STANDARD OPERATING PROCEDURE

SAFETY Everyone. Everywhere. Every day

BATTERY STORAGE AND CHARGING

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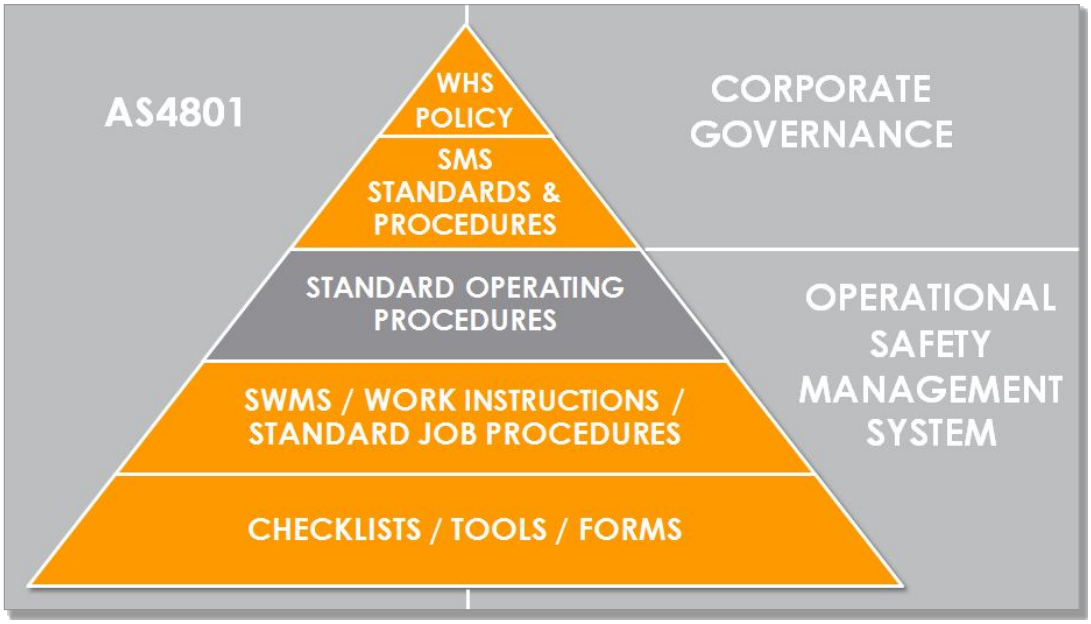
TABLE OF CONTENTS

1. SMS DOCUMENT HIERARCHY 2
2. PURPOSE 2
3. SCOPE 2
4. DEFINITIONS AND ACRONYMS 2
5. ROLES AND RESPONSIBILITIES 3
   - 5.1 QUU EXECUTIVE 3
   - 5.2 MANAGERS 3
   - 5.3 SUPERVISORS/PICOW 3
   - 5.4 WORKERS 3
   - 5.5 CONTRACTORS 4
6. RELATED DOCUMENTS 4
7. PROCEDURE 4
   - 7.1 OVERVIEW 4
   - 7.2 GENERAL SAFETY PRECAUTIONS 5
   - 7.2.1 FIRE AND EXPLOSION 5
   - 7.2.2 SPILLS MANAGEMENT 5
   - 7.2.3 MANUAL HANDLING 5
   - 7.2.4 PERSONAL PROTECTIVE EQUIPMENT (PPE) 5
   - 7.2.5 FIRST AID 6
   - 7.3 BATTERY INSPECTION AND MAINTENANCE 6
   - 7.4 BATTERY STORAGE 6
   - 7.5 BATTERY CHARGING 6
   - 7.6 DISPOSAL OF SEALED BATTERIES / BATTERY-RELATED WASTE 7
   - 7.7 TRAINING, COMPETENCY AND SUPERVISION 7
8. REFERENCES 7
9. REVIEW 7
10. FURTHER INFORMATION 7
11. APPENDIX A – EXAMPLES OF SIGNAGE TO BE USED AT CHARGING STATIONS 8

1. SMS DOCUMENT HIERARCHY



2. PURPOSE

This Standard Operating Procedure (SOP) documents Queensland Urban Utilities (QUU) approach to the management of batteries at QUU-controlled workplaces.

The overall purpose of this procedure is to ensure that risks associated with battery storage, charging and use are adequately managed in order to minimise the risk of injury or harm to workers. This procedure provides practical guidance on how to manage these health and safety risks.

3. SCOPE

This SOP only applies to battery storage, charging and related activities associated with plant and equipment use. It does not apply to the recharging of mobile phones or small office appliances.

This procedure applies to all QUU staff, including contractors and other persons on QUU-controlled worksites where lead-acid battery storage, charging and related activities occur.

4. DEFINITIONS AND ACRONYMS

Hydrogen – Hydrogen gas is formed during lead-acid battery charging. Hydrogen is very flammable and easily ignited.

Lead-Acid Batteries – Batteries that contain lead which are used to provide high voltage current for use in vehicles and plant. Batteries generate explosive hydrogen gas, even during normal operation, but additional hazards during charging raise the risk to workshop personnel and other personnel.

Manager – As per QUU naming conventions, the Manager who has direct responsibility for the activity being performed or the area the activity is occurring in.

Sulphuric Acid – Sulphuric acid is present in battery fluid. It is a corrosive chemical that causes damage to metals, containers etc., and presents a skin irritant and health risk to workers if not handled correctly.

Supervisor – Term used for any QUU employee who acts or is appointed as a Supervisor, Coordinator or Team Leader within QUU.

SMS – Acronym used for QUU's Safety Management System.

WHS – Acronym used for Work Health and Safety.

Worker – Employees, contractors, subcontractors, outworkers, apprentices and trainees, work experience students, volunteers and PCBUs who are individuals if they perform work for the business.

5. ROLES AND RESPONSIBILITIES

Outlined below are responsibilities specific to battery storage, charging and use at all QUU workplaces and controlled sites.

5.1 QUU EXECUTIVE

QUU Executive and Senior Management (CEO, ELT, General Managers – Officer and Non-Officer Appointed) are responsible for overseeing and ensuring the implementation of the requirements of this SOP and related procedures within their respective functional areas. This includes ensuring all sites are suitably risk assessed and have appropriate facilities, services and resources to ensure that risks associated with lead-acid battery storage, charging and use are adequately managed to minimise the risk of injury or harm to workers.

5.2 MANAGERS

Managers in all operational areas and QUU worksites are responsible for ensuring the review and management of risks associated with lead-acid battery storage, charging and use. This includes:

- Provision of appropriate resources so that design and operation requirements for lead-acid battery charging and storage areas are appropriate;
- Provision of appropriate resources to deliver training to workers who handling and charge lead-acid batteries in:
    - Related chemical hazards;
    - The risks associated with recharging (i.e. fire and explosion);
    - Manual handling risks associated with removing, installing and handling large lead-acid batteries; and
    - Personal Protective Equipment (PPE) requirements (refer to **(PRO424) PPE Standard Operating Procedure)**.

5.3 SUPERVISORS/PICOW

Supervisors and Team Leaders in all operational areas and QUU worksites are responsible for ensuring that risks associated with lead-acid batteries are managed including:

- Completing a risk assessment in relation to lead-acid battery storage, charging and use;
- Operating and maintaining storage areas for rechargeable lead-acid batteries as per QUU guidelines and manufacturer's specifications;
- Providing areas suitable for rechargeable lead-acid batteries;
- Keeping lead-acid battery charging and storage areas free of ignition sources;
- Mandating that workers who handle lead-acid batteries (e.g. changing lead-acid batteries, charging lead-acid batteries etc.) do not wear metallic jewellery and accoutrements; and
- Ensuring workers who handle lead-acid batteries or undertake lead-acid battery charging activities are appropriately trained and use required PPE; and
- Informing all workers and contractors of requirements of this SOP and ensuring their compliance with this SOP.

5.4 WORKERS

All workers shall ensure that they:

- Follow the guidelines of this Battery Storage and Charging SOP and related procedures and comply with manufacturers' recommended procedures for charging and handling rechargeable lead-acid batteries;
- Workers wear appropriate PPE; and
- Report any incidents to their supervisor and:
    - Follow the injury management procedure; and

- Complete a QUU WHS Incident Report Form in accordance with QUU WHS Incident Reporting Procedures.

5.5 CONTRACTORS

At all times when performing work on a QUU site or for/on behalf of QUU, contractors must comply with QUU's battery management requirements detailed in this and related procedures and must report any incidents to the relevant QUU Manager and to their employing / contracting agency in accordance with QUU WHS Incident Reporting Procedures.

6. RELATED DOCUMENTS

- WHS Hazard and Risk Management Procedure (PRO363)
- PRO360 Training and Competence
- (PRO364) Incident Reporting, Investigation and Escalation
- (PRO377) Hazardous Chemicals Standard Operating Procedure
- (MP71) Electrical Management Safety Plan
- (PRO384) First Aid Standard Operating Procedure
- (PRO416) Manual Tasks Standard Operating Procedure
- (PRO379) Lock Out Tag Out Standard Operating Procedure
- (PRO424) PPE Standard Operating Procedure

7. PROCEDURE

7.1 OVERVIEW

QUU will take action to manage their facilities, plant, work environment and tasks as to eliminate the risks associated with battery use and charging, and if that is not possible, QUU will minimise the risks so far as is reasonably practicable.

The charging of lead-acid batteries can be hazardous. However, this hazard may be overlooked by workers seeing as battery use is a common activity in many workplaces. The two primary risks are from a) the hydrogen gas that is formed when the battery is being charged; and b) the sulphuric acid contained in the battery fluid. To manage the risks associated with the storage, charging and use of lead-acid batteries at their worksites, QUU will:

- Identify and assess the risk for all locations and tasks that could cause injury or damage due to battery use;
- Supply and maintain suitable plant and equipment for workers to reduce the likelihood of a battery-related incident;
- Provide training to workers in the safe use of equipment and plant relevant to their tasks;
- Educate workers in the risks and controls required for managing batteries; and
- Develop and test emergency response, rescue and first aid plans.

Battery storage, charging and use will vary at each QUU workplace or controlled site. QUU will determine battery-related requirements (i.e. equipment, facilities and personnel) through a risk management approach. This will involve:

- Identifying hazards that could result in work-related injury, illness or damage;
- Assessing the type, severity and likelihood of injuries and illnesses;
- Providing appropriate equipment, facilities, first aid and training; and
- Reviewing battery storage, charging and use requirements on a regular basis or as circumstances change.

Refer to the WHS **Hazard and Risk Management Procedure (PRO363)** for further guidance on QUU's risk management process that must be applied.

7.2 GENERAL SAFETY PRECAUTIONS

7.2.1 FIRE AND EXPLOSION

- Hot works are not permitted in areas where lead-acid batteries are stored, handled or recharged, unless appropriate controls have been implemented through a risk assessment process;
- Lead-acid battery charging and storage areas must be designated and separated from work areas;
- All lead-acid battery charging and storage areas must be bundled, undercover and well-ventilated;
- Ignition sources must be removed from lead-acid charging areas;
- All lead-acid battery training must be conducted by a suitably trade qualified worker; and
- Warning signage must be displayed at charging areas (refer to Appendix A for further details).

7.2.2 SPILLS MANAGEMENT

In the event of a spill:

- Shower or wash exposed areas of skin as appropriate to size of spill and exposure;
- Stop leak if safe to do so;
- Contain the spill using spill kit materials. Do not allow to enter drains/waterways or natural environment;
- Clean up using soda ash/spill material when containment completed or remove contaminated soils as directed by the Environmental Team;
- Store waste in approved container;
- Complete an incident report and investigate causes; and
- Dispose of waste material in accordance with QUU's **Contaminated/Industrial Waste Procedure (PRO420)**.

Hazardous chemical management is outlined in **(PRO377) Hazardous Chemicals Standard Operating Procedure)**.

7.2.3 MANUAL HANDLING

- Lead-acid batteries must not be carried manually where more than one battery lift is required or where battery is large and/or awkward in size (refer to **(PRO416) Manual Tasks Standard Operating Procedure)**;
- Appropriate mechanical handling aides (e.g. cradles, trolleys etc.) must be used and secured for the transportation of lead-acid batteries;
- All lead acid batteries must be stored at heights below 1.2 metres; and
- Battery electrolyte acid must be transported in or decanted from approved containers only.

7.2.4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- PPE **(PRO424) PPE Standard Operating Procedure)** must be worn when handling, using or charging lead-acid batteries or the electrolyte (acid).
- As minimum, workers charging lead-acid batteries should wear:
    - Overalls;
    - Acid resistant aprons;
    - Acid resistant gloves;
    - Acid resistant face shield; and
    - Suitable respiratory equipment if required (i.e. if adequate ventilation is not available).

7.2.5 FIRST AID

All designated lead-acid battery storage and charging facilities must provide:

- Access to emergency wash facilities to allow rapid and continuous flushing with water;
- Emergency showers must have green fluorescent lighting;
- Access to saline eye wash for minor splashes to the eyes; and
- First aid kits, stocked with appropriate electrolyte acid exposure countermeasures (e.g. neutralising agent); and
- Access to first aid in the event of acid burn to the skin in accordance with **(PRO384) First Aid Standard Operating Procedure**.

7.3 BATTERY INSPECTION AND MAINTENANCE

All batteries must be inspected for serviceability (e.g. acid leads, sweating, bulging and corrosion).

Lead-acid batteries used for emergency power supply must be subject to regular inspection and maintenance as directed by the **Electrical Management Safety Plan (MP71)** and scheduled in Ellipse.

7.4 BATTERY STORAGE

Lead-acid batteries must be stored:

- In a bunded, cool, well-ventilated area;
- Away from ignition sources (e.g. welding, smoking, etc.);
- Used lead acid batteries are to be stored in well ventilated cupboard area; and
- New lead acid batteries are to be stored on wooden shelving or on other non-corrosive material.

Lead-acid batteries storage areas must:

- Be designated and indicated by appropriate signage; and
- Have appropriate emergency response equipment such as fire extinguisher, eye wash facilities and spill kits located nearby.

Lead-acid battery terminals are to be insulated to prevent the risk of contact by metal tools/objects.

7.5 BATTERY CHARGING

To minimise the risk of danger and injury, the following precautions are to be applied when charging lead-acid batteries:

- Manufacturer's instructions on battery handling and charging must be followed;
- Relevant Safety Data Sheets (SDS) must be located within charging area;
- All electrical sources must be disconnected from the battery prior to any work;
- Battery must be removed from vehicle or plant for charging (where appropriate);
- Charging must be conducted in designated area;
- Charger must be located as far from battery as cabling will permit;
- Fluid level in each cell must be checked prior to charging;
- Oversharing batteries must be avoided;
- Charging area must be well-ventilated;
- Contact with battery acid must be avoided;
- Required/correct PPE must be worn;
- Appropriate emergency response equipment (such as fire extinguisher, eye wash facilities and Spill Kits) must be located nearby;
- Spill Kits and/or soda ash must be available for spills; and

- If battery acid contacts with the skin, affected area must be washed immediately.

7.6 DISPOSAL OF SEALED BATTERIES / BATTERY-RELATED WASTE

Lead-acid battery material is hazardous waste and must not be disposed of in normal waste systems.

QUU work areas that store, use or recharge batteries that are not considered to be general waste material must collect the material (battery components, cells and electrolyte liquids) in approved containers for disposal.

All waste batteries and related battery waste material must only be disposed of in approved waste receptacles through QUU approved hazardous/ industrial waste contractors.

7.7 TRAINING, COMPETENCY AND SUPERVISION

QUU will provide instruction to workers on:

- Chemical hazards associated with batteries;
- Battery SDSs;
- Emergency procedures related to batteries; and
- Manufacturer's requirements for charging and changing batteries.

8. REFERENCES

The following references contain information used in the preparation and development of this SOP:

- Queensland Work Health and Safety Act 2011
- Queensland Work Health and Safety Regulations 2011

9. REVIEW

The Battery Storage and Charging SOP is to be reviewed every 2 years, or earlier if:

- There is an identified risk to business;
- A significant safety or serious injury event occurs;
- Incident investigation or audit results show that application of the standard fails to deliver the required outcomes;
- There are changes in associated legislation; or
- There is evidence that the standard is not having a positive impact on safety-related KPIs.

10. FURTHER INFORMATION

For further information, contact your Health and Safety Representative or the QUU Safety Team.

11. APPENDIX A – EXAMPLES OF SIGNAGE TO BE USED AT CHARGING STATIONS

TYPE OF SIGN	EXAMPLE OF SIGN
Caution Sign	
Danger Sign	
Danger Sign	
Safety Checklist