



FORM 3 – Chemical Incident Plan

Team Name:	Sungroper Solar Car Association
Name of Safety Officer:	Craig Richmond
Address of Safety Officer:	****
Phone No. of Safety Officer:	041 186 9925, (08) 9358 0598
Type of battery technology utilised:	Sealed Lead Acid
Number of cells/modules on-board solar vehicle:	10 x 12V modules
Number of cells/modules carried on support vehicles as spares:	10 x 12V modules
Describe storage and transport conditions:	

The batteries used as part of the race battery set will be stored in 4 sealed boxes that mount into the car. Under normal circumstances these boxes will not be opened. The boxes are sealed but probably not air tight. If tipped to a specific orientation they should be watertight for most of their capacity.

The spare batteries will be stored as individual batteries. They are sufficiently safe that they can be sent through normal Postal services. They will be stowed in the rear of a vehicle with a covering over the terminals to prevent accidental shorting.

State your intentions for handling or disposing of damaged or unwanted electrochemical materials

Both support vehicles will carry a bucket, a spade safety goggles and at least one pair of sturdy rubber gloves. Primary support vehicle will carry a small supply of soda ash or lime to neutralise any affected material.

Any damaged modules will be placed into a bucket. Any contaminated materials will also be placed in the bucket with some soda ash or lime. The bucket will be covered, carefully stowed in a trailer and disposed of at the first available place that can safely accept a damaged car battery. We presume a road house will have a mechanism for dealing with this and if this is not the case we will dispose of the battery at the appropriate facility in Adelaide after the race.

DUTIES OF TEAM SAFETY OFFICER

1. To travel in support vehicle at all times.
2. To ensure hardcopies of all MSDS are readily available to local emergency authorities.
3. To identify hazards and control procedures associated with battery pack:
 - 3.1 Document first aid procedures and emergency responses.
 - 3.2 Document safe handling, storage and transport conditions.

- 3.3 Document procedures for dealing with spill or leakage containment – safe transport to authorised disposal company.
- 3.4 Document procedures for dealing with overcharge conditions, e.g., gassing.
- 3.5 Document procedures for dealing with overheating conditions, e.g., emergency fire-fighting procedures. Note: fire extinguishers must be specific to the battery technology used in the vehicle.
4. To develop and document an Emergency Action Plan for support team and driver in the form of a flow diagram.
5. To ensure all members of the team (especially drivers) are trained to execute the Emergency Action Plan.
6. To ensure storage containers carry appropriate warning labels.

COMPULSORY DOCUMENTATION

1. Material Safety Data Sheets (MSDS) must be carried in support vehicle – see Attachment 1.
2. All MSDS and other documentation (see above) must be in English and, for non-English speaking teams, also in the native language of the team.
3. A copy of this form and all other documentation must be carried in the support vehicle.

The MSDS, this form and all other documentation should be lodged by no later than 31 August 2001.

Please send to:

Name:	Mr. Warren Baldsing,
Address:	CSIRO Energy Technology, Box 312, Clayton South, Vic. 3169, Australia
Tel:	+61 3 95458405
Fax:	+61 3 95458403

ATTACHMENT 1.

Hazardous Substances – Material Safety Data Sheets (MSDS) - can be downloaded from <http://www.nt.gov.au/dib/wha/pdf/080103msds.pdf>

Team Managers Declaration

I have read and understood the contents of the this form, and the duties of my Safety Officer

Signed..... date *26 Aug 2001*

Battery Hazard Register

Manual Handling

Each Module weighs approximately 10kg. When these modules are combined for the battery packs they become quite heavy. Placing the battery packs into the vehicle will require reaching. Always use two people to load battery packs. Use extreme care lifting battery packs.

Chemical Danger

Sealed Lead Acid batteries contain acid. Should the battery be damaged avoid bodily contact with all materials from the inside of the battery. Use gloves and safety goggles when you handle damaged modules.

Electrical Danger

Lead Acid batteries can deliver a large amount of current. Avoid shorting the terminals on the batteries. They are capable of melting metal objects placed across the terminals.

The car electric contains fuses but they will not prevent you from suffering serious injury should you touch two live wires. Individual batteries do not represent a high electrocution risk. The car contains voltages of up to 150V which is potentially fatal. Avoid bodily contact with any surface you believe to be live.

Explosion Danger

Lead Acid batteries give off small amounts of hydrogen when charging. Because of the small space in which the hydrogen could accumulate, any incident of this type is unlikely and will likely be minor. Avoid placing ignition sources near the battery packs when the batteries have been charging.

First Aid Procedures

Whoever applies first aid and comes into physical contact with an affected area of clothing or skin should wear all appropriate Personal Protective Equipment.

Should someone come into contact with Acid from the battery module, flush the affected area with a lot of water. This will dilute the acid and help wash any residue off the affected area. The affected area of skin may be burnt and if so should be kept cool for the first 24 hours. Seek proper medical attention as soon as possible for further advice.

Safe Handling Procedures

Avoid lifting battery packs without assistance.
Do not short battery terminals.
Leave battery terminals covered when stored to prevent accidental shorting of terminals.

Spill/Leakage Containment

Do not handle any contaminated materials without appropriate Personal Protective Equipment (PPE). Wear safety goggles, gloves and shoes at all times when handling contaminated materials.

Contain the damaged module to prevent further contamination. Both support vehicles should have a bucket, and PPE for this task. Spread soda ash or lime on the affected area. There will be soda ash or lime in the Primary Support Vehicle (rear vehicle). Try to collect any contaminated material for removal and disposal. Cover and seal the bucket if appropriate. Place the bucket securely in a trailer away from passengers. The damaged module is to be taken to a facility that can recycle car batteries.

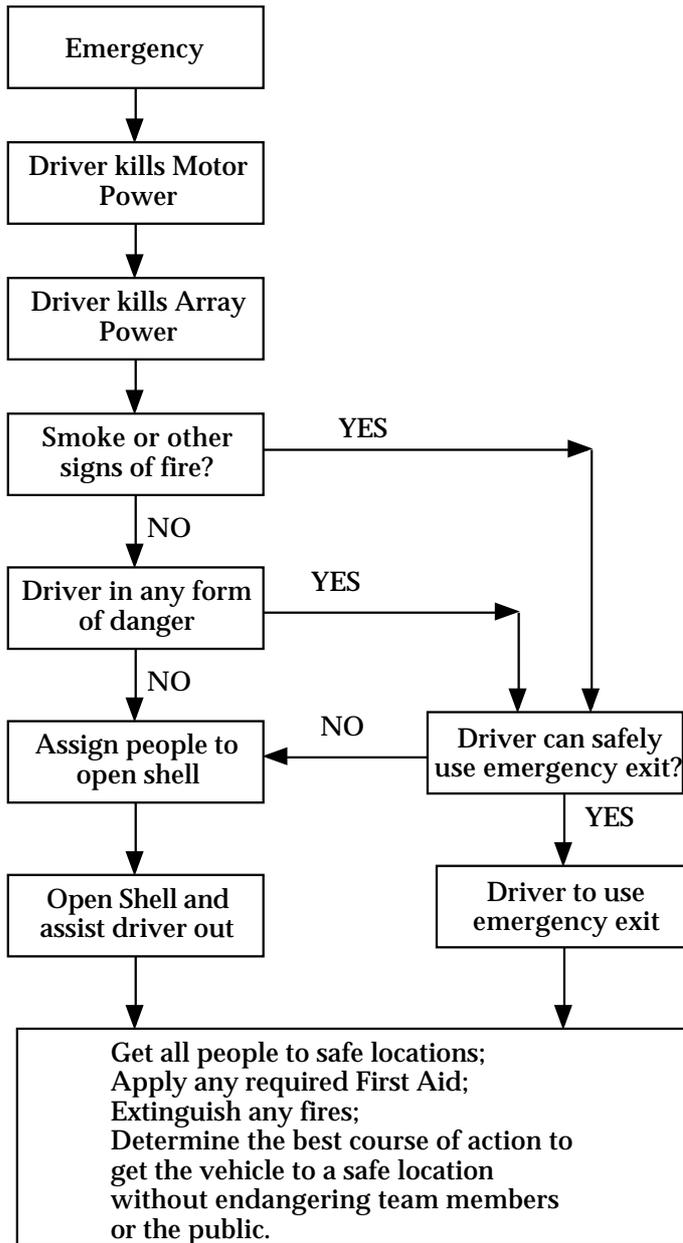
Overcharge Conditions

If the battery is overcharged it will give off small amounts of hydrogen gas. The space inside the battery box is very limited and could not contain enough hydrogen to cause a serious explosion. Should hydrogen leak into the body of the car there is the potential for a large amount to be stored up. We do not believe the car shell is sealed well enough for this to represent a risk. If there is a suspicion that the batteries have been overcharged and significant quantities of hydrogen may be present, the solar array is to be removed and turned on it's side to allow any hydrogen to escape into the atmosphere.

Fire Fighting

Lead Acid battery fires can be fought using Carbon Dioxide, Dry Powder and Water based fire extinguishers. There will be a fire extinguisher in both support vehicles.

Emergency Action Plan



based on information from <http://www.batteryweb.com/odysseymds.cfm>

Odyssey Sealed Lead Acid Battery Materials Safety Data Sheet (MSDS)

INFORMATION ONLY - Please read Section X

SECTION I - Product and Manufacturer Identity

Revision Date: June 1998 (original web page) August 2001 (this document)

Product Identity:

Sealed Lead Battery
Odyssey or Trolling Thunder

Manufacturer's Name and Address: Hawker Energy Products Inc.
617 North Ridgeview Drive
Warrensburg, MO 64093-9301

Supplier's Name and Address: Invensys Energy Systems Pty Ltd
119-127 Wicks Road
North Ryde, Sydney NSW 2113

Emergency Telephone Number: Hawker USA (660) 429-2165
Invensys 1300 303 059 (National Service Ctr)

SECTION II - Ingredients

Hazardous Components	CAS #	OSHA PEL-TWA	% (By weight)
Lead	7439-92-1	50 μ g/m ³	45 - 60 %
Lead Dioxide	1309-60-0	50 g/m ³	15 - 25 %
Sulfuric Acid Electrolyte	7664-93-9	1.0 mg/m ³	15 - 20 %
Non-Hazardous Materials	N/A	N/A	5 - 10 %

SECTION III - Physical/Chemical Characteristics

Boiling Point - N/A
Specific Gravity (H₂O=1) - NA
Vapor Pressure (mm Hg.) - N/A
Melting Point - N/A
Solubility in Water - N/A
Appearance & Color - N/A

SECTION IV - Fire & Explosion Hazard Data

Flash Point (Method Used): N/A
Flammable Limits: N/A
LEL: N/A
UEL: N/A

Extinguishing Media: Multipurpose Dry chemical, CO₂ or water spray.

Special Fire Fighting Procedures: Cool Battery exterior to prevent rupture. Acid mists and vapors in a fire are toxic and corrosive.

Unusual Fire and Explosion Hazards: Hydrogen gas may be produced and may explode if ignited. Remove all sources of ignition.

SECTION V- Reactivity Data

Conditions to Avoid: Avoid shorting. Avoid over-charging. Use only approved charging methods. Do not charge in gas tight containers.

SECTION VI - Health Hazard Data

Routes of Entry: N/A

Health Hazards (Acute & Chronic): N/A

Emergency & First Aid Procedures:

Battery contains acid electrolyte which is absorbed in the separator material. If battery case is punctured, completely flush any released material from skin or eyes with water.

SECTION VII - Precautions for Safe Handling & Use

Steps to be taken in case material is released or spilled:

Avoid contact with acid materials. Use soda ash or lime to neutralize. Flush with water.

Waste Disposal Method:

Dispose of in accordance with Federal, State, & Local Regulations. Do not incinerate. Batteries should be shipped to a reclamation facility for recovery of the metal and plastic components as the proper method of waste management. Contact distributor for appropriate product return procedures.

SECTION VIII - Control Measures - Not Applicable

SECTION IX - Transportation

Hawker Energy Products Inc. batteries are starved electrolyte batteries which means the electrolyte is absorbed in the separator material. The batteries are also sealed. As of September 30, 1995, Hawker Energy Products Inc. batteries were classified as "nonspillable batteries", and as such are not subject to the full requirements of 49 CFR § 173.159. The previous exempt classification, "Dry Batteries, Not Restricted" was discontinued effective September 30, 1995. "Nonspillable" batteries are excepted from the regulation's comprehensive packaging requirements if the following conditions are satisfied: (1) The battery is protected against short circuits and is securely packaged. (2) For batteries manufactured after September 30, 1995, the battery and outer packaging must be plainly and durably marked "NONSPILLABLE" or "NONSPILLABLE BATTERY" and (3) The battery is capable of withstanding vibration and pressure differential tests specified in 49 CFR § 173.159(d).

Hawker Energy Products Inc. batteries have been tested by WYLE Scientific Services & Systems Laboratories Group and determined to be in compliance with the vibration and pressure differential tests contained in 49 CFR § 173.159(d), and therefore as of September 30, 1995, excepted from the DOT requirements set forth in 49 CFR § 173.159, other than paragraph (d).

Battery shipments from Hawker Energy Products Inc. Warrensburg location, will be properly labeled in accordance with applicable DOT regulations.

Packaging changes performed at other locations may require additional labeling, since in addition to the battery itself containing the required marking, the outer packaging of the battery must also contain the required marking: "NONSPILLABLE" OR "NONSPILLABLE BATTERY". Because the batteries are classified as "Nonspillable" and meet the three conditions above, [from § 173.159(d)] they do not have an assigned UN number nor do they require additional DOT hazard labeling.

The regulation change effective September, 1995, was to clarify and distinguish to shippers and transporters, all batteries that have been tested and determined to be in compliance with the DOT Hazardous Material Regulations, the International Civil Aeronautics Organization (ICAO), and the International Air Transport Association (IATA) Packing Instruction 806 and Special Provision A67, and therefore excepted from all other requirements of the regulations and classified as a "nonspillable battery".

SECTION X - Additional Information

The Hawker sealed lead acid battery is determined to be an "article" according to the OSHA Hazard Communication Standard and is thereby excluded from any requirements of the standard. The Material Safety Data Sheet is therefore supplied for informational purposes only.

The information and recommendations contained herein have been compiled from sources believed to be reliable and represent current opinion on the subject. No warranty, guarantee, or representation is made by Hawker Energy Products Inc., as to the absolute correctness or sufficiency of any representation contained herein and Hawker Energy Products Inc. assumes no responsibility in connection therewith, nor can it be assumed that all acceptable safety measures are contained herein, or that additional measures may not be required under particular or exceptional conditions or circumstances.

N/A or Not Applicable - Not applicable for finished product used in normal conditions.