1. PURPOSE

This procedure establishes the minimum safety equipment and practices necessary for battery charging, handling and storage.

2. DEFINITIONS

3. SCOPE

This procedure applies to all BASF (MIDGA) employees, contractors, and their subcontractors, who are engaged in work activities involving batteries at BASF Midga sites.

4. PROCEDURE

This Procedure is divided into 7 sub categories:

A. Battery Charging Rooms
B. Battery Storage Rooms
C. Battery Banks for Back Up Power Supply
D. Battery Work and Maintenance Practices
E. Jump Starting Vehicles
F. Charging Batteries in Vehicles
G. First Aid

A. Battery Charging Rooms: The following precautions shall be taken in all battery charging rooms.
   1. Proper signage shall be displayed outside of rooms to include: No Smoking or open flame signs, Batteries under charge signs.
   2. Battery charging rooms shall be adequately lighted.
   3. A fire extinguisher of the ABC type shall be located in close proximity to the charging room.
   4. Rubber mats shall be available for insulation purposes if needed.
5. Personal Protective Equipment shall be available and worn when working directly with batteries, to include: Neoprene Acid Gloves, acid proof goggles, face shield, acid proof apron or suit, and rubber boots if fluids are added to battery.

6. A clean water source shall be available for addition to batteries if needed.

7. All battery electrolytes shall be stored in non-metallic bottles.

8. Tools for working on batteries shall be of the non-metallic type or wrapped with electrical tape to prevent arcing and sparks.

9. Bicarbonate of Soda shall be available for neutralizing any acid spills.

10. An approved battery lifting device shall be available for handling the batteries. Some of these come attached to the battery.

11. An eyewash station shall be immediately available for the flushing of the eyes in case of an emergency. A piped in water source is desirable. If piped water is not available, a container (portable eye wash station) capable of supplying a minimum of 5 gallons of water shall be available.

12. A storage cabinet shall be available for the storage of all battery additives to include battery electrolyte and for the storage of bicarbonate of soda for use on all acid spills.

13. All battery charging rooms shall be adequately ventilated. When batteries are being charged, a fan for forced ventilation is required and shall be operated during the charging process to prevent the build up of hydrogen gases.

14. The fan for forced air ventilation shall have a dedicated switch for emergency turn off if needed.

15. The floor shall be of acid proof design, or, acid spills shall be neutralized and cleaned up immediately.

B. Battery Storage Rooms (No Charging): The following precautions shall be taken in all battery storage rooms. These rooms are for battery storage only and no charging will be allowed in these rooms.

In battery storage rooms only, all of the items listed in section A above are required with the EXCEPTION of the following:

1. Rubber boots are not required to be stored in these areas. However, if for some reason, electrolyte or water is added to a battery in a battery storage area, rubber boots shall be obtained and used during the addition process, along with all other required PPE as listed in Section A above.

2. Clean water source for battery addition. If for some reason, clean water is required to be added to a battery in a battery storage area, a source of water will be obtained and brought to the area.
3. No non-metallic bottles for liquid storage are required.
4. No storage of non-metallic tools is required for battery storage rooms only.
5. Battery electrolyte shall not be stored in the area, so no storage cabinet is needed for storage. A supply of bicarbonate of soda is required to neutralize any acid spill that may result from the handling of batteries out of storage.
6. An exhaust fan is not required. However, the storage room should be adequately ventilated with open areas around the top of the room or adequate vents to prevent the build up of hydrogen gases.

C. Battery Banks for Auxiliary Power Source: The following precautions shall be taken in those areas where we have a bank of batteries installed in some form of series/parallel configuration to provide power back up in case of power failure.

In battery bank areas, all of the items listed in section A above are required with the EXCEPTION of the following:

1. Rubber boots are not required to be stored in these areas. If there is a need to add battery electrolyte or water to a battery in one of these areas, rubber boots shall be obtained and worn during the addition process, along with all other required PPE as listed in Section A above.
2. A clean water source for battery addition. If a clean water source is needed for battery addition, the source shall be brought to the area and added to the battery.
3. No non-metallic bottles for liquid storage are required.
4. No storage of non-metallic tools is required. If work is required in one of the battery bank areas, the proper tools shall be selected and brought to the area for the work required.
5. If battery electrolyte is to be added to a battery in one of the battery bank areas, the electrolyte shall be brought to the battery bank area, so no storage cabinet is needed for the storage of battery electrolyte. A supply of bicarbonate of soda is required to neutralize any acid spill that may result from the handling of a battery in a battery bank area.
6. An exhaust fan may or may not be required depending on the number of batteries and the amount of hydrogen gas that may be generated during the slow battery charging process of the battery banks. Adequate ventilation may be provided by proper venting and open air design. If in doubt about the proper ventilation of a battery bank system, contact Ecology Health and Safety.

D. Battery Work and Maintenance Practices: The following work practices shall be followed when working with batteries.
1. When performing work or maintenance directly on batteries, always work with a partner.

2. When performing maintenance or working directly on batteries, always wear the proper PPE to include: acid proof goggles, face shield, acid proof gloves, acid proof apron or suit. In addition, if electrolyte or water is to be added to batteries, rubber boots shall be worn.

3. Cover batteries with suitable insulating material (rubber mats or some similar material) when working over or close to batteries with tools or metallic objects.

4. Prior to working around a battery installation where sparks or flames may be created, the battery or batteries must be removed from the area if at all possible according to the Hot Work Procedure. Also, follow any other Safety Procedures that may apply. If the battery or batteries cannot be removed prior to close proximity hot work, notify Ecology Health and Safety.

5. When charging batteries, keep the vent caps in place to prevent acid spray. Neutralize any acid spill with bicarbonate of soda.

6. Battery racks for holding a series of batteries must be of substantial construction to support the weight of the batteries.

7. Do not disconnect or work on batteries that are "on charge." Batteries must be removed from charge for a minimum of 20 minutes prior to being placed into service (Exception, See F. 7). Also, Hydrometer and voltage readings are permitted with the proper Personal Protective Clothing (acid proof goggles, face shield, acid proof gloves, acid proof apron or suit).

8. Verify the location of nearest safety shower/eyewash station prior to handling or performing maintenance on any battery.

9. Prior to working on or maintaining any battery, make sure that the work space surrounding the battery is properly ventilated.

10. Do not take metal tools or objects around batteries unless batteries have been covered with some type of insulating material. Be extremely careful with wrenches when making connections directly to batteries. Wrenches should be of the non-sparking type or wrapped with electrical tape to prevent arcing. Maintain tight connections at terminal connections to prevent arcing and over heating. Do not rest tools or loose cables near battery terminals.

11. Wash to drain or neutralize any spilled acid from batteries with bicarbonate of soda.

12. Dispose of any rags or paper towels used for working with batteries immediately after use.

13. Seek assistance from the Ecology Health and Safety on any disposal of batteries.
14. Note: Battery systems connected in series-parallel configurations in order to provide power sources can present a serious shock hazard and should be handled with caution. Also, make sure that the proper terminals are connected in order to prevent short circuiting of such systems.

15. Personnel should remove watches and any other jewelry that could pose a hazard when working with batteries.

E. Jump Starting Vehicles: Note: Do not try to jump start a battery that is frozen or one that shows obvious signs of physical damage. Also, if a piped in eye wash facility is not readily available, a portable eye wash facility capable of supplying 5 gallons of water minimum must be available.

1. Conventional Jumper Cables shall be used on BASF/Contractor mobile equipment only. See Section 4.E.2 for starting personal vehicles.
   a. Put on PPE (acid proof goggles, face shield, acid proof gloves, acid proof apron or suit). Extinguish all cigarettes and flames.
   b. Make sure that the vehicles do not touch and that the engine is off in the good vehicle.
   c. Add battery water to the weak battery if necessary.
   d. Do not jump start unless both batteries are negatively grounded and have the same voltage potential.
   e. Clamp one cable to the positive pole of the dead battery and the other end of the same cable to the positive pole of good battery.
   f. Clamp the second cable to the negative pole of the good battery and the other end of the same cable to the dead vehicle’s frame on the opposite side of the battery.
   g. Start the vehicle with the good battery first, then start the disabled vehicle.
   h. After starting, remove the cable from the negative poles first, and then from the positive poles.

2. Battery Packs – Maybe used where applicable on BASF/Contractor equipment and Personal vehicles.

   Note: Follow Manufacturer’s directions on Battery Pack for battery boosting. Battery packs for personal vehicles can be checked out and returned to Security or designated shift supervisor location. Most Manufacturer’s directions include the following:
   a. Wear appropriate PPE: acid proof goggles, face shield, and acid proof gloves. Extinguish all cigarettes and flames.
b. Hook battery pack terminals to appropriate terminals on battery to be boosted.

c. Select proper voltage on battery pack for battery system being boosted.

d. Turn on battery pack switch.

e. Start disabled vehicle.

f. Turn off battery pack switch.

g. Remove battery pack terminals from disabled battery.

h. Store battery pack in appropriate storage area.

3. Jumper Cables - Mid Cable Connection - Minerals Group/Others

   Note: These are jumper cables that are attached to each battery, both good and disabled. The final connection between the cables is then made by joining the cables at the middle connection midway between the cables.

   a. Wear appropriate PPE: acid proof goggles, face shield, acid proof gloves, acid proof apron or suit.

   b. Hook each section of the jumper cable to the disabled battery and to the good battery. Make sure that the connections are properly made, positive to positive and negative to negative on each battery.

   c. Make the final connection of the jumper cables by joining the cable sections at the mid connection.

   d. Start the disabled vehicle.

   e. Disconnect the jumper cables at the mid cable connection.

   f. Disconnect the jumper cables from both the disabled battery and the good battery.

   g. Store the jumper cables in an appropriate storage area.

4. External Connections on Vehicles for the Purpose of Jumping off the Vehicle.

   In those situations where the vehicle is equipped with an external connection for the purpose of jumping off the vehicle, and where there is no direct exposure to the terminals of the battery on the vehicle, the PPE requirement will be the standard of safety glasses, hard hat, safety toed shoes and dry leather work gloves. As in all jump start situations, correct polarity of the connections is essential.
NOTE: IT IS RECOMMENDED THAT ALL DEPARTMENTS THAT DO ANY JUMP STARTING OF VEHICLES PURCHASE AND USE EITHER THE BATTERY PACKS OR THE MID-CABLE CONNECTION TYPE OF JUMPER CABLES, RATHER THAN THE CONVENTIONAL TYPE OF JUMPER CABLES.

F. Charging Batteries in Vehicles

Note: If possible, charging of batteries should be done outside of the vehicle in an approved battery charging room or facility. If it becomes necessary to charge a battery in a vehicle, the following procedure should be followed:

1. Wear the appropriate PPE prior to hooking up charger: acid proof goggles, face shield, acid proof gloves, acid proof apron or suit.
2. Portable signage should be placed in immediate area stating that charging is taking place.
3. Hook the terminals of the charger to the appropriate terminals of the battery.
4. Plug charger into a power source.
5. Turn charger on to begin charging of disabled battery.
6. After charging, turn charger off and disconnect charger from battery and from power source.
7. Close hood on vehicle that was disabled or close battery cover on battery that was disabled and start the vehicle that was disabled.
8. Store charger in appropriate storage area.

G. First Aid

If any battery fluid comes into contact with the eyes, flush the eyes immediately with water for at least 15 minutes. After flushing, personnel are to report to the Medical Department (Company Nurse) for evaluation. After regular hours, contact the Supervisor who will arrange for transportation to the nearest medical facility for evaluation.

Wash off any battery fluids from the skin with a large amount of water. If large areas of the body are affected, immediately use the closest available safety shower. Remove any affected clothing as soon as possible, taking care not to spread the battery fluids to other parts of the body. Employees should report to the Medical Department (Company Nurse) after thoroughly washing the area with water. After hours, contact the Supervisor who will evaluate the situation for further medical treatment, if needed.

H. Training
Only qualified personnel trained in this procedure are allowed to work with batteries and on battery systems. Personnel using Battery Packs for personal vehicles shall follow PPE and Manufacturer’s operating instructions provided in the kit. Visitors shall be assisted by a qualified BASF employee.

5. RESPONSIBILITIES

Site Maintenance Manager:

The Site Maintenance Manager is responsible for providing maintenance personnel with the proper equipment for the safe handling of batteries according to this procedure.

Employees:

Employees are responsible for inspecting and determining that equipment and tools are in good working order and condition before each use, using and following the safety precautions as outlined in this procedure, and making sure that all personal protective equipment is used during the performance of this procedure.

Ecology Health and Safety Department:

The Ecology Health and Safety Department is responsible for the periodic review and revision of this procedure.

Site Supervision:

The site supervisors are responsible for ensuring that all employees performing work associated with this procedure are properly trained, and providing the personal protective equipment and tools necessary to perform this procedure in a safe manner which shall include maintaining proper charging and maintenance of Battery Pack kits.

6. RELATED DOCUMENTS

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