers can be classified as either acute or chronic:

4.20.2.3 Acute hazards are those hazards that are immediately dangerous to life or health, and can cause immediate death (i.e. oxygen deficiency, H₂S, Chlorine).

4.20.2.4 Chronic hazards are those hazards that can cause permanent damage to a healthy worker following exposure over a substantial period of time (i.e., asbestos, benzene).

4.20.2.5 In order to determine the proper respiratory protective equipment to be used, the material(s) to which a worker may be exposed must be classified into one of the categories listed below:

- **DUST** – Solid particles generated by handling, crushing, or grinding of organic or inorganic materials (Hazardous types include: asbestos, coke fines, catalyst dust).
- **FUMES** – Solid particles formed when a molten solid, such as metal cools and condenses (Hazards: welding fumes).
- **MISTS** – Suspended liquid droplets generated from condensing gas to liquid or from breaking up a liquid by splashing or spraying (Hazardous types: spraying of paint or acid).
- **VAPORS** – The gaseous form of substances normally in the solid or liquid state (Hazardous types: benzene, solvents).
- **GASES** – Normally formless fluid that can only be changed to a liquid by combining pressure and temperature (Hazardous types: H₂S, Chlorine, Ammonia, SO₂, Methane, Butane).

4.20.3 Oxygen Deficiency

4.20.3.1 The single respiratory hazard that poses the greatest problem and threat to life is oxygen deficiency. Normal air contains 21 % (percent) oxygen by volume. Oxygen levels of 16 % or less cannot safely support the respiratory needs of a person. This is why oxygen levels must always be taken into account when evaluating a worker's respiratory protection equipment.

4.20.3.2 Oxygen levels must be at least 19.5% by volume if respiratory protective equipment is to be used. An oxygen deficient atmosphere is a condition often found in poorly ventilated confined spaces. This atmosphere is classified as immediately dangerous to life or health. This atmosphere can occur in two ways: oxygen may be used up by a chemical reaction or oxygen can be displaced by another gas.

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4.20.4 Evaluation of the Hazard

4.20.4.1 A qualified individual who is trained in the operation of the proper detection equipment must perform the hazard evaluation. If you are not qualified, contact the owner's personnel or the **Airde** Corporate HSE Officer to properly evaluate the hazard.

4.20.4.2 If others performed the hazard identification and evaluation, they should advise you in writing of their findings (i.e. stated on the Entry Permit).

4.21 Respirators and Their Limitations

4.21.1 General

4.21.1.1 There are two categories of respirators, which we use in our work; air purifying respirators and air supplying respirators.

4.21.2 Air Purifying Respirators

4.21.2.1 Air purifying respirators do just what the words imply: they purify the air, but they do not supply oxygen if there is a deficiency. Air purifying respirators with filters are designed to remove particulates (dusts, mists, and/or fumes) from the air: there are disposable respirators (Examples: the 3M 8710 Dust Respirator and the 3M 9920 Welding Fume Respirator); and those with dual cartridges (the North 7700 series has cartridges for contaminants such as highly toxic particulates, organic vapors, acid gases, or asbestos). Each is designed to protect the wearer from gases, dust and/or vapors.

4.21.2.2 LIMITATIONS OF AIR PURIFYING RESPIRATORS – “DO NOT USE” – DO NOT USE AIR PURIFYING RESPIRATORS under the following conditions:

- When the contaminant has poor warning properties; that is, when it cannot be recognized by taste, smell, or irritation at or below the permissible exposure limit;
- In oxygen deficient atmospheres;
- In atmospheres immediately dangerous to life or health (atmospheres in which a short exposure would cause death, injury, or delayed physical reaction).

4.21.2.3 Air purifying respirators are small and allow freedom of movement. However, every time the wearer inhales, a negative pressure is created in the mask relative to the outside atmosphere. If the wearer does not have the proper fit or seal of the respirator on his face, then the contaminants will be drawn into the face piece through the leaks in the seal.

4.21.2.4 If a wearer of an air-purifying respirator begins to taste, smell, or be irritated by the contaminant, it is an indication that a "breakthrough" has occurred. This means that it is time to replace the cartridge, provided that the wearer had a good seal or fit at that time. When using a cartridge for particulates, the contaminant will restrict or clog the airflow as the contaminant is trapped by the filtering action of the cartridge.

4.21.3 Air Supplying Respirators

4.21.3.1 We also have available airline respirators, which use a stationary source of compressed air delivered through a high-pressure hose. The breathing air is monitored for oxygen content and carbon monoxide contamination by special monitoring equipment connected to the source of the air.

(Instructions on the use of this equipment are provided with it.)

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4.21.3.2 This equipment is designed for protection against most gases, vapors, and particulates for extended periods of time. Air continuously flows into the face piece preventing inward leakage of contaminated atmospheres.

4.21.3.3 Limitations of air supplied respirators:

- This system is not designed to protect workers from air contamination that is immediately dangerous to life or health (IDLH) without the addition of an Emergency Escape Air Cylinder.
- Since the wearer is dependent upon a remote source of air, it would be extremely dangerous without emergency backup to work in an environment that is immediately dangerous. For example, if the hose is accidentally cut or blocked, or if the air source fails, the wearer would be unable to escape safely.
- Therefore, should a worker be required to work in any environment that is immediately hazardous to Life or Health (IDLH), they should be provided with, at minimum, an air supplied respirator with an emergency escape air pack, where the escape route will take no more than 5 minutes. These are minimum OSHA requirements.

4.21.3.4 Respirator equipment purchase:

- All respirator equipment must be "approved" equipment for the protection against the particular contaminant found. All respirator equipment will have either a NIOSH or MSHA approval certification. All respiratory equipment purchased must have the above approvals at minimum.

4.21.3.5 Employee screening:

- OSHA guidelines require that any employee required to wear respiratory protection first be able to pass a medical/physical examination that will demonstrate his ability to wear the equipment without being a threat to his health. All employees will be required to pass a preplacement examination prior to being issued any respiratory equipment.
- Some of the factors, which will be considered, include:
 - o Lungs – Does the individual have a history of asthma or emphysema, difficulty with normal breathing, or previously documented lung problems? These conditions coupled with the wearing of a respirator will further restrict already difficult breathing.
 - o Heart – Does the individual have high blood pressure, artery diseases or documented heart problems? The use of a respirator will add stress on the heart, which will aggravate these conditions.
 - o Other – Facial hair such as a beard or sideburns that project under the face piece will cause a poor seal. Missing or arthritic fingers which would make it difficult for the individual to properly adjust and operate the respirator. Facial scars that would prohibit a proper fit. Claustrophobia and poor eyesight are considered.

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4.22 Issuance of Respiratory Equipment

4.22.1 Where practical, respiratory protective equipment will be issued for an employee's exclusive use.

This will be especially true for cartridge type respirators. Cartridge type respirators come in various sizes, small, medium, and large, for the different shapes and sizes of faces.

4.22.2 For single use, "disposable", equipment such as the 3M 8710, the equipment will not be transferred from one individual to another. Disposable respirators will not be re-used or shared and should be disposed of after each use.

4.23 Employee Training

4.23.1 General

4.23.1.1 It will be the responsibility of the Field Supervisor to ensure that all individuals are properly trained in using the assigned respiratory equipment. The following items will be reviewed with each employee.

4.23.2 All Respirators

4.23.2.1 Training must be provided before requiring the employee to use the respirator. Retraining will be conducted annually. Training must include the following:

- Emergency use of respirators, maintenance & storage, medical signs & symptoms of effective use, and general requirements of the OSHA standard.
- Name and location of the work area requiring respiratory protection equipment. Describe the toxic substances present, which make it necessary to wear a respirator. Give specific information regarding the contaminants, i.e. gases, vapors, toxic dust, etc.
- Describe the type of respirator being assigned. Discuss the use and limitations of the assigned respirator (i.e. Good for dust only, do not use where toxic gases are present, etc.).
- Review the respirator operating procedures: refer to the manufacturer's instructions. Ensure each worker has a proper fit of the assigned respirator. Have each demonstrate a positive and negative fit test.

4.23.3 Respirators – Not Including Disposable

4.23.3.1 Instruct and show the employee how to inspect the respirator before each use.

4.23.3.2 Review the company and jobsite policy for respirator cleaning with the employees. If the respirators are to be cleaned on the site, identify the designated person assigned to the task. If the employees are assigned to clean and maintain the respirators, show the designated washing area and the proper procedure for cleaning. Insist that the respirator be cleaned after each use.

4.23.3.3 Review with the employee the designated storage area for his equipment. Insist that the respirator be placed here after each use of the equipment.

4.23.3.4 Explain to the employees the need to report any defects that may be found when using their equipment.

4.23.3.5 NOTE: Items above generally do not apply to disposable respirators or those designed for single use.

4.24 Medical Evaluation

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4.24.1 General

4.24.1.1 Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. This section specifies the minimum requirements for medical evaluation

that company will implement to determine the employee's ability to use a respirator.

4.24.1.2 The company will provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use a respirator in the workplace.

4.24.1.3 The medical evaluation must be confidential, during normal working hours, convenient, understandable.

4.24.1.4 All employees receiving a medical evaluation must be offered a chance to discuss results with a PLHCP.

4.24.1.5 The company may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

4.24.2 Medical Evaluation Procedures

4.24.2.1 The company will identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

4.24.2.2 The licensed health care medical evaluation may obtain the information as listed on the questionnaire in Sections 1 and 2, of its Appendix at the end of this policy.

4.24.3 Follow-Up

4.24.3.1 The company will ensure that a follow up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C or whose initial medical examination demonstrates the need for a follow up medical examination.

4.24.3.2 The follow up medical examination will include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

4.24.4 Administration of Questionnaire and Exams

4.24.4.1 The medical questionnaire and examinations will be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire will be administered in a manner that ensures that the employee understands its content.

4.24.4.2 The company will provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP upon request.

4.24.5 Supplemental Information for the PLHCP

4.24.5.1 The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

- The type and weight of the respirator to be used by the employee;
- The duration and frequency of respirator use (including use for rescue and escape);
- The expected physical work effort;
- Additional protective clothing and equipment to be worn; and

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- Temperature and humidity extremes that may be encountered.

4.24.5.2 Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

4.24.6 Medical Determination

4.24.6.1 In determining the employee's ability to use a respirator, the company will:

- Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation must provide only the following information:
 - o Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
 - o the need, if any, for follow up medical evaluations; and
 - o A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.
- If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the company will provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the company is no longer required to provide a PAPR.

4.24.7 Additional Medical Evaluation

4.24.7.1 At a minimum, the company will provide additional medical evaluations that comply with the requirements of this section if:

- An employee reports medical signs or symptoms that are related to ability to use a respirator;
- A PLHCP, supervisor, or the respirator program administrator informs the company that an employee needs to be reevaluated;
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or
- A change occurs in workplace conditions (i.e. Physical work effort, protective clothing, temperature, etc.) that may result in a substantial increase in the physiological burden placed on an employee.

4.25 Program and Site Evaluation

4.25.1 Periodic inspections and safety surveys will be performed by the Corporate HSE Officer to ensure that the necessary respiratory program is effective. In order to verify effectiveness of our program, the survey will ask about the fit, selection, use, maintenance, of their respirator. If surveys indicate that changes are required, they will be made. Each Supervisor should make a routine review of his equipment during their jobsite inspections.

4.25.2 Since each jobsite is different, hazard identification must be coordinated with the customer. Proper respirator selection must be based on hazard surveys and the customer's requirements.

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4.26 Records

4.26.1 General

4.26.1.1 Records will be maintained at the office of the Corporate HSE Officer or job site office. This section requires the company to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the company in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

4.26.1.2 Airde will establish and retain written information regarding medical evaluations, fit testing, and the respirator program. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020. These records will be maintained by the Airde Director of Human resources and will be held at the Head office in the HR Dept.

4.26.2 Medical Evaluation

4.26.2.1 Records of medical evaluations required by this section must be retained and made available in accordance with section 3204.

4.26.3 Fit Testing

4.26.3.1 The company will establish a record of the qualitative and quantitative fit tests administered to an employee including:

- The name or identification of the employee tested;
- Type of fit test performed;
- Specific make, model, style, and size of respirator tested;
- Date of test; and
- The pass/fail results for QLFT's or the fit factor and strip chart recording or other recording of the test results for QNFT's.

4.26.3.2 Fit test records will be retained for respirator users until the next fit test is administered.

4.26.3.3 The company will retain a written copy of the current respirator program.

4.26.3.4 Written materials required to be retained under this subsection will be made available upon request to affected employees and to the Chief of CAL/OSHA or designee for examination and copying.

5.0 REFERENCES

Respiratory Protection, Title 29 CFR 1910.134

Access to Employee Exposure and Medical Records, Title 29 CFR 1910.20

NIOSH/MSHA Approvals for Respirators, Title 30, Part II of the CFR

American National Standards Institute: Practices for Respiratory Protection, Z88.2-1980

CAL/OSHA CCR T-8 Sec. 5155 and Sec. 3204.

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MSP 027 RIGGING MATERIAL HANDLING PROCEDURES

1.0 PURPOSE

1.1 The company has established special guidelines for the use of special equipment including vehicles, heavy equipment, forklifts, mobile cranes, ladders, etc. Rigging equipment is another important area of safety and proper maintenance of specialized equipment.

1.2 Due to the danger involved in the use of rigging equipment; it is imperative that the equipment is maintained in the best condition possible. The company has established the following "equipment inspection program" to help ensure that all rigging equipment will be in working order when needed.

2.0 SCOPE

2.1 This section applies to slings used in conjunction with other material handling equipment for the movement of material by hoisting, in employments covered by this part. The types of slings covered are those made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene).

3.0 RESPONSIBILITY

3.1 The Supervisor is responsible for monitoring compliance with this procedure. All personnel are responsible to pre-inspect rigging equipment. The Logistics Manager is responsible to ensure inspection and maintenance in accordance with manufacturers recommendations.

4.0 PROCEDURE

4.1 Inspection

4.1.1.1 Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a qualified person. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service.

4.1.1.2 All equipment shall be maintained in excellent condition at all times. Prior to using any rigging equipment, it shall be thoroughly inspected for any defects or hazardous conditions that may impair the safe operation of the equipment.

4.1.1.3 Rigging equipment for material handling shall be inspected thoroughly prior to use on each shift and as necessary during its use to ensure it is functional and safe. Defective rigging equipment shall be removed from service immediately and tagged.

4.1.1.4 Workers must ensure that rigging is not subjected to a load of more than:

- 10 percent of the breaking strength of the weakest part of the rigging, if a worker is being raised or lowered,
- 20 percent of the ultimate breaking strength of the weakest part of the rigging in all other situations unless the manufacturer has fatigue rated the rigging in accordance with CEN

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Standard EN 1677-1: 2000, Components for slings – Part 1: Forged steel components grade 8, and

- The rigging is fatigue rated in accordance with CEN Standard EN 1677-1: 2000 and a worker is not being raised or lowered, the maximum load must not exceed 25 percent of the ultimate breaking strength. (Ref: AB OHS Code Part 21, Sec 292,293).

4.1.1.5 Workers employer must ensure that rigging components are rated relative to their ultimate breaking strength in accordance with the following safety factors:

- Running lines 3.5 to 1;
- Non-rotating hoist lines 5 to 1;
- Tugged lines/blocks for pulling 3 to 1;
- Pendant lines/guy lines 3 to 1; and
- Winch lines 2 to 1.

4.1.1.6 Workers must ensure that rigging components or hoisting lines that are used in any towing operation are not used for any hoisting operation.

4.2 Load Ratings

4.2.1 Workers must ensure that the maximum load rating of the rigging, as determined by the rigging manufacturer or a professional engineer, is legibly and conspicuously marked on the rigging.

4.2.2 Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.

4.2.3 Special custom design grabs, hooks, clamps, or other lifting accessories, for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof-tested prior to use to 125 percent of their rated load.

4.3 Other

4.3.1 All workers shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all cranes and derricks. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in this field and such determinations will be appropriately documented and recorded. Attachments used with cranes shall not exceed the capacity, rating, or scope recommended by the manufacturer.

4.3.2 Riggers must ensure that wire rope, alloy steel chain, synthetic fiber rope, metal mesh slings and synthetic fiber slings manufactured on or after July 1, 2009 meet the requirements of ASME Standard B30.9-2006, Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks and Slings.

4.3.3 Workers must ensure that below-the-hook lifting devices, other than slings, meet the requirements of ASME Standard B30.20-2006, Below the Hook Lifting Devices.

4.3.4 Workers may use a capacity data sheet to label a spreader bar with its rated capacity.

4.3.5 Where a capacity data sheet is used the worker must ensure that the data sheet and corresponding spreader bar are identified by a unique numbering system.

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4.3.6 Rated load capacities, and recommended operating speeds, special hazard warnings, or instruction, shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to the operator while he is at his control station.

4.4 Synthetic Web

4.4.1 Sling Identification. Each sling shall be marked or coded to show the rated capacities for each type of hitch and type of synthetic web material.

4.4.2 Webbing. Synthetic webbing shall be of uniform thickness and width and selvage edges shall not be split from the webbing's width.

4.5 Fittings

4.5.1 A minimum breaking strength equal to that of the sling; and free of all sharp edges that could in any way damage the webbing.

4.5.2 Attachment of End Fittings to Webbing and Formation of Eyes.

4.5.3 Stitching shall be the only method used to attach end fittings to webbing and to form eyes. The thread shall be in an even pattern and contain a sufficient number of stitches to develop the full breaking strength of the sling.

4.6 Environmental Conditions

4.6.1 When synthetic web slings are used, the following precautions shall be taken.

4.6.2 Nylon web slings shall not be used where fumes, vapors, sprays, mists or liquids of acids or phenolics are present.

4.6.3 Polyester and polypropylene web slings shall not be used where fumes, vapors, sprays, mists or liquids of caustics are present.

4.6.4 Web slings with aluminum fittings shall not be used where fumes, vapors, sprays, mists or liquids of caustics are present.

4.7 Safe Operating Temperatures

4.7.1 Synthetic web slings of polyester and nylon shall not be used at temperatures in excess of 180° F. Polypropylene web slings shall not be used at temperatures in excess of 150° F.

4.8 Repaired

4.8.1 Synthetic web slings which are repaired shall not be used unless repaired by a sling manufacturer or an equivalent entity.

4.8.2 The employer shall retain a certificate of proof test, for the service life of the sling, and make it available for examination by the Division upon request.

4.8.3 Slings, including webbing and fittings, which have been repaired in a temporary manner shall not be used.

4.9 Removal from Service

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4.9.1 Synthetic web slings shall be immediately removed from service if any of the following conditions are present:

- Acid or caustic burns;
- Melting or charring of any part of the sling surface;
- Broken or worn stitches.

4.10 Distortion of Fittings

4.10.1 Snags, punctures, tears or cuts; or those slings with other apparent defects, shall be referred to the manufacturer or equivalent entity for determination of rated capacity and safety for continued use.

4.11 Synthetic Web Sling Storage

4.11.1 Synthetic web slings shall be stored in an area or facility where they are not subject to heat above 150° F or exposed to direct sunlight.

4.11.2 Slings not included in these Orders shall be used only in accordance with the manufacturer's recommendation.

4.12 Swing

4.12.1 When rotating the crane, sudden stops shall be avoided. Rotational speed shall be such that the load does not swing out beyond the radius at which it can be safely controlled.

4.12.2 Tag or restraint lines shall be used where rotation of the load is hazardous.

4.12.3 Hooks on overhead ball assemblies, lower load blocks, or other attachment assemblies shall be of a type that can be closed and locked, eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.

4.12.4 Cranes or boom-type excavators shall not be mounted by personnel, unless the unit is stopped or an exchange of signals with the operator indicates that it is safe to mount.

4.12.5 A locomotive crane shall not be swung into a position where railway cars on an adjacent track might strike it, until it has been ascertained that cars are not being moved on the adjacent track and proper flag protection has been established.

4.13 Safe Operating Practices

4.13.1 Whenever any sling is used, the following practices shall be enforced:

- Slings that are damaged or defective shall not be used. Chain or wire rope slings shall not be shortened with knots or bolts or other makeshift devices. Sling shall not be kinked, or knotted.
- Slings shall not be loaded in excess of their rated capacities.
- Slings used in a basket hitch shall have the loads balanced to prevent slippage.
- Slings shall be set to avoid slippage.
- Slings shall be padded or protected from the sharp edges of their loads.
- Suspended loads shall be kept clear of all obstructions.
- All employees shall be kept clear of loads about to be lifted and of suspended loads.

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- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- Shock loading is prohibited.

4.14 Overhead Loads

4.14.1 Operations shall be conducted and the job controlled in a manner that will avoid exposure of employees to the hazard of overhead loads.

4.14.2 Wherever loads must be passed directly over workers, occupied work spaces or occupied passageways, safety type hooks or equivalent means of preventing the loads from becoming disengaged shall be used.

4.14.3 NOTE: Employees should not work in the area directly beneath a suspended load.

4.15 Inspection Checklist

4.15.1 The following "inspection checklist" should be completed on a monthly basis by the Site supervisor/foreman at the start of the shift.

4.15.2 When making an inspection, the following items shall be maintained:

- Any item shown on the list that is inspected and passed should receive the letter "P" in the box for each.
- Any item that needs correction should be identified by placing the letter "F" for failed in the box.
- Due to the potential for serious injury to the operator, any mechanical defect should be reported immediately to the supervisor/foreman and explained on the back of the report - after noting on the front to SEE NOTES.

4.16 Rejection Criteria

4.16.1 Synthetic Fiber Slings

4.16.1.1 Workers must ensure that a synthetic fiber web sling is permanently removed from service if it is damaged or worn as follows:

- The length of the edge cut exceeds the web thickness;
- The depth of an abrasion is more than 15 percent of the webbing thickness, taken as a proportion of all plies;
- The total depth of the abrasion on both sides of the webbing is more than 15 percent of the webbing thickness, taken as a proportion of all plies;
- The depth of the warp thread damage is up to 50 percent of the webbing thickness and the damage is within 25 percent of the sling width of the edge, or covers 25 percent of the sling width,
- The warp thread damage is as deep as the sling is thick in an area that is within 25 percent of the sling width of the edge, or over an area that is more than 12.5 percent of the width of the sling;
- Weft thread damage allows warp threads to separate over an area that is wider than 25 percent of the sling width and longer than twice the sling width.

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4.16.1.2 Workers must ensure that a synthetic fiber web sling is permanently removed from service if part of the sling is melted, charred or damaged by chemicals, stitches in load bearing splices are broken or worn, or end fittings are excessively pitted or corroded, cracked, distorted or broken.

4.16.1.3 Worker must ensure that a synthetic fiber web sling is permanently removed from service if it is damaged in such a way that the total effect of the damage on the sling is approximately the same as the effect of any one of the types of damage referred to in subsections (1) or (2).

4.16.1.4 Workers must ensure that a synthetic fiber web sling that is permanently removed from service under this section is physically altered to prevent its further use as a sling.

4.16.2 Wire Rope

4.16.2.1 Workers must ensure that wire rope is permanently removed from service if:

- Wear or corrosion affects individual wires over more than one third of the original diameter of the rope,
- There is evidence that the rope structure is distorted because of bulging, kinking, bird-caging or any other form of damage
- There is evidence of heat or arc damage, or
- The normal rope diameter is reduced, from any cause, by more than (i) 0.4 millimeters if the normal rope diameter is 8 millimeters or less,
 - o 1 millimeter if the normal rope diameter is more than 8 millimeters and less than 20 millimeters,
 - o 2 millimeters if the normal rope diameter is 20 millimeters or more and less than 30 millimeters, and
 - o 3 millimeters if the normal rope diameter is 30 millimeters or more.

4.16.2.2 All workers must ensure that a running wire rope is permanently removed from service if six or more randomly distributed wires are broken in one rope lay, or if three or more wires are broken in one strand in one rope lay.

4.16.2.3 All workers must ensure that a stationary wire rope such as a guy line is permanently removed from service if three or more wires are broken in one rope lay in sections between end connections, or if more than one wire is broken within one rope lay of an end connection.

4.16.2.4 All worker must ensure that wire rope that does not rotate because of its construction is permanently removed from service if there is evidence of the:

- If two randomly distributed wires are broken in six rope diameters, or
- If four randomly distributed wires are broken in 30 rope diameters.

4.16.3 Metal Mesh Slings

4.16.3.1 All workers must ensure that a metal mesh sling is removed from service if:

- There is a broken weld or a broken brazed joint along the sling edge,
- A wire in any part of the mesh is broken,
- Corrosion has reduced a wire diameter by 15 percent,
- Abrasion has reduced a wire diameter by 25 percent,
- There is a loss of flexibility because the mesh is distorted,

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- The depth of the slot is increased by more than 10 percent because the choker fitting is distorted,
- The width of the eye opening is decreased by more than 10 percent because either end fitting is distorted,
- The original cross-sectional area of metal is reduced by 15 percent or more at any point around the hook opening or end fitting:

- o Either end fitting is distorted, or
- o an end fitting is cracked.

4.16.4 Electric Arc Damage

4.16.4.1 All workers must ensure that a component of rigging that has been contacted by an electric arc is removed from service unless a professional engineer certifies that it is safe to use.

4.16.5 Damaged Hooks

4.16.5.1 All workers must ensure that a worn, damaged or deformed hook is permanently removed from service if the wear or damage exceeds the specifications allowed by the manufacturer.

4.17 Cranes, Hoists and Lifting Devices (>2000 Kg Rating)

4.17.1 Even though it is rare that we would be in direct control of CRANES, HOISTS AND LIFTING DEVICES (>2000 Kg Rating), our employees must be aware of the hazards when working around them.

4.17.2 The following safety precautions must be taken:

- All workers must be familiar with the hand signals and any other communication system that identify the movement of these devices.
- Workers may not stand or pass under a suspended load unless the worker has been effectively warned of the danger and the operator of the lifting device knows the worker is under the suspended load.
- Any person operating the device must be a trained and certified competent operator authorized by **AIRDE** or the client to operate such devices.
- If an operator is not sure of where the load is to be relocated or how high it is to be lifted, he/she will not be permitted move any equipment or load until this information has been clearly communicated first.
- The operator is not permitted to move any equipment or load if he/she has any doubts as to the safety of workers in the vicinity of the lift. The operator may do so only after he/she is assured that the working conditions are safe.
- Site supervisors must ensure that work is arranged, if it is reasonably practicable, so that a load does not pass over workers. An operator of a lifting device must not pass the load on the device over workers unless:
 - o No other practical alternative exists in the circumstances, and
 - o the workers are effectively warned of the danger. The operator of a lifting device that is travelling with a load must ensure that the load is positioned as close to the ground or grade as possible.

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- All major structural, mechanical and electrical components of a lifting device will be permanently and legibly identified as being component parts of a specific make and model of lifting device.
- The lifting device must have a plate or weatherproof label permanently secured to it that legibly shows
 - o the manufacturer's rated load capacity,
 - o the manufacturer's name, and
 - o the model, serial number and year of manufacture or shipment date.
- If a lifting device is not commercially manufactured, it must have a plate or weatherproof label permanently secured to it that legibly shows the rated load capacity according to the professional engineer's certification.
- A log book (paper) must be kept for each lifting device at the worksite.
- The log book must be readily available for inspection by an officer at any time,
- The most current log book of a mobile must be available to the operator at all times, and if ownership of a lifting device is transferred to a new owner, the log book is transferred to the new owner.
- The employer must ensure that the following details are entered into the log book:
 - o the date and time when any work was performed on the lifting device;
 - o length of time in lifting service
- ☐ Recorded as hours of service if the lifting device is equipped by the manufacturer with an hour-meter, or
- ☐ If required by the manufacturer's specifications;
 - o All defects or deficiencies and when they were detected;
 - o Inspections, including examinations, checks and tests, that are performed, including those specified in the manufacturer's specifications;
 - o Repairs or modifications performed;
 - o A record of a certification;
 - o Any matter or incident that may affect the safe operation of the lifting device;
 - o Any other operational information specifically identified by the employer;
 - o in the case of a tower crane, whether or not the weight testing device was lifted for that working day, before the work of lifting loads began.
 - o the employer must ensure that each entry in a paper log book is signed by the person doing the work.

4.18 Load Charts

4.18.1 Mobile crane or boom truck must be equipped at all times with load charts showing the rated load capacity of the mobile crane or boom truck at all permitted boom angles and boom radii.

4.18.2 Tower crane load chart must be:

- Conspicuously and permanently secured to the cab, and
- Showing the manufacturer's rated capacity loads at various radii of a two-part line and a four-part line separately.

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MSP 028 SAFE LIFTING PROCEDURE

1.0 PURPOSE

1.1 This procedure is to provide guidance on manual safe lifting.

2.0 SCOPE

2.1 The procedure applies to all **AIRDE** personnel and contractors responsible to follow **AIRDE** procedures.

3.0 RESPONSIBILITY

3.1 All employees are responsible for understanding their physical capabilities for safe lifting and adhering to any limitations. The Supervisor is responsible of identifying risks associated with manual lifting on work sites.

4.0 PROCEDURE

4.1 Introduction

4.1.1.1 Preventing back injuries is a major workplace challenge. According to the US Bureau of Labor statistics, more than one million workers suffer back injuries each year, and back injuries account for one of every five workplace injury or illness. Further, one fourth of all workers' compensation claims involve in back injuries, costing industry billions of dollars on top of the pain and suffering borne by employees.

4.1.1.2 Moreover, though lifting, placing, carrying, holding and lowering are involved in manual materials handling (the principle cause of recordable work injuries) account for four out of five of these injuries were to the lower back, and that three out of four occurred while the employee was lifting.

4.1.1.3 In order to prevent back injuries **Airde** recommends that our employees use the following lifting techniques identified in this program.

4.2 General

4.2.1 Before a worker manually lifts, lowers, pushes, pulls, carries, handles, or transports a load that could injure the worker, a Safe Job Work Plan must be conducted which considers.

- The weight of the load,
- The size of the load,
- The shape of the load,
- The number of times the load will be moved, and
- The manner in which the load will be moved.

4.2.2 Where reasonably practicable, appropriate equipment for lifting, lowering, pushing, pulling, carrying, handling or transporting heavy or awkward loads will be provided to the employees.

4.2.3 Where a worker who may be exposed to the possibility of musculoskeletal injury, that worker will be trained in specific measures to eliminate or reduce that possibility. The training will include:

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- Identification of factors that could lead to a musculoskeletal injury,
- The early signs and symptoms of musculoskeletal injury and their potential health effects, and
- Preventive measures including, where applicable, the use of altered work procedures, mechanical aids, and personal protective equipment.

4.3 Lifting Procedures

4.3.1 Size up the load: Never attempt to lift a load that is heavier than your comfort level. Do not lift alone if you estimate that the load is too heavy, awkward, and bulky or will obscure your vision.

4.3.2 Secure your footing: Make sure you are wearing appropriate footwear. Align your body with the load. Face the load straight on. Assure your footing and balance by placing one foot forward of the other.

4.3.3 Bend your knees: Bend your knees and squat. Keep your head up back straight. Spread your knees or lower one knee to get closer to the object.

4.3.4 Lift the load: Push up with your legs to utilize your strongest set of muscles as you rise. Remember to breathe steadily when lifting. Keep the load close to your body as you come up.

4.3.5 Carry the load: lift the object to the carrying position. If it is necessary to change your direction when in the upright position, be careful not to twist your body. Turn your body by changing the position of your feet. Always maintain steady breath in while handling the load.

4.3.6 Lower the Load: Bend your knees while lowering the load to the floor from a waist-high carrying position. Keep you back natural with the load close to the body, lowering the load with the arm and leg muscles.

4.4 Special Safety Tips

4.4.1 If the load is too heavy or awkward to lift alone, and no one is available to assist you, use a mechanical device such as a hand truck, manual lift truck or forklift to lift the load.

4.4.2 Push, don't pull: You can move twice as much when you push. So, remember when you are moving a load on a cart or hand truck, push don't pull.

4.4.3 Buddy lifting saves backs: Impatience will injure you. Get help with awkward or bulky items. Lifting together is easier and safer than lifting alone.

4.4.4 Avoid unstable loads: Unstable loads will injure your back and damage the load. Only carry as much as you can handle. Make sure you can see the ground in front of you when carrying the load.

4.4.5 Stack your load carefully: Stack heavy or large boxes on the bottom of the load to avoid tipping during transport.

4.4.6 Standing on stable surfaces. Don't stand on unstable chairs, stools or ladders when lifting or moving objects.

4.4.7 Lifting above your head: Never lift an object past shoulder height. Use a sturdy stool, ladder or seek mechanical assistance.

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MSP 029 SAFETY INSPECTION PROCEDURE

1.0 PURPOSE

1.1 To establish a plan for the systematic recognition and control of work place hazards (unsafe acts and conditions) through periodic safety surveys.

2.0 SCOPE

2.1 The procedure applies to all **AIRDE** personnel and contractors responsible to follow **AIRDE** procedures.

3.0 RESPONSIBILITY

3.1 All employees in the US are responsible for following this procedure.

4.0 PROCEDURE

4.1 General

4.1.1 Employee injuries and liability claims resulting from the unsafe actions by an employee or because of an unsafe condition on a company job site or facility constitutes a significant financial drain upon company capital. While some conditions are beyond our control, we must use our best efforts toward eliminating the causes.

4.1.2 It is the responsibility of every employee to assist in the identification of hazardous conditions or unsafe actions of employees in order to prevent losses and injury. These are also key responsibilities on the part of every Supervisor in conducting their everyday duties. The following procedure outlines the role of all company employees for hazard recognition.

- Eliminate or control unsafe acts and conditions before they result in accidents or exposures that may produce injury and/or damage.
- Stimulate regular employee hazard detection and control activity.
- Provide a mechanism for employees to formally report hazards and to make safety recommendations.

4.2 Definitions

4.2.1 Hazard - An unsafe act or unsafe condition that may cause an exposure, accident or injury

4.2.2 Unsafe act - Means not following proper work procedures or the violation of the safety rules. It is what the employee did or failed to do that has or could have resulted in an exposure or accident (There are various factors, which influence the employee to act in an unsafe way including mental, emotional, physical and attitudinal problems).

4.2.3 Unsafe condition - Any hazardous physical condition that is unguarded or uncontrolled is an unsafe condition. It is any part of employee's physical surroundings that has or could have resulted in an accident or exposure (factors such as the deterioration of equipment, poor design of equipment, inadequate maintenance; even the unsafe actions of employees are the source of unsafe conditions).

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4.2.4 This training can be regarded as required training as per the Provincial and Federal OSH regulations.

4.3 Program Philosophy

4.3.1 It is the responsibility of "all" employees to identify any hazardous condition on the jobsite. However, it is each Supervisor's responsibility to make a planned systematic survey of his jobsite for hazard detection and control.

4.3.2 Thoughtful preparation for hazard detection produces a greater likelihood of identifying critical (high-risk) hazards. It is generally the more obscure high-risk hazard that produces the severe injuries and illnesses.

4.4 Hazard Recognition and Control

4.4.1 Minimum Action Standard

4.4.1.1 It is the Field Supervisor's responsibility to periodically monitor the worksite for unsafe acts or unsafe conditions by implementing the following actions:

4.4.1.2 Conduct observations of employees performing job/task, record any unsafe acts and take required hazard control action.

4.4.1.3 Take a visual survey of tools, machines, equipment or work areas to identify any unsafe condition and take any required hazard control action.

4.4.1.4 Record and act on any unsafe acts or unsafe conditions brought to the Field Supervisor's attention by others.

4.5 Corrective Action

4.5.1 General

4.5.1.1 When any unsafe act or unsafe condition is observed, it requires that the Field Supervisor or Supervisor take one or more of the following actions within 24 hours after identifying and recording a hazard.

4.5.2 Eliminate or Control

4.5.2.1 Eliminate or control the detected hazard. Always take immediate temporary control (ITC) action.

4.5.2.2 For those hazards, which cannot be immediately controlled or eliminated, the action necessary for correction should be documented with a date established for completion. Complete the form "REQUEST FOR CORRECTIVE ACTION" for follow-up, of those hazards that cannot be controlled within 24 hours.

4.5.2.3 The original copy of this report is to be sent to the Corporate Office with a copy kept at the jobsite. Any item that has not been corrected will be identified in the reviewed at the employee safety meetings.

4.5.3 Imminent Danger

4.5.3.1 Imminent Danger: Should an imminent danger be associated with any jobsite; the hazard must be immediately corrected before work continues or the jobsite shut down and all personnel removed from the area until corrected. If it is necessary for company personnel to enter the area of "imminent danger" to correct the hazard, then only the minimum number of personnel necessary are permitted to re-enter the area using

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extreme caution and with the necessary safeguards, equipment, and provisions that will minimize their exposure to the hazard.

4.5.3.2 Schedule for correction those hazards, which may require more than 24 hours for control and provide protection against the hazards until they are corrected.

4.5.4 Pass to Higher Supervision

4.5.4.1 Pass to higher supervision all hazards, which may require assistance due to limitations of responsibility or authority. The Supervisor will retain the responsibility for follow-up and corrective action until the hazard is corrected. The form, "REQUEST FOR CORRECTIVE ACTION", should be used for this purpose.

4.6 Jobsite Inspection Form

4.6.1 The "JOB SITE SAFETY INSPECTION CHECKLIST" is to be used to record all job/task observations, and hazard detection and control activity.

4.6.2 The form will be sent to the Company Office with any Tailgate Safety Meeting form. The Safety Coordinator will maintain the Inspection Forms and monitor completion of the items.

4.6.3 The reports will remain on file for six (6) years for audit and reference purposes.

4.6.4 Job/task observation and unsafe act recording: The name of employee(s) should be recorded for necessary follow-up.

4.7 Employee Participation

4.7.1 The Field Supervisor should encourage employees to bring hazards to his/her attention without fear of reprisals. When an employee advises the Field Supervisor of a hazard, the Field Supervisor should immediately record the hazard and note the employee's name on the JOB SITE SAFETY INSPECTION CHECKLIST. The Field Supervisor should discuss the employee's views on the significance or urgency of the hazard in question to avoid any possible misconceptions concerning control timing. After the Field Supervisor has evaluated and/or controlled the hazard, he should personally advise the employee of what action was taken.

4.7.2 In the event the Field Supervisor and the employee differ regarding the existence of a hazard and, in the Field Supervisor's best judgment, no action is necessary; the following steps should be taken:

4.7.3 Avoid any rejecting comments during the initial contact.

4.7.4 Provide impersonal, objective reasons for the rejection after review.

4.7.5 If the employee persists, review the question with the Supervisor, or Safety Coordinator for final disposition.

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MSP 030 SCAFFOLD SAFETY PROCEDURE

1.0 PURPOSE

1.1 The purpose of this program is to prevent injuries due to falls from elevated work areas and ensure employees and contractors are able to inspect scaffolding materials and erected scaffolds.

2.0 SCOPE

2.1 This program is applicable at every work area where scaffolding is erected. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers **AIRDE** employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

3.0 RESPONSIBILITY

3.1 The Director of HSE&Q is responsible for monitoring and administering this procedure.

3.2 The Field Supervisor is responsible for ensuring that employees are familiar with required written procedures and for ensuring that all employees, and/or contractors have been trained in the use and inspection methods for scaffolds (as applicable).

3.3 The Field Supervisor is responsible for ensuring that all employees and contractors are aware that if an employee discovers a defect, he/she is to report to the defect to the competent person.

3.4 Employees are Responsible for following this program by inspecting the scaffolds daily and reporting any damages or repairs that may be needed to the competent person.

3.5 The OPERATIONS COORDINATOR, with assistance from the Director of HSE&Q will ensure various state/provincial and/or client requirements are understood in the areas that **AIRDE** crew are working in.

4.0 PROCEDURE

4.1 Definitions

4.1.1 Bearer - A horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.

4.1.2 Brace - A tie that holds one scaffold member in a fixed position with respect to another member.

4.1.3 Coupler - A tie that holds one scaffold member in a fixed position with respect to another member.

4.1.4 Double pole or independent pole scaffold - A scaffold supported from the base by a double row of uprights, independent of support from the walls and constructed of uprights, ledgers, horizontal platform bearers, and diagonal bracing.

4.1.5 Guardrail - A rail secured to uprights and erected along the exposed sides and ends of platforms.

4.1.6 Heavy Duty Scaffold - A scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.

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- 4.1.7 Ledger (stringer) - A horizontal scaffold member which extends from post to post and which supports the putlogs or bearer forming a tie between the posts.
- 4.1.8 Light Duty Scaffold - A scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.
- 4.1.9 Manually Propelled Mobile Scaffold - Manually propelled mobile scaffold.
- 4.1.10 Maximum intended load - The total of all loads including the working load, the weight of the scaffold, and such other loads as may be reasonably anticipated.
- 4.1.11 Medium duty scaffold - A scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.
- 4.1.12 Mid-Rail - A rail approximately midway between the guardrail and platform, used when required, and secured to the uprights erected along the exposed sides and ends of platforms.
- 4.1.13 Putlog - A scaffold member upon which the platform rests.
- 4.1.14 Runner - The lengthwise horizontal bracing or bearing members or both.
- 4.1.15 Scaffold - Any temporary elevated platform and its supporting structure used for supporting workmen or materials or both.
- 4.1.16 Toe board - A barrier secured along the sides and ends of a platform, to guard against the falling of material.
- 4.1.17 Tube and coupler scaffold - An assembly consisting of tubing, which serves as posts, bearers, braces, ties, and runners, a base supporting the posts, and special couplers which serve to connect the uprights and to join the various members.
- 4.1.18 Tubular welded frame scaffold - A sectional, panel, or frame metal scaffold substantially built up of prefabricated welded sections that consist of posts and horizontal bearer with intermediate members. Panels or frames shall be braced with diagonal or cross braces.
- 4.1.19 Working Load - Load imposed by men, materials, and equipment.

4.2 Competent Person

- 4.2.1 Federal/provincial regulations require that all scaffold should be erected and inspected under the direction of a "competent person".
- 4.2.2 A Competent Person is defined as an employee who has passed the written "Scaffold Inspection Safety Test" and demonstrates proper knowledge of scaffolding inspection.
- 4.2.3 Each site where **AIRDE** will use or possibly use any scaffolding must have at least one person designated as the "Competent Person". Typically, when working with clients, the competent person is the qualified scaffolder assigned as per client/site.

4.3 Survey the Jobsite/Environment

- 4.3.1 Inspect the jobsite for hazards such as untamed earth fills, ditches, debris, high-tension wires, unguarded openings or hazardous conditions created by other crafts.
- 4.3.2 Scaffolding is not to be used during a storm, high winds, or when the platform is covered with ice, snow or sleet (unless covered with anti-slip substance)
- 4.4 Repairs / Replacement

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4.4.1 Modification and repairs shall be performed by a qualified person, who is competent to certify the scaffolding safe to use.

4.4.2 Employees shall not perform any modifications or repairs, unless they have been trained and certified to do so. Failure to comply may result in disciplinary action and or termination.

4.4.3 Scaffold equipment that is broken or deteriorated to the extent that it would weaken the scaffold shall not be used. Defective equipment is be immediately reported to the competent person and tagged accordingly.

4.5 Inspection

4.5.1 Inspection shall be made to ensure that the scaffold is stable and any movement is prevented.

4.5.2 Scaffold is to be inspected by the "Competent Person" prior to the use and periodically throughout the shift. Scaffold is also to be inspected following any failure of the material, after any abnormal pressure or any incident which might have adversely affected the structure and when re-used after any length work interruption.

4.5.3 At a minimum, the following shall be inspected:

- Ground or surface footing shall be inspected to ensure that there is no settling.
- All main supports and cross braces shall be inspected for any signs of damage, missing pins, bolts and any locks and/or safety keepers.
- All walking surfaces and/or planks shall be inspected for damage and proper placements and any possible movement.
- All walkways and planks must be secure to prevent any movement.
- The person inspecting the scaffold should see that one of three tags are attached to the scaffold near the access ladder or another conspicuous place.

4.5.4 If during the inspection, a defect or damage to the scaffold is discovered, the scaffold shall be tagged out and use prohibited until needed repairs are made.

4.5.5 **AIRDE** crew are also expected to inspect scaffold themselves prior to use on a daily basis and all deficiencies reported to the competent person.

4.6 Signs and Safety Tags

4.6.1 Signs and tags shall be visible at all times when work is being performed, and shall be removed or covered promptly when the hazards no longer exist.

4.6.2 Defective equipment shall be tagged out by using a weather resistant tag secured to the scaffolding structure on all four sides.

4.6.3 Danger signs shall be used only where an immediate hazard exists. Danger signs must be posted around the immediate area of the scaffold, to alert other workers of possible danger from falling objects from the scaffold.

4.6.4 Caution Signs and/or barricade tape shall be used to mark off a larger area around scaffolding warning other workers to use caution.

4.6.5 Tags – All scaffolds will be color coded using tags at each point of entry indicating its status and condition as follows:

- **GREEN**: The scaffold has been properly built, is safe for workers, and meets

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FEDERAL/PROVINCIAL REGULATIONS and federal safety standards. The tag will also say “Safe to Use”.

- **YELLOW:** The scaffold is safe for workers, with some restrictions (low overhead clearance, etc.). Restrictions should be detailed on the tag. The tag will also say, “Caution: Potential or Unusual Hazard”, to indicate the presence of a restrictions.

- **RED:** The scaffold is not safe for workers. All employees must stay off the scaffold until appropriate repairs or corrections are made. The tag will also say, “Unsafe for Use”, to indicate it is not safe to use.

4.6.6 No worker is permitted to use a scaffold if it has a red tag, a green or yellow tag that has expired, or no tag at all. Use of scaffold includes contact with the structure while climbing, abseiling, etc.

4.6.7 Note that client specifics may vary, but a scaffold tag typically expires 21 calendar days after the date of the inspection.

4.7 Scaffold Construction

4.7.1 Assembly Utilization and Maintenance

4.7.1.1 Types of scaffolding include:

- Outrigger scaffolding
- Suspended scaffolding
- Platforms
- Boatswain's chair
- Ladder jack scaffolding
- Mobile scaffolding
- Metal scaffolding
- Suspended scaffolding used by bricklayers

4.7.2 General

The following guidelines must be met and maintained on all built scaffolds.

4.7.2.1 Scaffolds shall only be erected by a qualified third party, who is competent to certify the scaffolding safe to use.

4.7.2.2 The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose boards shall not be used to support scaffolds or planks.

4.7.2.3 No vehicle or equipment which can be moved and on which scaffolding is installed or erected, may be moved when a worker is on the scaffolding.

4.7.2.4 The poles, legs, or uprights of scaffolds shall be plumb, and securely and rigidly braced to prevent swaying and displacement.

4.7.2.5 Materials being hoisted onto a scaffold shall have a tag line.

4.7.3 Capacity

4.7.3.1 Scaffolds shall not be loaded in excess of the working loads for which they are intended.

4.7.3.2 Each scaffold and component must be able to support 4 times the maximum intended load.

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4.7.3.3 Each scaffold and component must be able to withstand 4 times the tipping moment by a loaded hoist or 1/2 times the stall load, whichever is greater.

4.7.3.4 Ropes and connecting hardware must withstand at least 6 times the intended load and 6 times that of a rated load on a hoist or 2 times the stall load, whichever is greater.

4.7.3.5 The load to which a scaffold is subjected to shall never exceeds the equivalent of 1/4 of the load for which it is designed.

4.7.3.6 A competent person must confirm that the scaffold used to carry the equivalent of an evenly distributed load of more than 367 kilograms per square meter is:

- Designed and certified by a professional engineer, and
- Constructed, maintained, and used in accordance with the certified specifications. An employer must ensure that all workers on a scaffold are informed of the maximum load that the scaffold is permitted to carry.

4.7.4.1 Materials used for scaffolding shall be free from any defects which might impair their resistance.

4.7.4.2 Bolts used in the construction of scaffolds shall be of adequate size and in sufficient numbers at each connection to develop the designed strength of the scaffold.

4.7.4.3 The metal parts of a scaffold shall not be weakened by rust, nor by any corrosive material and if tubular elements are used, not be weakened by the effects of cold or heat.

4.7.4.4 The lumber used for scaffolding shall be:

- In good condition, composed of long non-breaking fibers and free from any defect which might impair its strength;
- Of a quality equivalent to No 1 spruce;
- Barked, if it is rough timber, and without paint or any opaque coating.

4.7.5 Planking

4.7.5.1 Scaffolds must be fully planked / decked between the front uprights and guardrail with a space of 1" maximum except where necessary to fit around uprights when side brackets are used, etc., with a maximum opening between the platform and uprights of 9 1/2 inches. EXCEPTION: This does not apply to walkways or during the erection / dismantling of scaffolds.

4.7.5.2 Scaffold deck boards shall be cleated, wired or nailed into place.

4.7.5.3 Planking must extend at least 6 inches over the end of the scaffold but not more than 12 inches unless designed when less than 10 feet and not more than 18 inches when over 10 feet.

4.7.5.4 Planks must not be painted with an opaque finish. Preservatives or fire-retardant sealers may be used without creating any obscurity.

4.7.5.5 All working levels of scaffolds will be floored completely except where internal ladders require space for ladder openings.

4.7.6 Walkways

4.7.6.1 Walkways must be at least 18 inches wide while jack scaffold, top plate bracket scaffolds, roof bracket scaffolds, and pump jack scaffolds must be at least 12 inches wide or when reasonably demonstrated, as wide as feasible and protected by guardrails and/or personal fall arrest systems.

4.7.7 Front Edge Requirements

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4.7.7.1 The front edge of scaffolds must be within 14 inches from the face of work unless guardrails and/or personal fall arrest systems are used.

4.7.7.2 Outrigger scaffolds must be within 3 inches of the face.

4.7.7.3 Plastering scaffolds must be within 18 inches of the face.

4.7.8 Access

4.7.8.1 Ladders or equivalent must be used when platforms are more than 2 feet above or below a point of access. Cross-braces must not be used. The bottom rung of the ladder must be within 2 feet of the level above.

4.7.8.2 Scaffolding over 30 feet must have rest platforms provided at least every 35 feet.

4.7.8.3 Each rung length must be at least 11 1/2 inches, and rungs must be uniformly spaced with a maximum spread of 16 3/4 inches.

4.7.9 Stairway Ladders

4.7.9.1 Stairway ladders must be positioned within 24 inches of the level above and provided with rest platforms at least every 12 feet vertical. Each step has slip resistant treads and must be at least 16 inches wide except mobile stands, which must be 11 1/2-inch minimum.

4.7.9.2 A worker must not perform work from a ladder that is used to give access to the working levels of a scaffold.

4.7.10 Portable Ladders

4.7.10.1 Three-point climbing is required while ascending/descending ladders. While on ladders, both hands and one foot, or both feet and one hand shall always be in contact with the ladder.

4.7.10.2 Tools required to perform a task shall be transported by a mechanical carrier such as a tag line, suspended bucket or tool belt.

- Tools shall not be carried by hand while climbing.
- Hands must be free to grip the ladder.
- Tools shall not be carried in clothing pockets.
- Tools shall be pulled up to the job site only after reaching the area of work.

4.7.10.3 Straight ladders shall be tied off at the top to prevent them from moving. A second person shall steady the ladder at the base while it is being tied off at the top by another employee. Do not tie off fall protection equipment to the ladder.

4.7.11 Stair Towers

4.7.11.1 The bottom step must be within 2 feet of the above support level. The tower must have a top-rail and mid-rail on each side; the top-rail must be equal to construction requirements of "standard railings" including surface finish; at least 3 inches from other objects; not less than 28 inches or more than 37 inches from the upper rail to the tread; have a landing of at least 18 inches by 18 inches at each level; have at least 18 inches between rails; be at least 40 and 60 degrees of the horizontal; have a uniform riser height (within 1/4 inch); have a uniform tread depth (within 1/4 inch); and provide guardrails on all open sides.

4.7.12 Ramps and Walkways

4.7.12.1 When 6 feet or more above lower levels, a ramp/walkway must be provided; must have guardrails; no slope greater than 1 vertical to 3 horizontals (20 degrees) is permitted; when over a 1 to 8 slope, it

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must be securely cleated at least 14 inches apart.

4.7.13 Power Lines

4.7.13.1 A safe clearance must be maintained from live power lines as follows:

- Insulated Lines

Less than 300 V = 3 feet

300 to 50000 V = 10 feet

Over 50,000 V = 10 feet

+ 2 times the length of line insulation

- Un-insulated Lines

Less than 50000 V = 10 feet

Over 50,000 V = 10 feet + 2 times the length of line insulation

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4.8 Fall Protection

- 4.8.1 A personal fall arrest system is required for boatswains' chairs, centenary, float, needle beam, or ladder jack scaffolds;
- 4.8.2 Guardrails must be installed on scaffolding when workers are exposed to a danger of falling more than 3 meters (or as per local/client requirements).
- 4.8.3 The guardrails of the scaffolds may be temporarily removed if they prevent the carrying out of work that cannot reasonably be performed otherwise. In these cases, the wearing of a Fall Arrest Harness is compulsory.
- 4.8.4 Suspension scaffolds require a personal fall arrest system and guardrails.
- 4.8.5 A crawling board scaffold requires a personal fall arrest system and guardrails, or a 3/4-inch diameter grab-line securely fastened.
- 4.8.6 Adjustable scaffolds require a personal fall arrest system and guardrails or both when supported by ropes.
- 4.8.7 Bricklaying scaffolds require a personal fall arrest system or guardrails.
- 4.8.8 Vertical and horizontal lines are permitted if the safety and integrity of the structure is not compromised.
- 4.8.9 Guardrails must be capable of withstanding a 100lbs top force, a 200lbs horizontal force, and 75lbs force to mid-rails without being compromised.
- 4.8.10 Rope rails may be used but must be inspected to ensure their integrity.
- 4.8.11 In assembling metal scaffolding, it is prohibited to use any piece that has been reformed or straightened in such a way that its strength is diminished.
- 4.8.12 Cross bracing can be acceptable as a mid-rail when the crossing is 20 to 30 inches above the platform or as a top-rail if the cross is between 38 and 48 inches above platform. The end points must be no more than 48 inches apart and secured together with #9-gauge wire.

4.9 Protection from Falling Objects

- 4.9.1 Workers should not place any tools or debris inside scaffold tubes at any point.
- 4.9.2 When the potential for workers to be injured by items/elements falling from above, hard hats are required. Toe-boards and screens (or the equivalent protection) are required to keep debris from falling onto workers below. Any large objects/equipment should be stationed away from the edge and secured as required.
- 4.9.3 The area below should be protected by barricades and toe-boards on planking above. In cases where employees must work adjacent to workers on scaffolding, overhead protection should be provided in the form of a canopy or equivalent, made of materials strong enough to withstand the weight of materials/equipment housed above.
- 4.9.4 No alterations or changes should be made to any scaffolding structures or components.
- 4.10 Mobile Ladder Stands and Scaffolds
 - 4.10.1 All ladder stands and scaffolds must be able to support four times the designed working load.
 - 4.10.2 All exposed surfaces must be free of sharp edges, burns, or other laceration hazards.

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4.10.3 Maximum work level height may not exceed three times the least base dimension below the platform.

4.10.4 Minimum platform width must not be less than 20 inches for mobile scaffolds and 16 inches for ladder stands.

4.10.5 The supporting structure must be rigidly braced.

4.10.6 Ladder stands must have slip-resistant treads.

4.10.7 All scaffold work levels that are 6 feet or more above the ground must have toe boards at locations where workers work and pass underneath.

4.10.8 All scaffold work levels that are 30 inches or more above the ground must have standard guardrails.

4.10.9 Casters or wheels must be lockable.

4.11 Suspended Scaffold (Swing Stage)

4.11.1 A fall arrest system is required when working from any elevated platforms such as an aerial personnel-carrying unit. This includes man baskets, forklifts with mounted scissor lifts, and boom lifts even when there are guardrails in place. The reason is due to the nature of the work being performed and reaching over guardrails to specific areas for inspection or evaluation.

4.11.2 Swing stage scaffolds are required to be certified by a professional engineer.

- Operators of swing stage scaffolds require training to operate.
 - They are to be designed to prevent the scaffold from swinging or swaying.
 - Powered swing stages must have a manual override or an escape device other than a lifeline.
 - Workers on swing stages are required to remain between the stirrups at all times during movement.
 - Workers must wear a fall protection harness securely anchored while on a swing stage.
- 4.11.3 NOTE: For rescues from swing stages, it may be necessary to have specially trained personnel with special equipment to perform the rescue. Detailed rescue procedures shall be identified prior to use.

4.12 Training

4.12.1 Awareness training in scaffolding is provided during the company orientation.

4.12.2 Affected employees will receive instruction on the particular types of scaffolds which they are to use; this training is more specific than the orientation and is provided by a “Competent Person”.

4.12.3 Specific training should focus on proper erection, handling, use, inspection, and care of the scaffolds. Training must also include the installation of fall protection, guardrails, electrical hazards, load capacity and the proper use and care of fall arrest equipment.

4.12.4 This training should be done upon initial job assignment. Retraining shall be done when job conditions change. Periodic refresher training shall be done at the discretion of the supervisor.

4.12.5 The designated “competent person(s)” will receive additional training regarding the selection of scaffolds, recognition of site conditions, recognition of scaffold hazards,

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protection of exposed personnel and public, repair and replacement options, and requirements of standards.

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MSP 031 WELDING SAFETY PROCEDURE

1.0 PURPOSE

1.1 This program is designed to provide the basic safety practices for welding and cutting. All work must meet the requirements of the applicable CSA/ANSI Standard W117.2-01 “Safety in Welding, Cutting and Allied Processes requirements.

2.0 SCOPE

2.1 Applies to all personnel required to follow **AIRDE**’s procedures for welding.

3.0 RESPONSIBILITY

3.1 The Supervisor is responsible for ensuring compliance with this procedure.

4.0 PROCEDURE

4.1 Oxygen, Acetylene, Welding and Cutting

4.1.1 Oxygen – Fuel Gas Apparatus

4.1.1.1 Oxygen-fuel gas welding depends on the heat produced by the combustion of a fuel gas in the presence of oxygen. The equipment is relatively portable and does not require an electric power source. Basic equipment consists of a cylinder of oxygen, a cylinder of fuel gas, two regulators, two hoses and a welding torch. The regulators are used to reduce the pressure of the gas in the cylinder to the required work pressure. Other protective equipment (safety check valve) in the piping system prevents the backflow of oxygen into the fuel gas system, stops a flash from entering the fuel gas system, and prevents an excess of pressure from oxygen in the fuel gas system. These devices help to prevent fires and explosions and are basic and permanent parts of the apparatus.

4.1.2 Safe Handling and Storage of Compressed and Liquefied Cylinders

4.1.2.1 Explosions of fuel gas or oxygen cylinders are not common occurrences due in part to the healthy regard that workers have developed for the disastrous consequences of unsafe handling procedures.

4.1.2.2 Compressed or Liquefied gas cylinders are to be used, transported, stored and handled in accordance to manufacturers specifications

4.1.2.3 **AIRDE** will ensure that all flammable substances stored or used at a work area (that is considered not a hazardous location) will be not be sufficient quantity to produce an explosive atmosphere if inadvertently released, are not stored within 30 meters of an underground shaft, are not stored in the immediate vicinity of the air intake of a ventilation supply system, an internal combustion engine, or the fire box of a fired heater or furnace, and are store only in containers approved by CSA, NFPA, or ULC Standards.

4.1.2.4 If the work requires that the contents of metallic or conductive containers be transferred from one to another, we will ensure that static electricity is controlled while the contents are being transferred.

4.1.2.5 Cylinders must be stored in dry well-ventilated areas where they are not likely to be struck or knocked over.

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4.1.2.6 They should be secured "upright" by some substantial (chain, heavy wire, etc.) means so they will not fall.

4.1.2.7 Compressed or liquefied gas cylinders, piping and fittings are protected from damage during handling, filling, transportation and storage.

4.1.2.8 They should never be stored near stairways, gangways, or elevators.

4.1.2.9 Keep sources of ignition at least 20 feet away from the storage area.

4.1.2.10 They may not be exposed to heat sources that generate sufficient temperatures that may exceed the maximum exposure temperatures set by the manufacturer. Excessive heat may result in a fire or explosion.

4.1.2.11 Store oxygen and fuel gas cylinders separately (at least 20 feet apart or by a non-combustible barrier 5 feet high) and do not store oxygen with reserve stocks of carbides or other combustible materials.

4.1.2.12 It is particularly important not to store oxygen cylinders in the same area as oil, grease or other petroleum products. **CONTACT BETWEEN OXYGEN AND ANY PETROLEUM BASED PRODUCTS CAN RESULT IN FIRE AND EXPLOSION.**

4.1.2.13 Always attach the valve protection cap (hand tight) when the cylinder is not being used. The cap is designed to protect the valve from damage, which could cause the sudden release of the contents of the cylinder.

4.1.2.14 Make sure the cylinders clearly marked with their contents, i.e. oxygen, acetylene, etc. When a cylinder is emptied, mark it EMPTY or M T.

4.1.3 Valve Examination and Regulators

4.1.3.1 Use the proper wrench when attaching the regulator to the cylinder. Do not use a pipe wrench or a pair of pliers. If the valve is equipped with a hand wheel do not attempt to open or close it with a hammer.

4.1.3.2 Watch the needle of the regulator after the torch valves have been closed. If it begins to creep upward replace the regulator immediately. Do not try to repair regulators or torches. Repair work should be done by a qualified person.

4.1.4 Connections and Hoses

4.1.4.1 Replace hoses that have leaks, burns, or worn places. Cut out the damaged section and splice the two cuts together. Do not attempt to repair hoses with tape. You can test for leaks by submerging the hose in water and looking for bubbles. Leaks in connections and hoses can also be detected by painting on a leak test solution of soapy water and checking for bubbles. Never test for leaks by using a flame.

4.1.4.2 Use only approved bronze or brass fittings. When making up connections do not use white lead, grease, pipefitting compounds or other petroleum products.

4.1.4.3 Make sure that the hoses are not placed where they can be walked on, driven over, cut or otherwise damaged. Do not expose them to heat, sparks, oil or grease.

4.1.5 Color Code the Hoses

4.1.5.1 All welding gas hoses used in the operation should conform to the following color code schedule:

- **GREEN** = OXYGEN
- **RED** = ACETYLENE
- **BLACK** = AIR/INERT GAS

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4.2 Electric Arc Welding

4.2.1 Oxygen – Fuel Gas Apparatus

4.2.1.1 Electric arc welding is a fusion process in which adjoining pieces of metal are melted together forming a joint, which is as strong as the original metal. Heat is supplied by an electric arc drawn between the work and an electrode. There are two types of electrodes, Carbon and Tungsten. The only function of a carbon or tungsten electrode is to carry current. As current is applied to the electrode the electrode melts supplying filler metal to the joint.

4.2.1.2 In addition to carrying current and supplying filler metal, these electrodes are coated with a substance, which vaporizes as the electrode melts. The vapor which is formed provides a gaseous shield around the arc and the work which prevents the formation of oxides and nitrides in the weld metal. While vapor from the coating on the electrodes has not been identified as an occupational hazard, filler metals which are introduced to the joint as the electrode melts may contain cadmium, nickel, or fluorine compounds. In all instance's precautions must be taken to avoid contact with the metal fumes or the flux itself.

4.2.1.3 When the filler metal contains cadmium the containers must be labeled:

WARNING CONTAINS CADMIUM POISONOUS FUMES MAY BE FORMED ON HEATING

4.2.1.4 When fluxes contain fluorine compounds the containers must be labeled:

CAUTION CONTAINS FLUORINE

4.2.1.5 Adequate ventilation and/or respirators must be used to avoid breathing the fumes

4.2.2 Welding Equipment

4.2.2.1 Check both the weld lead cable and the work lead cable for damaged insulation and for exposed wires.

4.2.2.2 Check electrode holders for loose or exposed connections. Do not splice weld lead within 10 feet of the holder. Replace it.

4.2.2.3 Do not coil the electrode cable around your body.

4.2.2.4 Operators are to ensure that appropriate welding and grounding leads are used to fasten electric supply cable securely.

4.2.2.5 Check the composition of fluxes, rods, and coatings. If there is a potential hazard find out how to protect yourself.

4.2.2.6 Ground both the frame of the welding equipment and the metal being welded. Do not attach the ground wires to pipes carrying gas or flammable liquids or to metal conduits carrying electrical wires. Ground as close to the machine as possible.

4.2.2.7 When floors are wet take precautions against shock.

4.2.2.8 Do not allow metal parts in contact with the electrode to touch your skin or wet clothing. Wear dry work gloves.

4.2.2.9 Do not cool electrode holders by putting them in water.

4.2.2.10 Electrically disconnect the welding equipment when changing electrodes in gas tungsten arc electrode holders.

4.2.2.11 Operators are not to leave an electric welding machine unattended without removing the electrode.

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4.2.3 Personal Protective Gear

4.2.3.1 Personal protective gear for welders is required to protect the operators' eyes from radiation and to protect the operator from hot weld slag.

4.2.3.2 Sunglasses or colored glass will not provide sufficient protection against radiation. Specially designed helmets equipped with filter plates to protect against ultraviolet, infrared and visible radiation must be worn when arc welding.

4.2.3.3 Cover bare skin to protect against both sparks and radiation. Woolen clothing gives better protection than cotton because it is less flammable. If cotton clothing is worn it should be treated chemically to reduce flammability. Clothing should be free of grease and oil and other substances, which may burn. Do not wear clothing with cuffs or pockets where sparks can lodge. Flameproof gauntlet gloves, a leather or asbestos apron and high-top shoes provide good protection against sparks and hot slag.

4.2.4 Welding Procedures

4.2.4.1 Fire prevention:

- Misuse of portable welding equipment is a frequent cause of industrial fires. Stationary equipment is less hazardous because it is usually located in an area designed with fire prevention in mind. Portable equipment can be carried to almost any location on the job and improper use of the equipment can result in a fire and/or explosion.
- Do not allow welding in areas, which have not been made fire safe.
- Operators must ensure that a regulator and its flexible connecting hose are tested immediately after connections to a gas cylinder to ensure that there is no leak of the gas supply. They ensure that if a leak of the gas supply develops during gas welding or an allied process, the supply of gas is immediately shut off and the work is not resumed until the leak is repaired.

4.2.4.2 Before beginning welding operations:

- Clear the floor of paper, wood shavings and other flammable materials for a space of 35 feet. Move other flammable materials at least 35 feet from the work area, or cover them with fire resistant shields.
- Cover the cracks and openings in the floor to prevent sparks from falling through to the lower floors. If it isn't possible to do this, check the lower floor and make sure there are no combustibles, which could be exposed to, sparks.
- When possible move the work to be welded to a safe location.
- Cover wooden floors with a fire-resistant material.
- Cover nearby combustible walls and partitions with fire resistant shields. If the walls are made of metal, remove the combustible material from the other side. If they cannot be removed, station a "fire watch".
- Shut down ventilation and close ducts if there is a chance, they could transmit sparks to other areas in the facility.
- Maintain a "fire watch" during the work and for 1/2 hour after the work is completed.
- Train "fire watchers" in the proper use of fire extinguishing equipment and how to sound alarms. (See Fire Watch Instructions)
- Provide fire extinguishers or sprinkler systems in welding areas. Portable welding equipment should be equipped with an extinguisher.

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4.2.4.3 Toxic substances may be present when welding:

- When hazardous substances are used as base metals, fluxes, plating or filler metals, local exhaust ventilation must be used. Beryllium, cadmium, chromium, fluorides, lead, mercury, zinc, or any inert gas metal arc welding, and oxygen cutting of stainless steel, all require the use of local exhaust ventilation to bring toxic concentrations within the Permissible Exposure Limit (PEL). If it is not possible to supply adequate ventilation, use supplied air respirators.
- Remove coatings along the line of the weld (lead paint, galvanize, coal tar pitch, plastic, etc.) so they can't burn. Clean all work which has been degreased, and do not operate electric arc welding equipment near a degreasing operation. The degreasing agent's trichlorethylene and perchloroethylene (or any other agent) decomposes when exposed to the arc and can irritate the eyes and respiratory tract.

4.2.4.4 Welding in confined spaces:

- The threat posed by toxic gases, fumes, and dust is intensified when the welding work is done in a confined space.
- Concentrations of toxic substances can rapidly reach hazardous levels without adequate ventilation.
- Work in confined spaces requires that the area be adequately ventilated and free from flammable or explosive substances.
- No welding or cutting may take place until the atmosphere has been tested and shown not to be dangerous or likely to become dangerous.
- Workers in the confined space must be equipped with a safety belt and lifeline.
- A trained worker with approved respiratory equipment must remain on "standby" outside the confined space ready to provide assistance in case of emergency.
- REFER TO THE CONFINED SPACE EVALUATION SURVEY FOR COMPLETE DETAILS.

4.3 Fire Watch Instructions

4.3.1 General

4.3.1.1 Because of the important responsibilities you assume when you become a Fire watch, you should be thoroughly familiar with the duties. READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

4.3.2 Primary Responsibilities

4.3.2.1 Your primary responsibilities are:

- Prevent ignition of any flammable material.
- Should a fire occur, immediately extinguish it or turn on a fire alarm.
- CALL THE EMERGENCY ALARM NUMBER
- Maintain the conditions and requirements listed on the safety permit.
- STOP THE JOB if you observe any condition, which you consider to be hazardous.

4.3.3 Basic Duties

4.3.3.1 Circumstances and conditions of the job determine what the safety requirements and fire watch duties will be. However, the following duties are basic to all jobs:

- Do not leave the jobsite while welding or spark-producing operations are in progress. If other duties require you to leave the jobsite, you must first STOP THE JOB.

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- Before the job starts and during its progress, survey the entire area for potential release of flammable liquids or vapors. In this connection, be on the lookout for possible operating upsets. Make sure that operations at nearby jobsites are aware of the work in progress.
- Prevent the taking of samples, venting or opening of piping or equipment in the immediate area of the hot work where such action would release flammable liquids or vapors and expose our workers to their danger.
- Determining the exact location of fire fighting equipment in the immediate area. Be certain that you know how to operate this equipment, i.e., fire extinguishers, hydrants, hose carts, fixed monitors.
- NOTE: Do not pre-charge fire extinguishers.
- If you have any questions regarding the job, check with your Supervisor.
- BE ON THE ALERT. Try to anticipate and prevent any condition that would be hazardous.
- Upon completion of the job and before departing from the site, make sure there are no hot sparks, burning embers, etc. still present. **YOU MUST REMAIN AT THE SITE FOR AT LEAST 30 MINUTES AFTER THE HOT WORK HAS BEEN COMPLETED TO ENSURE THAT A FIRE DOES NOT IGNITE.** Return any fire fighting equipment to its original location.
- If there are workers in the area, ensure that they are aware of the work being conducted. You must also ensure that sufficient protective methods have been put in place to ensure they are not affected by falling debris, sparks and other falling hazards. This may include, but not limited to:
 - o Fire Blankets
 - o Welding Screens
 - o Restricted areas.

4.4 Hot Work

4.4.1 General

4.4.1.1 The following must be considered prior to commencing hot work:

- The work area is a hazardous location, or
- The work area is not normally a hazardous location but an explosive atmosphere may exist for a limited time because a flammable substance is or may be in the atmosphere of the work area,
- A flammable substance is or may be stored, handled, processed or used in the location,
- The hot work is on or in an installation or item of equipment that contains a flammable substance or its residue, or
- The hot work is on a vessel that contains residue that may release a flammable gas or vapor when exposed to heat.

4.4.1.2 We will ensure that hot work is not begun until:

- All combustible, flammable or explosive gas or vapors is removed or alternative methods of rendering the area safe are implemented, and
- A hot work permit is issued that indicates:
 - o the nature of the hazard,
 - o the type and frequency of atmospheric testing required,

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- o the safe work procedures and precautionary measures to be taken, and the protective equipment required,
- o the hot work location is cleared of combustible materials, or suitably isolated from combustible materials,
- o Procedures are implemented to ensure continuous safe performance of the hot work, and

o Testing shows that the atmosphere does not contain a flammable substance, in a mixture with air, in an amount exceeding 20 percent of that substance's lower explosive limit for gas or vapors, or the minimum ignitable concentration for dust.

4.4.1.3 We will ensure that the atmospheric tests are repeated at regular intervals appropriate to the hazard associated with the work being performed.

4.4.2 Hot Taps

4.4.2.1 Airde does not perform "Hot Tapping".

4.4.3 Internal Combustion Engines

4.4.3.1 AIRDE will ensure that an internal combustion engine in a hazardous location has a combustion air intake and exhaust discharge that are:

- Equipped with a flame arresting device, or Located outside the hazardous location

4.4.3.2 We will ensure that all the surfaces of an internal combustion engine that are exposed to the atmosphere in a hazardous location are:

- At a temperature lower than the temperature that would ignite a flammable substance present in the hazardous location, or
- Shielded or blanketed in such a way as to prevent any flammable substance present in the hazardous location from contacting the surface

4.4.3.3 If it is not reasonably practicable to comply with the above section, we will ensure that another effective safeguard is established.

4.4.3.4 We must ensure that a vehicle powered by an internal combustion engine is not located or operated in a hazardous location.

4.4.3.5 We will ensure that an internal combustion engine is not located in a Zone 0 hazardous location as defined in the Canadian Electrical Code or in a part of a Division 1 hazardous location that meets the description of a Zone 0 location as defined in the Canadian Electrical Code.

4.4.3.6 We will ensure that an internal combustion engine is not located in a Zone 1 or Division 1 hazardous location as defined in the Canadian Electrical Code unless it is equipped with combustible gas monitoring equipment in accordance with section 18 of the Canadian Electrical Code.

4.4.3.7 We will ensure that an internal combustion engine is not located in a Class II, Division 1 or a Class III, Division 1 hazardous location as defined in the Canadian Electrical Code

4.4.4 Manufacturer Specifications

4.4.4.1 The Logistic Department and the Field Supervisor must ensure that:

- Compressed or liquefied gas containers are used, handled, stored and transported in accordance with the manufacturer's specifications, and

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- Welding or allied process equipment is erected, installed assembled, started, operated, used, handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, carried, maintained, repaired, and dismantled in accordance with manufacturers specifications

4.4.5 Welding from Vehicles

4.4.5.1 Airde currently does not weld from vehicles. If this changes in the future, a procedure will be added to this section.

MSP 032 HEAT AND COLD STRESS PREVENTION PROCEDURE

1.0 PURPOSE

The purpose of this procedure is to provide guidelines for the safe work practices in extreme hot or cold work environments.

2.0 SCOPE

2.1 This procedure applies to all AIRDE personnel and contractors responsible to follow AIRDE procedures.

3.0 RESPONSIBILITY

3.1 It is the responsibility of all personnel, when working in an extreme work environment, to do so in accordance with these instructions, as well as all applicable procedures and company policies.

4.0 PROCEDURE

4.1 General

4.1.1 Heat-related illnesses can develop over several days, or they can strike during a single burst of strenuous physical activity.

4.1.2 The body removes heat by:

- Sweating
- Rapid respiration
- Increased blood flow to the skin

4.1.3 Sometimes the body's cooling system fails and will lead to the following heat ailments:

- Heat Edema - Swelling of the hands and feet when blood vessels expand and allow blood to pool beneath the skin. Swelling disappears after staying out of the heat for a few hours.

- Heat Syncope - Fainting caused by decreased blood flow to the brain during skin cooling. Most victims regain consciousness quickly after spending a few minutes in a cool place.

- Heat exhaustion - Characterized by muscle pains, nausea and feverishness. Symptoms include clammy skin, diarrhea, rapid pulse, vomiting and weakness.

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– Heat stroke - A potential, fatal failure of the body's heat mechanism. Symptoms include confusion, loss of consciousness, agitation, hyperventilation, convulsion, rapid pulse and high temperatures. The patient will need urgent medical attention.

4.1.4 While waiting for assistance, the following steps can help save someone's life:

- Take the patient to a cool, shaded area
- Sprinkle the person with water
- If the victim is unconscious, elevate feet to increase blood supply to the brain.
- Fan the person with a newspaper or a towel.
- If the person is fully conscious, offer plenty of fluids.

4.1.5 Supervisor will be trained in Airde's heat illness emergency response procedure prior to supervising employees.

4.2 Stress: Control Measures

4.2.1 Engineering Methods:

- Use of increased general ventilation or spot cooling to reduce temperature at the work place.
- Use of local exhaust ventilation at the point of high heat production to remove sensible and /or latent heat from work areas
- Use of evaporative cooling or mechanical refrigeration and cooling fans to reduce work site temperatures
- Application of radiant heat shielding, isolation relocation, redesign of equipment to reduce thermal stress
- Wider use of work saving devices (such as power tools) to reduce the metabolic workload

4.2.2 Administrative Work Practices

- During the pre-job meeting, the Supervisor shall discuss with workers the symptoms and prevention methods for heat stress. The Job Hazard Analysis (JHA) shall ensure that controls to prevent heat stress are identified and understood.
- Work-rest regimen shall be designed to reduce peaks of stress, distribute workloads over a maximum amount of time, and perform hot works in the hotter or cooler part of the day. See Appendix A, Table A-1 for Work/Rest Limits
- At or below 85 degrees Fahrenheit the employee shall have timely access to shade upon request. For temperatures at or above 85 degrees Fahrenheit, one or more areas with shade shall be provided at all times while employees are present. Shade shall accommodate at least 25% of employees on shift at any one time.
- Employees should be allowed to pace themselves and take rest breaks.
- Workers should be taught the basics of preventing heat stress and be able to observe employees for alertness and signs/symptoms of heat illness include in
- Adequate water / fluid supplies must be available.
- Supervisors shall closely observe employees for the first 14 days of being exposed to extreme heat to assist and monitor during the acclimatization.
- Ensure procedures for providing first aid and or requesting medical assistance is understood.

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4.2.3 Personal Protective Equipment

- The amount and kind of clothing that employee's wear is important in controlling heat stress.
 - Loose fitting, lightweight and light-colored clothing should be used in highly humid areas.
 - Jobs with high radiant heat loads often require reflective garments to be worn. Extreme radiant and convective heat exposure may require special insulation or even mechanically cooled suits (e.g., blaster suits, firefighting suits).
- Cold Related Illness / Precaution

4.3 Treatment and Prevention

4.3.1 Hypothermia is defined as a core body temperature of 35° C most cases occur in winter months in areas with cold climates. Hypothermia can occur in mild climates at any season. The following table lists the levels of severity of hypothermia.

Mild 35 to 32°C

Moderate 32 to 28°C

Severe below 28°C

4.3.2 The four (4) environmental conditions that cause cold-related stress are:

- Low temperatures
- High / cool winds
- Dampness
- Cold water

4.3.3 The major risk factors for becoming hypothermic include the following:

- Wearing inadequate or wet clothing
- Taking certain drugs, such as alcohol, nicotine, caffeine and medication that inhibit the body's response to cold or impairs judgment.
- Having certain diseases, such as diabetes, heart, vascular and thyroid problems
- Being male increases a person's risk to cold-related stress due to inherent risk-taking activities, body fat composition and other physiological differences.
- Becoming exhausted or immobilized due to injury or entrapment
- Extremes of age (especially the elderly)
- Malnutrition
- Mental Illness / Substance Abuse (e.g., drugs, alcohol, etc.)
- Others: homelessness / poverty

4.3.4 At any temperature, you feel colder as the wind speed increases. The combined effect of cold air and wind speed is expressed as "equivalent chill temperature" (ECT) or simply "wind chill" temperature in degrees Celsius or Fahrenheit. It is essentially the air temperature that would feel the same on exposed human flesh as the given combination of air temperature and wind speed. It can be used as a general guideline for deciding clothing requirements and the possible health effects of cold. See Appendix B Wind Chill Equivalency Chart.

4.3.5 The major causes of hypothermia are listed in the table below:

Condition Caused By

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Excessive Heat

Loss

Environmental exposure

Increased continuous blood flow

Decreased Metabolism from:

Adrenal Insufficiency Hypoglycemia

Diabetic Ketoacidosis Hypothyroidism

Hepatic Failure Malnutrition

Inadequate Heat Production

Altered Thermoregulation from:

Episodic spontaneous hypothermia with
hyperhidrosis

Sepsis

Spinal cord injury - T1 or above

Hypothalamic Dysfunction

Uremia

Drug-induced from:

Barbiturates

Benzodiazepines

Clonidine

Ethanol

Lithium Opiates

Phenothiazines

4.3.6 Symptoms of hypothermia include the following:

- Mood changes, irritability, poor judgment or lassitude
- Paradoxical undressing (a severely hypothermic person removes clothing in response to prolonged cold stress.)
- Slurred speech and ataxia may mimic a stroke.
- Possibly, coma or cardiac arrest

4.3.7 The clinical symptoms of hypothermia are listed in the table below:

Clinical Symptoms Severity Lethargy, confusion, shivering, loss of fine motor coordination

Mild hypothermia (32° to 35°C)

Delirium, slowed reflexes Moderate

hypothermia (29° to 32°C)

Moderate hypothermia (29° to

32°C)

Very cold skin, unresponsive Severe hypothermia (below 29°C)

Cold

4.4 Stress: Control Measures

4.4.1 Engineering

- Use of onsite source of heat, such as air jets, radiant heaters or contact warm plates

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- Shield work areas from drafty or windy conditions
- Provide a heated shelter for workers who experience prolonged exposure to wind chill temperature of -6°C or lower.
- Use of thermal insulating material on equipment handles when temperatures drop below -1°C.

4.4.2 Administrative Work Practices

- During pre-job planning meeting, the Supervisor shall discuss with workers the symptoms and prevention methods of cold stress. The Job Hazard Analysis (JHA) shall ensure that controls to prevent cold stress are identified.
- Acclimatization - Allow a period of adjustment to the cold before embarking on a full work scheme.
- Establishment of a "buddy system"
- Educate workers / employees to the symptoms of cold-related stresses. This will be a part of orientation course by HMA staff.
- Permit employees to take extra work breaks when needed.
- Monitor and if reasonably practicable, reduce number of activities performed outdoors; select the warmest hours of the day and minimize activities that reduce the circulation. See Appendix B Work/Rest Limits.
- Ensure procedures for providing first aid and or requesting medical assistance is understood.
- Balanced meals and adequate liquid intake are essential to maintain body heat and prevent dehydration. Eat properly and frequently. Working in the cold requires more energy than in warm weather because the body is working to keep the body warm. It requires more effort to work when wearing bulky clothing and winter boots especially when walking through snow.
- Drink fluids often especially when doing strenuous work. For warming purposes, hot non-alcoholic beverages or soup are suggested. Caffeinated drinks such as coffee should be limited because it increases urine production and contributes to dehydration. Caffeine also increases the blood flow at the skin surface which can increase the loss of body heat. Potable water will be provided to employees at all work sites.
- Alcohol should not be consumed as it causes expansion of blood vessels in the skin and impairs the body's ability to regulate temperature (it affects shivering that can increase your body temperature). These effects cause the body to lose heat and thus increase the risk of hypothermia.

4.4.3 Personal Protective Equipment

- Personal Protective Clothing most important step: wear at least three layers of clothing.
- Outer layer to break the wind and allow some ventilation (like Gore-Tex or nylon)
- Middle layer of wool or synthetic fabric to absorb sweat and retain insulation in damp environment
- Inner layer of cotton or synthetic weave to allow ventilation.
- Sunglasses / sunscreen - while working in snow conditions, protection against snow blindness and sunburn.

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- Pay special attention to protecting feet, hands, face and head. Up to 40% of body heat can be lost when the head is exposed.
- Footgear should be insulated to protect against cold and dampness.
- Keep a change of clothing available in case work garments become wet.

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MSP 033 ROOF ANCHOR INSPECTION PROCEDURES

1.0 PURPOSE

- 1.1 General/Technical Review
- 1.2 Review Pro-Bel file contents for:
 - system background information
 - availability of engineered drawing. Note whether it has been stamped, signed, and dated.
 - use of epoxy adhesive anchor bolt securement. Note when last tested.
 - use of davits or other permanent equipment. Look for 100 davit arm upgrade information.
 - use of monorails, including access to same.
 - when building was last inspected.
 - special notes for inspection, and if system and been approved in past.

2.0 SCOPE

2.1 Guidelines

- 2.1.1 All fall arrest anchors are designed in accordance with Federal OSHA standards and the ANSI-IWCA I-14.1 Window Cleaning Safety Standard.
- 2.1.2 All fall arrest anchors are designed for a working/rated load of 1,250 IBS and a breaking/fracture load of 5,000 IBS (4-1 Safety factor).
- 2.1.3 All fall arrest anchors have been evaluated by industry typical structural evaluation and/or testing methods.
- 2.1.4 The additional live loads imposed by the fall arrest anchors on the structure to which they are attached shall be verified by the structural engineer of record for the project.
- 2.1.5 All welding shall be done in accordance with AWS structural welding code.
- 2.1.6 All Structural fasteners shall be tightened to the following torque values:

-Diameter in*IB ft*IB

5/8	720	60
3/4	1200	100
1"	1800	150

2.2 Material Specifications

- Steel W-Shapes: ASTM 572 (50 KSI)
- Steel Pipe: ASTM A53 (35 KSI)
- Steel Angle: ASTM A36 (36 KSI)
- Steel Channel: ASTM A36 (36 KSI)
- Steel Plate: ASTM A 36 (36 KIS)
- Stainless Steel: Type 304 (30 KSI)
- Stainless Fasteners: Type 18-8 (30 KSI)

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2.3 Roof Anchor Class

2.3.1 This falls into the following classes of Adhesive (ARA), Cast in Place (CPRA), Beam Wrap (BWRA), and Weldable (WRA) “Roof Anchor class”.

-Height -Working load

10” 1250lbs

12” 1250lbs

14” 1250lbs

16” 1250lbs

18” 1250lbs

20” 1250lbs

22” 1250lbs

-No Adhesives shall be located within 26” from slab edge

-No Anchors shall be located within 12” from slab edge

3.0 RESPONSIBILITY

3.1 Warning

Only qualified persons experienced in the installation methods shall install fall arrest equipment. All users shall be properly trained to use the equipment safely and properly to inspect fall protection system prior to each use. Incorrect use and/or installation of the fall protection equipment may result in property damage, personal injury, or death. All equipment shall be annually inspected by a qualified person and re-certified at a period not to exceed 10 years under the direct supervision of a licensed professional engineer.

4.0 PROCEDURE

4.1 On roof drawing (if available) for each building, carefully review quantity, type, location, and securement of anchors. Not manufacturer, name of engineering company and whether drawing is stamped, signed and dated.

4.1.1 During the inspection, record and photograph any differences between your findings and the drawing.

4.1.2 Always check anchors by tapping the U-bar with a hammer and by kicking and pulling the U-bar only. Record any movement or other concerns, e.g. corrosion, placement, compliance, and similar items.

4.1.3 If ends of anchor bolts are visible, check for [deformation](#) of thread (to prevent loosening of nuts) unless provided with a cotter pin in which case, [check for missing pins](#).

4.1.4 In cases where the ends of anchor bolts have exposed nuts, ensure that a lock washer has been used under the nut. However, if there are less than two threads exposed, it is more important to deform the threads.

4.1.5 If roof anchors are equipped with a stainless-steel screw down cap where the cap is locked into place using a Surloc pin, check to ensure pin is still in place. If pin is missing take a photograph and tag the anchor to indicate anchor cannot be used.

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4.1.6 Record and photograph any restrictive conditions noted during the inspection process. As an example, in narrow roof areas where the parapet is less than 915 mm (36) in height, and anchors are placed within 3 meters (6.5') of the roof edge workers must be tied off when approaching this restricted area. Alternatively, a minimum 3 meter (10'-0") wide approach area, or guardrail, is recommended.

4.1.7 When inspecting primary rigging equipment such as davits, outrigger beams, monorails and similar equipment (especially aluminum), check for signs of distress, weld cracks, corrosion, and damaged or missing pins.

4.2 Roofing

4.2.1 Check for defect [in flashing](#) at the base of anchors, davits or other equipment, including heat shrink rubber collar flashing at the top of anchors.

4.2.2 At wall anchor locations, where caulking seals are used, check for [shrinkage](#) or [cracking](#) in caulking.

4.3 Structural Substrates

4.3.1 Note any defects in visible structural elements to which anchorages are affixed such as parapet walls for signs of cracking or other signs of distress.

4.4 Restricted Areas

4.4.1 If parapet wall height is less than 915 mm (36"), workers must be tied off if approaching within 2 meters (6.5) of the roof edge. Check drawing to ensure this type of restriction is noted. Also, see item 8 in "General" above.

4.5 Access Details

4.5.1 On the file cover, ensure that the following points are noted for convenience of future inspections:

- Parking opportunities
- Major intersections, or suite numbers, of site.
- Contact name and telephone number.
- Multi-level building roof access points (suite Nos.)

4.6 Recording Deficiencies

4.6.1 In the event deficiencies are observed, take the following action:

- Photograph and note even the slightest defect as these may be indicative of a larger system problem.
- Re-tightening any loose nuts found at the time of inspection. However, if there are more than 5 loose nuts, at the inspector's discretion, a construction crew will need to remedy the problem.
- if serious problems have been detected, tag the anchor or equipment. Make every attempt to speak with the building superintendent or property manager to advise them the system must not be used until the problem has been fixed. [Document your advice while obtaining a name and signature.](#)

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-Spraying minor rust spots on anchors or equipment using a cold zinc-based paint. If there are more than 5 or 6 items involved (or at the inspector's discretion), a Pro-Bel construction crew will need to remedy the problem. Note: If touching up any corrosion, first use a stainless-steel brush before spraying. Always photograph any rusting both before and after for Pro-Bel files.

4.7 Davits

- 4.7.1 Take detailed photographs of davit bases for Pro-Bel records
- 4.7.2 Tap all exposed butts on bolted connections with a hammer to ensure they are snug and secure. Do not deform any threads on davit bold ends as this is not a Ministry of Labor requirement. Do however, note on your report if two threads are exposed.
- 4.7.3 Ensure that all locking pins are in good working order and tethered to the arm or the base.
- 4.7.4 Examine all welds and look for signs of distress or cracking (especially with aluminum).
- 4.7.5 Inspect any trolleys and ensure cam followers are moving freely and that T-Type locking screws are functioning properly.
- 4.7.6 Confirm that any ends stop on davit booms are in place and are snug and secure.
- 4.7.7 On top-rotating davits, ensure the boom moves easily. On larger arms, check that transport wheel assemblies are in good working order and that raising winches and stanchions are on hand and operable.

4.8 Permanent Outrigger Beams

- 4.8.1 Ensure outrigger beam can be moved into position without difficulty.
- 4.8.2 Examine all welds for signs of distress cracking, or deterioration.
- 4.8.3 Confirm that back stops are able to prevent beams from coming away from their bases.

4.9 Additional Information

- 4.9.1 All anchors shall be hot dipped galvanized unless otherwise noted. Stainless steel and other weather protective coatings are available. Please contact representative for availability.

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MSP 034 BRIDGE INSPECTION & ROPE ACCESS TECHNIQUES

1.0 PURPOSE

The purpose of this procedure is to provide guidelines for the safe work practices during bridge inspection and Rope Access Techniques applied on bridges.

2.0 SCOPE

2.1 Definitions

- In depth:** Prescribes “hands on” or “arm’s reach” range inspection of specified components, may be above or below water level.
- Routine:** Regularly scheduled (usually 2 years) inspections determining the physical and functional condition of the bridge. Underwater components are usually examined during low-flow periods or by probing.
- Inventory:** initial inspection before a new bridge enters active service verifying as-built dimensions, recording various site data, and providing a baseline bridge inspection report.
- Damage:** An unscheduled inspection in response to an acute event either natural or man-made. Examples include earthquakes, floods, collisions affecting the structure, or vehicle fires.
- Special:** An inspection conducted outside the normal inspection cycle to monitor a particular area of the structure only.
- Due to the versatility of industrial rope access, it would typically be used in the performance of in-depth inspections.

3.0 RESPONSIBILITY

It is the responsibility of the site supervisor to assure that access plans adhere to the Rope Access Procedures where applicable and the most efficient rescue scenario be considered when selecting access methods.

Bridges with open water below the accessed area requires additional life saving mitigation. Life vests and rescue boats are required over open water.

4.0 PROCEDURE

4.1 Suggested Access Techniques and Strategies for Various Structure Types

4.2 Through Trusses

- Access through trusses using industrial rope access is typically a straightforward process. Efficiencies can be gained through thoughtful planning to minimize the number of anchors the team must set. The inspection of verticals can be accomplished with rappelling and ascending techniques, or slings with over-sized scaffolding carabiners, depending on the configuration of the structure and member being inspected.
- Inspection of inclined truss members, otherwise referred to as diagonals, can be effectively inspected by using a rope-to-rope transfer with pairs of ropes anchored at

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adjacent verticals. Another method would be to ascend (via structure climbing) the diagonal from ropes anchored to the top chord while using a sling around the diagonal to prevent an uncontrolled swing if a fall were to occur. The slings should not be used as your primary means of fall protection and should always be used in conjunction with rope mounted overhead.

- In the case of Pratt or Howe-Type through trusses the rigging team needs only to set ropes at each vertical location. By ascending the ropes at each vertical and utilizing a rope transfer between verticals to return to deck level while simultaneously inspecting the intervening diagonal, the ropes provide a smooth, constant, efficient work path between support locations. In the case of other common truss types like Warren, Whipple, or Baltimore trusses, a certain number of repeated ascents is inevitable.

- In some cases, to gain access to the top cord of through trusses, you can use lead climbing techniques. Care must be taken to minimize fall factor and the particularities of that technique should be addressed in the Job Hazard Analysis (JHA).

4.3 Deck Trusses

4.3.1 **Deck trusses**, similar to through trusses, tend to be a straight forward inspection in terms of access. Typical rope access methods include ascending and descending for vertical members (or oversized carabiners/slides on lacing bars), and rope-to-rope transfers for diagonal members. In certain truss configurations/designs, the diagonal members are constructed of lacing bars, or plates with access holes for inspection. The inspector can utilize these configurations by using an oversize carabiner and shock absorbing assembly or dynamic slings in lieu of rope-to-rope transfers. This may decrease the amount of rigging necessary. However, care must be taken to always properly orient the oversized carabiners as the possibility of side-loading increases in the event of a fall. Furthermore, a dynamic connection should be used with these components (short lanyard, etc.)

4.3.2 **Floor beams** can be inspected utilizing beam claps or beam rollers. This allows the inspector to access all areas of the floor beam/stringer system. Sidewalk/shoulder overhangs are common and may require multiple rigging points at the edge of the deck and on the truss. Depending on the distance between the edge of the deck and truss, the inspector may be required to perform a rope-to-rope transfer, or re-belay to access deck truss members. A telescoping stick with hook can be useful to reach ropes out of arms reach.

4.3.3 **Anchorage** at/on the deck railing may be necessary and traffic control should be deployed per the applicable regulation for traffic control to protect exposed anchor points. Depending on the railing configuration, the ropes may be attached directly to the guardrail system. If the guardrail system has heavy corrosion/deterioration, multiple anchorage locations may be necessary to develop adequate strength for an anchorage. If a concrete parapet is your only anchorage point, anchorages may be drilled into the concrete, or a parapet clamp/roller may be utilized for an anchorage point. Care must be taken if anchorages are unprotected to oncoming traffic.

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-In some cases, to gain access to the top cord of through or deck trusses, you can use lead climbing techniques. Care must be taken to minimize fall factor and the particularities of that techniques should be addressed in the Job Hazard Analysis (JHA).

4.4 Suspension Bridges

4.4.1 **Main Cables:** The Main cables for suspension bridges refer to the primary wrapped cable bands that support the bridge deck and superstructure elements. There are at least two main cables on these types of bridges. Often these elements have fall prevention systems built into them. The existence of fall prevention systems, though, does not necessarily entail an acceptable system. These systems are frequently installed as a construction afterthought, and are generally old and may not be well maintained. The suitability of an existing system should be made by a competent person. Most systems involve two cables connected to the main cables by stanchions, which would be used as handrails/tie off points. When these systems are available, the most common form of access is walking along the cable with 100% tie off techniques.

4.4.2 **Suspender cables** refer to the vertical cables that carry the deck/superstructure load to the main cables and are clamped around the main cable in some capacity. Accessing these items involves one of two actions: one is access to the entire cable; the other is access to just the ends of the suspender cables.

Accessing the entire cable will involve basic descent/ascent activities. The complication will involve the method of anchoring the rope system to the structure. To ascent/descend the entire cable will require ropes to be anchored near the top of the suspender cable. This may require a person on the main cable above, setting the ropes and monitoring the ascent/descent while having the ability to act as a rescuer should a situation arise. This entails a method of anchoring the ropes at the suspender cable connection. If a sling, cable, etc. cannot easily be used, an anchoring system will need to be engineered. Sometimes suspender cables only need to be accessed at their top and bottom connections. In this case, the bottom connections can usually be accessed from the stiffening truss. Often stiffening trusses can be accessed from the deck level. The top connections will need to be accessed from the main cable. If a hand-held inspection mirror is available to the climber, and the inspector is comfortable with what they see using the mirror, then maneuvering into position to see the full suspender cable and clamp is not necessary. If a mirror is not feasible, the climber will need to maneuver such that they can see the entire clamp and suspender cable. This situation is bridge-dependent, but usually involves some manner of positioning and fall restraint system with an (stirrup) webbing ladder to climb down and inspect the clamp. A certain amount of dexterity and climbing ability is needed, as re-positioning oneself back onto the main cable is not an easy task.

4.4.3 **Stiffening Trusses:** Techniques for accessing stiffening trusses are similar to other trusses. The distance between the chords of a stiffening truss is roughly 10-15ft. Also, the

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top chord can often be accessed from either the deck or sidewalk. In this case proper fall protection techniques are needed.

4.4.4 **Floor Systems**: steel floor systems can be accessed in many ways, depending on the steel shapes used for the floor system. Beam clamps can be used to slide/roll on the bottom flanges of beams; however, an appropriate back-up fall protection system must also be employed. This can be accomplished by using multiple beam clamps, high-line, or other comparable back up system. Climbing the floor system with slings or other appropriate fall protection and work positioning can be used to access the floor system. Note that fall protection systems can be built into floor systems, but they should be inspected for their structural integrity prior to use.

-Most climbing will be horizontal in nature, so care must be taken to prevent or minimize pendulum swings from the anchor points. High-lines and other complicated set ups can be employed for the main means of inspection, but rope sag when at mid-point may affect the quality of the inspection. Ultimately, the inspecting company must consider the level of effort, time, and safety for the rope work involved, all of which should be addressed in the Job Hazard Analysis (JHA). This will need to be contrasted with the same variables when utilizing other access methods, to determine the preferred course of action.

4.5 Arches

4.5.1 Inspection of arch bridges via rope access can be more challenging than other types of bridges due to the unique curved geometry of arch bridges. Gaining adequate access for in-depth inspection with rope access can be separated into two distinct subsets: through arches and deck arches. Through arches are those in which the roadway surface passes below arch and is typically supported by the arch through the use of cables. In contrast, deck arches support the roadway surface from below by the use of columns, called spandrel columns.

4.5.2 In through arches, gaining access to the top of the arch can vary considerably with the bridge's design. Some through arch bridges with hollow, box-type arch ribs allow inspection access through the interior of the arch with access hatches near the roadway and again at the apex. IN the event of a closed arch, prusiks can be utilized to ascend the suspension cables in order to access the arch's apex. Once on top of the arch, it has been found that the most efficient access techniques for inspection is to anchor two-rope systems to each panel point (Connections location) to allow inspectors to efficiently ascend and descend adjacent to the suspender cables and inspect the suspender connection at the arch, as well as the arch itself.

4.5.3 For inspection of the arch rib between connection locations, typically the arch rib top and side faces can be inspected from the top surface of the arch; however, inspection of the bottom face of the arch requires the use of edge negotiation to position oneself at an elevation lower than the arch. Depending on the geometry of the rib cross-section, a choking setup might be required as in the case of the smooth box section as picture above.

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4.5.4 Due to the location of the road way deck and live traffic, it may be necessary to secure the bottom of the ropes to avoid them swaying into traffic. This can be completely accomplished using a small fabric sling used as a prusik on the lower part of the suspender cable and an extra rope grab to maintain tension on both ropes. Rubberized dumbbells/weights suspended from the bottom of the ropes have been found to be useful to control the ropes during lowering from the arch.

In order to access deck arches, the preferred method is using rope-to-rope transfers. From the roadway deck, it has been found useful to set two-rope systems at each panel point and allow the inspector to descend from the deck, inspecting a spandrel column on the way down.

4.5.5 When the inspector reaches the spandrel column connection to the deck arch, a rope transfer can be utilized to control position in town dimensions to travel along the length of the arch section to the next column connection as pictured below, inspecting the rib along the way. Once the inspector reaches the second column connection and the inspector ascends back to the roadway deck, performing inspection of the second column and connections during the ascents. It is important to perform this technique downhill whenever possible for maximum efficiency.

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MSP 035 BLOODBORNE PATHOGENS EXPOSURE PLAN

1.0 PURPOSE

1.1 The Bloodborne Pathogens Standards, is designed to protect at – risk employees from exposure to blood and other potentially infectious materials. Employees covered by this standard include those who:

- Work with blood and other bodily fluid specimens.
- Handle contaminated equipment.
- or those who are at risk of exposure due to first aid or medical treatment.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** Employees, Contractors, Sub Contractors (and any projects or jobs)

2.2 NOTE: The Safety Program of customers may supersede or take precedence over the details of **AIRDE**'s own Safety Policy and Procedures but in no case shall the governing safety policy and procedures be less than the applicable Federal/Provincial/State Safety Regulations.

2.3 Appropriate standards such as OSHA shall be complied with accordingly.

2.4 Our Exposure Control Plan is readily available to our employees and it is communicated through MSF-004 Safe Job Work Plan.

3.0 RESPONSIBILITY

3.1 The Supervisor is responsible for identifying the appropriate protocol to follow.

3.2 All personnel are responsible for following safety procedures

3.3 The Supervisor is responsible to monitor for compliance.

3.4 All level 3 Supervisors are required to have their Emergency First Aid Certification. Which also allows proper protocol procedure for Bloodborne Pathogens. **AIRDE** verifies that all certifications are current and up to date.

3.5 PPE equipment will be provided to ALL **AIRDE** employees.

3.6 All Employees will be trained on Blood Borne Pathogens and sign the MSF-016 BBP Acknowledgement Agreement. Training records will be kept for 3 years.

3.7 **AIRDE** will provide the Hepatitis B vaccination to all employees that have occupational exposure at no additional cost.

3.8 **AIRDE** will keep medical records of employees with occupational exposure for the duration of their employment plus 30 years.

4.0 PROCEDURE

4.1 Bloodborne Pathogens

4.1.1 Bloodborne Pathogens are viruses, bacteria, and other microorganisms in human blood or other potentially infectious materials that can cause disease in persons who are exposed to blood or other potentially infectious materials containing the pathogens. These microorganisms can Immunodeficiency Virus (HIV), and many others.

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4.1.2 Standards: for reducing risk of bloodborne pathogens include:

Use of standard precautions during all tasks that involve a reasonable likelihood for exposure to blood, body fluids, and all other materials that are possibly infectious.

- Use of personal protective equipment (PPE) whenever there is reasonable anticipation of exposure to blood or other potentially infectious materials.
- Hand washing after the removal of PPE; following contact with blood or other potentially infectious material.
- Hand washing prior to or after dealing with blood or body fluids.
- Avoid splashing, spraying, spattering, or creating droplets of blood or other fluids.
- Discarding blood and other potentially infectious body substances in amounts sufficient to cause infection in red bags or containers labeled *Infectious Waste* or marked with the biohazard label.
- Use of health care organization-approved disinfectant on all contaminated items before use on another person.
- Appropriate use of Personal Protective Equipment, a health-care organization-approved disinfectant, and a blood spill kit for containing and cleaning spills of blood or body substances.
- Antiseptic hand cleaner/towelettes cleaners are provided in the first aid kit.
- An Exposure plan that ensures a follow up is in place to address exposure to blood or body fluids via needlestick, sharps injury, splash to mouth, nose or eyes, or to non-intact skin for all employees. (See Exposure Protocol below)

STANDARD PRECAUTIONS

Standard precautions require that all human blood and other potentially infectious materials be treated as if known to be infectious for HIV, HBV, HCV, or other bloodborne pathogens, regardless of the perceived “low risk” status of a source individual. These precautions are “standard” because they are used for all employee, regardless of whether or not they have a diagnosis of infectious disease. Bloodborne Pathogens Standard recommends that employers including employee implement standard precautions when dealing with blood and other potentially infectious materials, which have the capability of transmitting a bloodborne pathogen.

The Bloodborne Pathogens Standards apply to blood or **Other Potentially Infectious Material (OPIM)**, which includes:

- cerebrospinal fluid
- synovial fluid
- pleural fluid
- amniotic fluid
- pericardial fluid

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- peritoneal fluid
- unfixed tissue or body organs other than intact skin
- semen
- vaginal secretions
- any body fluid contaminated with blood
- saliva
- body fluids in emergency situations that cannot be recognized

Respiratory Hygiene/Cough Etiquette is a new component of Standard Precautions and is targeted at employees/workers with undiagnosed transmissible respiratory infections. They apply to any person with signs of illness including cough, congestion, rhinorrhea, or increased production of respiratory secretions. The concepts of respiratory hygiene and cough etiquette involve using control measures to prevent employees/workers with respiratory infections from transmitting their infection to others. These measures include asking coughing or sneezing persons to:

1. Cover their mouth and nose with tissues and dispose of used tissues in waste containers.
2. Use a mask if coughing (when a mask can be tolerated).
3. Perform hand hygiene (wash with soap and warm water for 15 seconds or clean hands with alcohol-based hand product if hands are not visibly soiled) after contact with respiratory secretions.
4. To stand or sit at least 3 feet from other persons, if possible.

EXPOSURE PROTOCOL

- An exposure is contact with blood or other potentially infectious material with eyes, nose,

mouth, nonintact skin, or parenteral contact, which is an injury that results in a piercing of the skin or mucous membranes, such as bite, cut, or abrasion.

Steps for Exposure to Blood or Other Potentially Infectious Material

Immediately:

- Wash needlestick and cuts with soap and water.
- Flush splashes to the nose, mouth or skin with water.
- Irrigate eyes with clean water, saline, or sterile irrigates.
- Report exposure to your instructor, preceptor or supervisor.

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- Seek medical evaluation because treatments are most likely to be effective if administered as soon as possible after the exposure.
- Employees that have not be vaccinated AIRDE will provide that for them.
- Report exposure Incident to Operations Coordinator and provide the following information:
 - The names of all employees involved in the exposure incident (include all first-aid providers who have rendered assistance regardless of whether personal protective equipment was used)
 - A description of the exposure or first-aid incident, including:
 - The time and date
 - A determination of whether an exposure incident occurred. This determination is necessary to ensure that the proper post-exposure evaluation is conducted and prophylaxis and follow up are made available immediately if an exposure incident has occurred.
 - Person receiving the report with telephone number

5.0 Reference

MSF-004 Safe Job Work Plan

MSF- 017 Sharp Injury Log

MSF-018 Reporting Exposure Incidents

MSF-018 Post Exposure Evaluation and Follow Up Log

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MSP 036 NOISE EXPOSURE AND HEARING EQUIPMENT PROCEDURE

1.0 PURPOSE

1.1 To ensure that persons working for **AIRDE** are informed of the expectations for Noise Exposure and Hearing Equipment.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** employees, Sub-Contractors, General Contractors.

2.2 The Safety Program of customers may supersede or take precedence over the details of **AIRDE**'s own Safety Policy and Procedures but in no case shall the governing safety policy and procedures be less than the applicable Federal/Provincial/State Safety Regulations.

2.3 Appropriate standards such as CSA or ANSI shall be complied with accordingly, depending on jurisdiction.

2.4 All OSHA regulations are to be complied with at all times with no exceptions.

3.0 RESPONSIBILITY

3.1 The Supervisor is responsible for identifying the appropriate hearing protection for the planned work.

3.2 All personnel are responsible for wearing hearing protection appropriately, inspecting hearing protection before use and reporting issues to their Supervisors.

3.3 The Supervisors are to assure that proper hearing protection is provided and used correctly. The Supervisor is responsible to monitor for compliance.

3.4 All Employees are to be informed of noise hazards and the requirement of appropriate hearing protection equipment that is required to be worn for all jobs/projects.

3.5

4.0 PROCEDURE

4.1 General

4.1.1 Hearing Protection

4.1.2 Employees exposed to noise in excess of the Occupational Exposure Limits will have hearing protection provided.

4.1.3 There are two types of recognized hearing protectors available for use in reducing noise exposure:

- Ear Plugs
- Ear Muffs

4.1.4 In most instances' earplugs are acceptable hearing protectors.

4.1.5 When using earmuffs for hearing protection, they must be disinfected before being issued to another employee.

4.1.6 Employees are to be informed of the hazards associated with the exposure to noise and the purpose and limitations of protective hearing devices. The wearing of this equipment will be mandatory in high noise areas.

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4.1.7 Hearing Protection: is required to be worn on job locations where the noise level exceeds the permissible levels. Supervisor will supply hearing protection equipment as needed. Follow the manufacturer instructions for the proper use, fit, and sanitation requirements.

4.1.8 **AIRDE** is required to monitor noise exposure levels to accurately identify employees exposed to noise at or above 85 decibels averaged over 8 working hours, or 8-hour time weighted average. **AIRDE** monitors all employees whose noise exposure is equivalent to or greater than a noise exposure received in 8 hours where the noise level is constantly 85. The exposure measurement must include all continuous, intermittent, and impulsive noise within an 80 db. to 130 db. range and must be taken during a typical work situation. This requirement is performance-oriented because it allows employers to choose the monitoring method that best suits each individual situation. Hearing protection will be evaluated for each different environment.

4.1.9 **AIRDE** will repeat monitoring whenever changes in production, process, or controls increase noise exposure. These changes mean that more employees will need to be included in the program and that their hearing protection may no longer provide adequate protection. Employees are entitled to observe monitoring procedures and must receive notification of the results of exposure monitoring. The method **AIRDE** uses to notify employees is at **AIRDE**'s discretion. **AIRDE** must carefully check or calibrate instruments used for monitoring employee exposures to ensure that the measurements are accurate. Calibration procedures are unique to specific instruments. **AIRDE** will follow manufacturer's instruction to determine when and how extensively to calibrate the instrument.

4.1.10 **AIRDE** provides a baseline audiogram within 6 months of an employee's first exposure at or above an 8-hour TWA of 85 db. An exception is allowed when **AIRDE** uses a mobile test van for audiograms. In these instances, baseline audiograms must be completed within 1 year after an employee's first exposure to workplace noise at or above a TWA of 85 db. Employees, however, must be fitted with, issued, and required to wear hearing protectors whenever they are exposed to noise levels above a TWA of 85 dB for any period exceeding 6 months after their first exposure until the baseline audiogram is conducted. Employees should not be exposed to workplace noise for 14 hours before the baseline test or wear hearing protectors during this time period.

Annually after obtaining the baseline audiogram, the employer shall obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels. Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift, the employee shall be informed of this fact in writing, within 21 days of the determination.

AIRDE will reevaluate the suitability of the employee's hearing protector whenever a change in working conditions may make it inadequate. If workplace noise levels increase, employees must give employees more effective protectors. The protector must reduce employee exposures to at least 90 dB and to 85 dB when an STS already has occurred in the

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worker's hearing. **AIRDE** will show employees how to use and care for their protectors and supervise them on the job to ensure that they continue to wear them correctly.

4.1.11 **AIRDE** will train employees exposed to TWAs of 85 dB and above at least annually in the effects of noise; the purpose, advantages, and disadvantages of various types of hearing protectors; the selection, fit, and care of protectors; and the purpose and procedures of audiometric testing. The training program may be structured in any format, with different portions conducted by different individuals and at different times, as long as the required topics are covered.

4.1.12 **AIRDE** will keep noise exposure measurement records for 2 years and maintain records of audiometric test results for the duration of the affected employee's employment. Audiometric test records must include the employee's name and job classification, date, examiner's name, date of the last acoustic or exhaustive calibration, measurements of the background sound pressure levels in audiometric test rooms, and the employee's most recent noise exposure measurement.

AIRDE is also required to record work-related hearing loss cases when an employee's hearing test shows a marked decrease in overall hearing. Employers will be able to make adjustments for hearing loss caused by aging, seek the advice of a physician or licensed health-care professional to determine if the loss is work-related, and perform additional hearing tests to verify the persistence of the hearing loss.

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MSP-037 COVID-19 RISK MITIGATION PROCEDURE

1.0 PURPOSE

1.1 All staff, technicians, contractors, sub-contractors, vendors and suppliers working in concert with or in proximity to Airde personnel must adhere to MSP-037 outlined herein. This procedure is not meant to circumvent or take precedent over local, state, and federal regulations or Center for Disease Control and Department of Health mitigation recommendations. In the possible event where this procedure and public safety policies and recommendations differ, the safest mitigation shall be followed. In the event where this procedure differs from rule of law, rule of law shall take precedent.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** employees and contractors who are required to follow **AIRDE**'s procedures. This procedure shall serve to identify mitigations required to protect workers from biological hazards and implement programs to address known hazards in the workplace. **AIRDE** will operate in a manner consistent with public health orders and issued guidance.

3.0 RESPONSIBILITY

3.1 All employees are responsible for reporting hazardous conditions and behaviors and taking corrective action as appropriate to mitigate the risk.

3.2 The Supervisor is responsible for reviewing this information at safety meetings and for communicating with all parties potentially exposed to risk under their direction.

4.0 PROCEDURE

COVID-19 SUPERVISOR

4.1 A site-specific COVID-19 Supervisor shall be designated by the contractor at every job site to monitor the health of employees and enforce the COVID-19 Mitigation Procedure. A designated COVID-19 Supervisor must be present at all times during work related activities.

COVID-19 SAFETY TRAINING

4.2 A Safety Stand-Down/toolbox talk/tailgate training must be conducted on all job sites on the first day of returning to work, and at least daily thereafter, to explain the protective

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measures in place for all workers. Social distancing must be maintained at all gatherings.

4.3 Attendance will be communicated verbally and the trainer will sign in each attendee.

4.4 COVID-19 Mitigation Procedure shall be visibly posted on each jobsite.

SOCIAL DISTANCING

4.5. Social distancing of at least 6 feet of separation must be maintained by every person on the worksite at all times when possible.

4.6 Gatherings of any size must be precluded by taking breaks and lunch in shifts. Any time two or more persons must meet, ensure minimum 6 feet of separation.

4.7 Identify “choke points” and “high-risk areas” on job sites where workers typically congregate and control them so social distancing is always maintained.

4.8 Minimize interactions when picking up or delivering equipment or materials, ensure minimum 6-foot separation.

4.9 To the extent practical allow only one trade/subcontractor at a time on a jobsite and maintain 6-foot separation social distancing for each member of that trade. If more than one trade/subcontractor must be on the job to complete the job, then at a minimum all trades and subcontractors must maintain social distancing policies in accordance with this guidance.

PPE-EMPLOYER PROVIDED

4.10 Employer provides personal protective equipment (PPE) such as gloves, goggles, face shields and face masks as appropriate, or required, for the activity being performed.

4.11. Masks, in accordance with state guidelines, or as required by OSHA 3990, must be worn at all times by every employee on the worksite.

4.12 Eye protection must be worn at all times by every employee while on worksite.

4.13 Gloves must be worn at all times by every employee while on worksite. The type of glove worn should be appropriate to the task. If gloves are not typically required for the task, then any type of glove is acceptable, including latex gloves.

4.14. If appropriate PPE cannot be provided, the worksite must be shut down.

SANITATION AND CLEANLINESS

4.15 Soap and running water shall be abundantly provided on all job sites for frequent handwashing. Workers should be encouraged to leave their workstations to wash their hands regularly, before and after going to the bathroom, before and after eating and after coughing, sneezing or blowing their nose.

4.16 When running water is not available, portable washing stations, with soap, are required. Alcohol-based hand sanitizers with greater than 60% ethanol or 70% isopropanol can also be used but are not a replacement for the water requirement.

4.17 Post, in areas visible to all workers, required hygienic practices, including not to touch face with unwashed hands or with gloves; washing hands often with soap and water for at least 20 seconds; use hand sanitizer with at least 60% alcohol; cleaning and disinfecting frequently touched objects and surfaces such as workstations, keyboards, telephones, handrails, machines, shared tools, elevator control buttons, and doorknobs; covering the

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mouth and nose when coughing or sneezing as well as other hygienic recommendations by the U.S. Centers for Disease Control (CDC).

4.18 Ensure cleaning supplies are frequently replenished.

4.19 Frequently clean and disinfect high-touch surfaces on job sites and in offices, such as shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets. If these areas cannot be cleaned and disinfected frequently, the jobsite shall be shut down until such measures can be achieved and maintained.

4.20 If an employee reports feeling sick and goes home, the area where that person worked should be immediately disinfected.

EMPLOYEE HEALTH / SYMPTOMS

4.21 Encourage workers to stay home or leave the worksite when feeling sick or when they have been in close contact with a confirmed positive case. If they develop symptoms of acute respiratory illness, they must seek medical attention and inform their employer.

4.22 Have employees inform their supervisors if they have a sick family member at home with COVID-19. If an employee has a family member sick with COVID-19, that employee must follow the isolation/quarantine requirements as established by the State Department of Health.

4.23 All workers must confirm at the beginning of their shift if they have a fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell. Instruct workers to report to their supervisor if they develop symptoms of COVID-19 (e.g., fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell). If symptoms develop during a shift, the worker should be immediately sent home. If symptoms develop while the worker is not working, the worker should not return to work until they have been evaluated by a healthcare provider.

4.24 Failure of employees to comply will result in employees being sent home during the emergency actions.

4.25 Employees who do not believe it is safe to work shall be allowed to remove themselves from the worksite and employers must follow the expanded family and medical leave requirements included in the Families First Coronavirus Response Act or allow the worker to use unemployment benefits, paid time off, or any other available form of paid leave available to the worker at the workers discretion.

4.27 If an employee is confirmed to have COVID-19 infection, employers should inform fellow employees of their possible exposure to COVID-19 in the workplace but maintain confidentiality as required by the Americans with Disabilities Act (ADA). The employer should instruct fellow employees about how to proceed based on the CDC Public Health Recommendations for Community-Related Exposure.

4.26 The COVID-19 Risk Mitigation Procedure must be reviewed annually or whenever circumstances have changed that may affect the current plan. If the plan must be amended, all affected employees must be consulted.

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JOB SITE VISITORS

4.28 A daily attendance log of all workers and visitors must be kept and retained for at least four weeks. The log must include the name, phone number, and email address of all workers and visitors

MSP-038 PANDEMIC RISK MITIGATION PROCEDURE

1.0 PURPOSE

1.1 All staff, technicians, contractors, sub-contractors, vendors and suppliers working in concert with or in proximity to Airde personnel must adhere to MSP-038 outlined herein. This procedure is not meant to circumvent or take precedent over local, state, and federal regulations or Center for Disease Control and Department of Health mitigation recommendations. In the possible event where this procedure and public safety policies and recommendations differ, the safest mitigation shall be followed. In the event where this procedure differs from rule of law, rule of law shall take precedent.

2.0 SCOPE

2.1 This procedure applies to all **AIRDE** employees and contractors who are required to follow **AIRDE**'s procedures. This procedure shall serve to identify mitigations required to protect workers from biological hazards and implement programs to address known hazards in the workplace. **AIRDE** will operate in a manner consistent with public health orders and issued guidance.

3.0 RESPONSIBILITY

3.1 All employees are responsible for reporting hazardous conditions and behaviors and taking corrective action as appropriate to mitigate the risk.

3.2 The Supervisor is responsible for reviewing this information at safety meetings and for communicating with all parties potentially exposed to risk under their direction.

4.0 PROCEDURE

PANDEMIC SUPERVISOR

4.1 A site-specific Pandemic Supervisor shall be designated by the contractor at every job site to monitor the health of employees and enforce the Pandemic Mitigation Procedure. A designated Pandemic Supervisor must be present at all times during work related activities.

PANDEMIC SAFETY TRAINING

4.2 A Safety Stand-Down/toolbox talk/tailgate training must be conducted on all job sites on the first day of returning to work, and at least daily thereafter, to explain the protective

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measures in place for all workers. Social distancing must be maintained at all gatherings.

4.3 Attendance will be communicated verbally and the trainer will sign in each attendee.

4.4 Pandemic Mitigation Procedure shall be visibly posted on each jobsite.

SOCIAL DISTANCING

4.5. Social distancing of at least 6 feet of separation must be maintained by every person on the worksite at all times when possible.

4.6 Gatherings of any size must be precluded by taking breaks and lunch in shifts. Any time two or more persons must meet, ensure minimum 6 feet of separation.

4.7 Identify “choke points” and “high-risk areas” on job sites where workers typically congregate and control them so social distancing is always maintained.

4.8 Minimize interactions when picking up or delivering equipment or materials, ensure minimum 6-foot separation.

4.9 To the extent practical allow only one trade/subcontractor at a time on a jobsite and maintain 6-foot separation social distancing for each member of that trade. If more than one trade/subcontractor must be on the job to complete the job, then at a minimum all trades and subcontractors must maintain social distancing policies in accordance with this guidance.

PPE-EMPLOYER PROVIDED

4.10 Employer provides personal protective equipment (PPE) such as gloves, goggles, face shields and face masks as appropriate, or required, for the activity being performed.

4.11. Masks, in accordance with state guidelines, or as required by OSHA 3990, must be worn at all times by every employee on the worksite.

4.12 Eye protection must be worn at all times by every employee while on worksite.

4.13 Gloves must be worn at all times by every employee while on worksite. The type of glove worn should be appropriate to the task. If gloves are not typically required for the task, then any type of glove is acceptable, including latex gloves.

4.14. If appropriate PPE cannot be provided, the worksite must be shut down.

SANITATION AND CLEANLINESS

4.15 Soap and running water shall be abundantly provided on all job sites for frequent handwashing. Workers should be encouraged to leave their workstations to wash their hands regularly, before and after going to the bathroom, before and after eating and after coughing, sneezing or blowing their nose.

4.16 When running water is not available, portable washing stations, with soap, are required. Alcohol-based hand sanitizers with greater than 60% ethanol or 70% isopropanol can also be used but are not a replacement for the water requirement.

4.17 Post, in areas visible to all workers, required hygienic practices, including not to touch face with unwashed hands or with gloves; washing hands often with soap and water for at least 20 seconds; use hand sanitizer with at least 60% alcohol; cleaning and disinfecting frequently touched objects and surfaces such as workstations, keyboards, telephones, handrails, machines, shared tools, elevator control buttons, and doorknobs; covering the

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mouth and nose when coughing or sneezing as well as other hygienic recommendations by the U.S. Centers for Disease Control (CDC).

4.18 Ensure cleaning supplies are frequently replenished.

4.19 Frequently clean and disinfect high-touch surfaces on job sites and in offices, such as shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets. If these areas cannot be cleaned and disinfected frequently, the jobsite shall be shut down until such measures can be achieved and maintained.

4.20 If an employee reports feeling sick and goes home, the area where that person worked should be immediately disinfected.

EMPLOYEE HEALTH / SYMPTOMS

4.21 Encourage workers to stay home or leave the worksite when feeling sick or when they have been in close contact with a confirmed positive case. If they develop symptoms of acute respiratory illness, they must seek medical attention and inform their employer.

4.22 Have employees inform their supervisors if they have a sick family member at home with pandemic symptoms. If an employee has a family member sick with the pandemic virus or pandemic symptoms, that employee must follow the isolation/quarantine requirements as established by the State Department of Health.

4.23 All workers must confirm at the beginning of their shift if they have a fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell. Instruct workers to report to their supervisor if they develop symptoms of the pandemic virus (e.g., fever, cough, shortness of breath, fatigue, muscle aches, new loss of taste or smell, or any other symptoms related to the pandemic). If symptoms develop during a shift, the worker should be immediately sent home. If symptoms develop while the worker is not working, the worker should not return to work until they have been evaluated by a healthcare provider.

4.24 Failure of employees to comply will result in employees being sent home during the emergency actions.

4.25 Employees who do not believe it is safe to work shall be allowed to remove themselves from the worksite.

4.26 If an employee is confirmed to have the pandemic infection, Airde will inform fellow employees of their possible exposure to the pandemic virus in the workplace but maintain confidentiality as required by the Americans with Disabilities Act (ADA). The employer will instruct fellow employees about how to proceed based on the CDC Public Health Recommendations for Community-Related Exposure.

4.27 All confirmed pandemic infections will be reported to any client contacted by said employee during their infectious period within 24 hours of Airde's notification.

4.27 The Pandemic Mitigation Procedure must be reviewed annually or whenever circumstances have changed that may affect the current plan. If the plan must be amended, all affected employees must be consulted.

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4.28 Following a pandemic event, the Pandemic Mitigation Procedure must be reviewed and revised to include measures that could be beneficial for employees during future pandemics.

CONTINUED OPERATIONS

4.29 A daily attendance log of all workers will be maintained. If more than 50% of any project team is confirmed infected, the entire team will be replaced by employees who have been confirmed negative until such time the original team reports negative virus results.

JOB SITE VISITORS

4.30 A daily attendance log of all workers and visitors must be kept and retained for at least four weeks. The log must include the name, phone number, and email address of all workers and visitors.

IMMUNIZATION

4.31 Airde encourages all employees to obtain immunizations when they are available and eligible for any pandemic virus

5.0 REFERENCES

<https://www.osha.gov/Publications/OSHA3990.pdf>

<https://www.cdc.gov/coronavirus/2019-ncov/php/public-health-recommendations.html>

MSP-039 FATIGUE MANAGEMENT PROCEDURE

1.0 PURPOSE

1.1 This procedure is to establish the requirements for managing fatigue. It is intended that this policy will reduce the risk of fatigue-related injuries and incidents in the workplace.

2.0 SCOPE

2.1 This policy applies to all staff—especially those whose work involves shift work, extended hours and on-call arrangements.

3.0 RESPONSIBILITY

3.1 The Field Supervisors are responsible for reviewing and enforcing the Safety Meetings procedure, and for monitoring its implementation. Field Supervisor(s) are responsible for

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ensuring that documentation required by this procedure is properly maintained. (If a Job Safety Supervisor is assigned to the project, he/she will be responsible for all documentation.)

4.0 DEFINITIONS

Employee Assistance: The Employee Assistance Program (EAP) provides confidential counselling and support to staff and their families on a range of issues, such as alcohol and drug related problems, emotional stress, and relationship difficulties. It should not be used for counselling relating to an injury that is the subject of a workers' compensation claim or as post-incident counselling following a traumatic incident in the workplace. Refer to the EAP policy for further details.

Extended hours: Hours that are an extension of the standard working week, as a result of overtime, on-call arrangements or secondary employment.

Fatigue: A mental or physical exhaustion that prevents a person from functioning normally. In the work environment this can mean that a person is also unable to function safely. It has many causes, but is usually related to inadequate restorative sleep.

Restorative sleep: The process by which the body overcomes fatigue. It involves cycles of deep sleep that allow a person to recuperate and wake up refreshed.

Shift work: Work performed outside the hours between 0600 and 1800 hours, Monday to Friday.

Sleep cycles: Sleep cycles are determined by the body's natural biological rhythms (also known as circadian rhythms or the 'body clock'), which are repeated every 24 hours. As well as regulating sleep cycles, biological rhythms also regulate body temperature, digestion and hormone levels.

5.0 PROCEDURE

5.1 Airde Mechanical Services, LLC is committed to providing and maintaining safe systems of work for all its workers, including those whose work involves shifts work, extended hours or on-call arrangements. Airde Mechanical Services' operations are sometimes undertaken outside ordinary working hours. Activities such as construction or building wraps often involve shift work, extended hours and on-call arrangements. These working arrangements may contribute to fatigue if not managed appropriately.

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5.2 Fatigue can be caused by both work and non-work related factors. Non-work factors include family responsibilities, social activities, health issues—such as sleep disorders— study commitments and sporting commitments. Work factors include shift work— especially night shift— and working extended hours.

5.3 While everyone doesn't respond to fatigue in the same way, fatigue can cause reduced concentration, impaired coordination, compromised judgement and slower reaction times, which ultimately increase the risk of incidents and injuries.

6.0 RESPONSIBILITIES

Managers and workers Airde Mechanical Services, LLC have a responsibility to ensure that fatigue does not impact the safety, health and well-being of themselves and others. Managers and supervisors are responsible for:

6.1 Applying risk management in consultation with staff and in accordance with the fatigue risk management system.

6.2 Ensuring systems of work that minimize the risk of fatigue—for example, reasonable rosters, reasonable overtime practices and adequate recuperation between shifts.

6.3 Providing opportunities for workers to obtain adequate rest from work.

6.4 Monitoring workloads, work patterns and rostering arrangements to ensure workers are not placed at risk from fatigue.

6.5 Managers must analyze work tasks to control fatigue recognizing that personal limits are not the same for everyone. Factors that promote alertness include; bright light, clean air, moderate temperature. When these items are unavailable, fatigue should be taken into consideration on task assignment.

6.6 Consulting with workers when introducing shift work or new rostering systems.

6.7 Providing information, instruction and training about risks to health, safety or welfare of workers involved with shift work, extended hours and on-call arrangements.

6.8 Ensuring workers performing shift work are properly supervised and that tasks are undertaken safely.

6.9 Referring workers with non-work fatigue related issues to the EAP. Workers are responsible for: Participating in risk management processes. Using time off from work to recuperate to be fit and able for the next shift. Participating in education and training to gain an understanding of fatigue. Avoiding behaviors and practices that contribute to fatigue and which could place themselves and others at risk—for example, secondary employment or not using time off work to recuperate.

6.10 Recognizing signs of fatigue that could place the health, safety and well-being of themselves or others at risk and reporting this to their manager or supervisor.

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6.9 Providing ergonomic friendly equipment when available for the task at hand.

MSP-040 SHORT SERVICE EMPLOYEE PROGRAM (SSE)

1.0 PURPOSE

The Short Service Employee (SSE) program applies to employees who have less than six months service with the company or craft. The purpose of the program is to ensure that these contractor employees have an initial orientation of safety requirements prior to performing work under direct on-site supervision of a designated contractor employee who also serves as a mentor/trainer. An SSE may only work under the direct on-site supervision of a designated Airde employee who, as one of his or her duties, serves as a mentor/trainer in safety for the SSE

2.0 SCOPE

2.1 The “Short Service Employee (SSE) Program ”Guideline outlines minimum requirements of contractor companies using employees with less than six months service with the contractor company or in their craft.

3.0 RESPONSIBILITY

3.1 The Field Supervisors are responsible for reviewing and enforcing the Safety Meetings procedure, and for monitoring its implementation. Field Supervisor(s) are responsible for ensuring that documentation required by this procedure is properly maintained. (If a Job Safety Supervisor is assigned to the project, he/she will be responsible for all documentation.) The Field Supervisors are responsible for notifying the host facility/client when a SSE is in service.

3.2 SSE Mentor shall be responsible for overseeing Orientation, Training and Observation of SSE during first six months of employment. Mentor will Coach and supervise work. The SSE’s safety will be of highest priority while learning the new job and unfamiliar tasks.

3.3 SSE shall Consult with and listen to Mentor, and will be responsible for performing work as directed, but always has the responsibility to speak up when and if work is deemed unsafe.

4.0 PROCEDURE

4.1 Short Service Employees (SSE’s) An initial employee orientation is required.

4.2 SSE’s shall be kept to a minimum on a work location.

4.3 SSE’s may only work under the direct on-site supervision of a designated contractor employee.

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4.4 The contractor person-in-charge must provide written notification of all SSE's working.

4.5 SSE's should be easily identifiable while on work locations by wearing a helmet sticker.

4.6 All sub-contractors must inform Airde Mechanical, LLC of any SSE's on site.

MSP-041 PROFESSIONAL CONDUCT POLICY

1.0 PURPOSE

1.1 The professional conduct policy outlines standards of personal and professional conduct that all employees must strive to uphold and always behave in an ethical and professional manner. This policy provides a basis for all employees to maintain a working environment that is productive, positive, enjoyable, safe, and free from harassment and discrimination.

2.0 SCOPE

2.1 This professional conduct policy provides clear guidelines and standards for the appropriate behavior expected of the company employees.

3.0 RESPONSIBILITY

3.1 General

3.1 It is the responsibility of all employees, regardless of contract type, or term of employment to adhere to this policy. Every employee is personally accountable and responsible for their own performance, behavior, and attendance in the workplace. Employees must carry out their responsibilities and act in accordance with the provisions.

4.0 PROCEDURE

4.1 Compliance with the Law

4.1. We are compliant with municipal, national, regional, etc., laws that are applicable to our business. The legal compliances of the Company must be done by all our employees and

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those operating on our behalf. All environmental, safety and fair, as well as ethical trade practices, must be followed.

Hefty monetary penalties, imprisonment, tarnishing of goodwill, damage to our business connections, etc. are some of the consequences of breaking the law.

4.2 Dress and Appearance

4.2 Only Airde branded clothing or unbranded clothing is permitted on Airde project sites. Hi-viz CAT2 shirt(s) and or vests will be provided when necessary and it is the responsibility of each individual to keep their appearance presentable and clean. Tattered and ripped clothing is not allowed on the jobsite or when representing Airde.

All staff and technicians must have a clean, well groomed, hygienic and professional appearance. Steel toe safety boots are required on all AIRDE projects unless otherwise advised, and they are the responsibility of the employee. When FR (NFPA 2112) clothing is required AIRDE will provide branded (NFPA 2112) coveralls. These coveralls are the property of AIRDE. It is the employee's responsibility to maintain a clean and presentable uniform. If the work scopes include painting, coating, or working with other materials that will contaminate the uniform a protective outer layered clothing (eg. Tyvek coveralls) will be provided and must be used when possible.

4.3 Sexual Harassment

4.3 The Policy Statement

AIRDE is committed to providing a safe environment for all its employees free from discrimination on any ground and from harassment at work including sexual harassment. AIRDE will operate a zero tolerance policy for any form of sexual harassment in the workplace, treat all incidents seriously and promptly, investigate all allegations of sexual harassment. Any person found to have sexually harassed another will face disciplinary action, up to and including dismissal from employment.

All complaints of sexual harassment will be taken seriously and treated with respect and in confidence. No one will be victimized for making such a complaint.

Definition of sexual harassment

Sexual harassment is unwelcome conduct of a sexual nature which makes a person feel offended, humiliated and/or intimidated. It includes situations where a person is asked to engage in sexual activity as a condition of that person's employment, as well as situations which create an environment which is hostile, intimidating or humiliating for the recipient. Sexual harassment can involve one or more incidents and actions constituting harassment may be physical, verbal and non-verbal. Examples of conduct or behavior which constitute sexual harassment include, but are not limited to:

Physical conduct

- Unwelcome physical contact including patting, pinching, stroking, kissing, hugging, fondling, or inappropriate touching
- Physical violence, including sexual assault.
- Physical contact, e.g. touching, pinching.
- The use of job-related threats or rewards to solicit sexual favors.

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Verbal conduct

- Comments on a worker's appearance, age, private life, etc.
- Sexual comments, stories, and jokes
- Sexual advances
- Repeated and unwanted social invitations for dates or physical intimacy
- Insults based on the sex of the worker.
- Condescending or paternalistic remarks
- Sending sexually explicit messages (by phone or by email)

Non-verbal conduct

- Display of sexually explicit or suggestive material
- Sexually suggestive gestures
- Whistling
- Leering

Anyone can be a victim of sexual harassment, regardless of their sex and of the sex of the harasser. AIRDE recognizes that sexual harassment may also occur between people of the same sex. What matters is that the sexual conduct is unwanted and unwelcome by the person against whom the conduct is directed.

AIRDE recognizes that sexual harassment is a manifestation of power relationships and often occurs within unequal relationships in the workplace, for example between manager or supervisor and employee. Anyone, including employees of [company name], clients, customers, casual workers, contractors, or visitors who sexually harasses another will be reprimanded in accordance with this internal policy.

All sexual harassment is prohibited whether it takes place within AIRDE premises or outside, including at social events, business trips, training sessions or conferences sponsored by AIRDE.

Complaints procedures

Anyone who is subject to sexual harassment should, if possible, inform the alleged harasser that the conduct is unwanted and unwelcome. AIRDE recognizes that sexual harassment may occur in unequal relationships (i.e. between a supervisor and his/her employee) and that it may not be possible for the victim to inform the alleged harasser. If a victim cannot directly approach an alleged harasser, he/she can approach one of the designated staff members responsible for receiving complaints of sexual harassment. The CEO and COO are designated staff members to receive any complaints.

When a designated person receives a complaint of sexual harassment, he/she will:

- ☐ immediately record the dates, times and facts of the incident(s)
- ☐ ascertain the views of the victim as to what outcome he/she wants.
- ☐ ensure that the victim understands the company's procedures for dealing with the complaint.
- ☐ discuss and agree the next steps: either informal or formal complaint, on the understanding that choosing to resolve the matter informally does not preclude the victim from pursuing a formal complaint if he/she is not satisfied with the outcome.

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- ☐ keep a confidential record of all discussions.
- ☐ respect the choice of the victim.
- ☐ ensure that the victim knows that they can lodge the complaint outside of the company through the relevant country/legal framework

Informal complaints mechanism

If the victim wishes to deal with the matter informally, the designated person will:

- ☐ give an opportunity to the alleged harasser to respond to the complaint.
- ☐ ensure that the alleged harasser understands the complaints mechanism.
- ☐ facilitate discussion between both parties to achieve an informal resolution which is acceptable to the complainant, or refer the matter to a designated mediator within the company to resolve the matter.
- ☐ ensure that a confidential record is kept of what happens.
- ☐ follow up after the outcome of the complaints mechanism to ensure that the behavior has stopped.
- ☐ ensure that the above is done speedily and within [5] days of the complaint being made.

Formal complaints mechanism

If the victim wants to make a formal complaint or if the informal complaint mechanism has not led to a satisfactory outcome for the victim, the formal complaint mechanism should be used to resolve the matter.

The designated person who initially received the complaint will refer the matter to a senior human resources manager to instigate a formal investigation. The senior human resources manager may deal with the matter him/herself or refer the matter to an internal or external investigator.

The person carrying out the investigation will:

- ☐ interview the victim and the alleged harasser separately.
- ☐ interview other relevant third parties separately.
- ☐ decide whether the incident(s) of sexual harassment took place.
- ☐ produce a report detailing the investigations, findings, and any recommendations.
- ☐ if the harassment took place, decide what the appropriate remedy for the victim is, in consultation with the victim (i.e.- an apology, a change to working arrangements, a promotion, training for the harasser, discipline, suspension, dismissal)
- ☐ follow up to ensure that the recommendations are implemented, that the behavior has stopped and that the victim is satisfied with the outcome.
- ☐ if it cannot determine that the harassment took place, he/she may still make recommendations to ensure proper functioning of the workplace.
- ☐ keep a record of all actions taken.
- ☐ ensure that all records concerning the matter are kept confidential.
- ☐ ensure that the process is done as quickly as possible and in any event within [10] days of the complaint being made

Sanctions and disciplinary measures

Anyone who has been found to have sexually harassed another person under the terms of this policy is liable to any of the following sanctions:

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- ☐ verbal or written warning
- ☐ adverse performance evaluation
- ☐ reduction in wages
- ☐ transfer
- ☐ demotion
- ☐ suspension
- ☐ dismissal

The nature of the sanctions will depend on the gravity and extent of the harassment. Suitable deterrent sanctions will be applied to ensure that incidents of sexual harassment are not treated as trivial. Certain serious cases, including physical violence, will result in the immediate dismissal of the harasser.

Monitoring and evaluation

AIRDE recognizes the importance of monitoring this sexual harassment policy and will ensure that it anonymously collects statistics and data as to how it is used and whether it is effective. Supervisors, managers and those responsible for dealing with sexual harassment cases will report on compliance with this policy, including the number of incidents, how they were dealt with, and any recommendations made. This will be done on a yearly basis. As a result of this report, the company will evaluate the effectiveness of this policy and make any changes needed.

4.4 Conflict of Interest

4.4 Employees and contractors of AIRDE are expected to commit themselves to ethical and professional conduct. This includes the proper use of authority and appropriate decorum.

Employees must represent unconflicted loyalty to the interest of AIRDE. This accountability supersedes any conflicting loyalty such as that to advocacy or interest groups, business interests, personal interests, or paid or volunteer service to other organizations. It also supersedes the personal interest of any staff, contractor or volunteer acting as a consumer or client of AIRDE's services.

It is the policy of the AIRDE that no employee shall derive any personal profit or gain, directly or indirectly, by reason of his or her employment other than that which is stipulated in the employment terms.

There may be no self-dealing or any conduct of private business or personal services between any employee or contractor and AIRDE except those conducted in an open and objective manner to ensure equal competitive opportunity and equal access to information.

Employees must recognize the inability of any individual staff member to speak for AIRDE except as expressly authorized by the CEO. All employees must hold strictly confidential all information of a private nature, all information related to company businesses, transactions, policies, procedures, clients, client contacts, project and job details and all personnel matters.

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4.5 Client Interaction

4.5 AIRDE employees and contractors have occasion to interact with clients, other contractors, vendors and customers throughout the execution of their duties. These interactions must be conducted in a professional manner. All communications, electronic (sms, email), verbal (phone or in person) and written must be within the authority of the employee. If an employee is uncertain about their authority to engage in an interaction(s) they should consult with their Project Manager or Executive Management, in advance. Electronic communications by any means other than an AIRDE email account or cell phone are assumed to be work product and the property of AIRDE. Any email communications with clients, contractors, vendors, customers or their staff that were initiated from work product on an account other than an AIRDE email account must be copied or otherwise shared with the AIRDE Project Manager or Executive Management.

Upon the conclusion of the project, the conclusion of the employees term on the project, at the request of the Project Manager or the Executive Management, or the termination of the employee / contractor, the employee / contractor agrees that no further interaction with the client is permitted, and any communications received from the client will immediately be forwarded to AIRDE Executive Management.