ABU DHABI OIL REFINING COMPANY (TAKREER)

RUWAIS REFINERY EXPANSION (RRE) PROJECT

PROJECT NO. 5578 / AGREEMENT NO. 09-5578-E-4

EPC PACKAGE - 4 : TANKAGE AND ASSOCIATED INTERCONNECTING PIPING

DOCUMENT / DRAWING COMMENTS SHEET

COMMENTS TO BE RETURNED TO:
COMPANY/PMC

FAX NO.:

BY DATE:

FAX NO.:

BY DATE:

Contractor Transmittal No.	**T-DH-5578-E4-1587**	**Recd. Date**	**29 Oct 2010**
Document No.	**5578-E4-HSE-HU-00025**	**Rev. Date**	**27 Oct 2010**
Document Title	**Battery Charging and Changing Procedure**	**Rev**	**0**

COMMENTS:

By: **Signed** **Date**

Review Code:

1. REJECTED : REVISE AND SUBMIT ☐
2. COMMENTS AS NOTED : WORK MAY PROCEED SUBJECT TO COMPLIANCE WITH AND INCORPORATION OF COMMENTS ☐
3. NO COMMENTS : WORK MAY PROCEED ☐
4. INFORMATION ONLY. : ACCEPTED FOR INFORMATION ONLY ☐

No. of Pages attached to this form :

BATTERY CHARGING AND CHANGING PROCEDURE

AGREEMENT NO.	**:**	**09-5578-E-4**
PROJECT NAME	**:**	**Ruwais Refinery Expansion Project EPC-4: Tankage & Associated Interconnecting Piping**
COMPANY	**:**	**Abu Dhabi Oil Refining Company (TAKREER)**
PMC	**:**	**Mott MacDonald Ltd.**
CONTRACTOR	**:**	**Daewoo Engineering & Construction Co., Ltd.**

This page is a record of all revisions of this document. All previous issues are hereby superseded and are to be destroyed.

DOC. CLASS: T/1

DIST. CODE: 18/19

REV	DATE	REASON FOR ISSUE	PREP	CHKD	REVD	APP'D	COMPANY
0	27 Oct 2010	Issued For Construction	D Bhandari	A Mesquita	DY Kim	M Heo	
A	16 August 10	For Review and Comment	C Wardman	DY Kim	J Brand	M Heo	
SIGNED (Initials)							

NOTES:

(a) Revisions are denoted by a vertical line placed in the right-hand margin against the revised text.

(b) PREP = Prepared by, CHKD = Checked by, REVD = Reviewed by, APP'D = Approved by.

(c) In case of conflict between any requirements stipulated in this document with the contractual requirements, the contractual requirements shall prevail.

REVISION INDEX DETAILS

Rev	Location of Change	Brief Description of Change

CONTENTS

1. INTRODUCTION

1.1 Purpose

The purpose of this procedure is to define the Ruwais Refinery Expansion Project safety requirements for handling and charging batteries.

1.2 Scope

This procedure applies to all project personnel when handling or charging batteries.

1.3 Objectives

The main objective of the Battery Charging and Changing Procedure is to list safe working instruction when dealing with batteries on the Ruwais Refinery Expansion Project. This applies to when batteries are being charged and being changed.

2. DEFINITIONS

Company	Abu Dhabi Oil Refining Company (TAKREER)
Contractor	Daewoo Engineering and Construction Company Ltd.
MSDS	Material Safety Data Sheet
PMC	Mott Macdonald
Terminal	Electrical contacts used to connect a load and/or charger to a single cell or multiple-cell battery

3. RESPONSIBILITIES

3.1 Project Manager

- Has the final responsibility to ensuring that the work related to charging and changing on the project is done as per mentioned herein this HSE management system document.
- Reviews and approves procurement requisitions: carries out checks and inspections to ensure that delivered goods are of good quality in respect of health and safety.
- Ensure that accidents related to charging and changing the batteries are reported, investigated and that corrective and preventive measures are taken.

3.2 HSE Manager

- Shall coordinate with the section managers to ensure that suitable arrangements, including subcontractors, are in place to conduct the work with charging and changing batteries safely.
- Shall assign HSE personnel for performing internal audits, advising employees on subjects concerning health and safety.

3.3 Section Manager

- Ensure that work on the project site is carried out without endangering health and safety in accordance with the HSE plan and procedures.
- Give his staff members job-related information and instructions on the subject of health and safety and repeats such information and instructions as needed.
- Conducts audits checks on plant and equipment prior to commencement of work.
- Ensures that all employees receive PPEs and sees to it that they use them where necessary and maintain them correctly.
- Makes inventory of potential hazards, takes corrective and preventive actions, and ensures that records are available if requested for audit.
- Is authorized, if he is of the opinion that there is a threat of immediate and serious danger, to stop any activity under his authority from being carried out and/or stop the use of plant and equipment, etc. until effective measures have been taken.

3.4 Supervisor

- To ensure that all personnel are; adequately trained for the relevant task; that they are using the correct equipment and personal protective equipment; that all relevant hazards have been identified; and that the respective permit to work formalities have been correctly addressed, where required.
- Must conduct a tool box talk meeting with his crews about the concrete work, related hazards and control measures to prevent any kind of injury and the instruction laid down in the MSDS before starting the job.
- Has responsibilities of providing the required PPEs to his crew for the job as mentioned herein this procedure.
- Housekeeping is done at the end of the battery charging work and the waste to be disposed off as per project waste disposal procedure and manufacturer instructions. (See MSDS) Has responsible for ensuring the charging and changing of batteries is performed in a safe and proper manner and that the machine is left in a safe condition

3.5 Employee

All Personnel carrying out the tasks covered by this procedure are responsible for operating the relevant equipment and performing the activities in a safe and proper manner and in accordance with this procedure. They shall also ensure that they are fully aware of all the hazards involved in the specific job and carry out all the appropriate safety precautions and should follow all the instruction mentioned in the MSDS of each chemical being used.

4. REQUIREMENTS FOR CHARGING & CHANGING BATTERIES

- Only designated competent persons shall change or charge batteries.
- Battery charging and changing shall be performed only in areas designated upon the advice of the CONTRACTOR HSE Manager.
- The battery charging room should be well ventilated during the charging process in order to expel out the hazardous fumes of lead oxide which generates due to chemical reaction of acid and lead terminals of battery, from the room to avoid the risk of lead poisoning.
- Smoking and other ignition sources are prohibited in charging areas.
- Personnel must use all personnel protective equipments as per the MSDS of the chemical i.e. “Fire Resistant” apron, rubber gloves and a full face visor, with safety glasses when charging batteries.
- Adequate numbers of Fire extinguishers must be kept in the location where the battery charging is being carried out.
- Hot work is not to take place in the same area where battery charging is being carried out.
- Filler caps shall be in place when batteries are charged and changed.
- Parking brakes shall be applied before batteries are charged or changed.
- When a jumper battery is connected to a battery in a vehicle, the ground lead shall connect to the ground away from the vehicle's battery. Ignition, lights and accessories on the vehicle shall be turned off before the connections are made.
- Batteries shall be free of corrosion build-up and cap vent holes shall be open.
- Adequate ventilation shall be provided during charging.
- Facilities for flushing the eyes, body and work area with water shall be provided wherever electrolyte is handled. Carboy tilters or siphons shall be used to handle electrolyte in large containers.
- Battery handling equipment which could contact battery terminals or cell connectors shall be insulated or otherwise protected.
- Metallic objects shall not be placed on uncovered batteries.
- When batteries are being charged, the vent caps shall be in place.

- Chargers shall be turned off when leads are being connected or disconnected.
- Installed batteries shall be secured to avoid physical or electrical contact with compartment walls or components.
- All personnel engaged in charging the batteries shall wash their hand and exposed parts of body properly with soap and water after completion of this activity.
- MSDS shall be available in the battery charging shop.
- The waste of battery, acid is classified as hazardous waste and shall be disposed of as per the client, CONTRACTOR waste management procedure and manufacturers' instructions.
- Spill trays need to be provided in the battery charging room
- If any person has accidentally come into contact with chemicals used for battery charging, he/she shall immediately go to the cleaning station and wash the affected body parts with plenty of water, remove the clothing which is saturated with the chemical and immediately after this, seek medical assistance.
- As a minimum, a supervisor and one or two crews should be authorized first-aiders to attend any emergency.
- Changing or shifting the batteries involves many manual handling tasks. Personnel to attend the safe manual handling training before they deployed for the job to avoid the risk of back injuries

5. HAZARDS

- **Chemical**: Batteries contain sulphuric acid, which is poisonous, corrosive and causes burns/irritation on contact with the skin or eyes.
- **Electrical**: Short circuits can cause extensive arcing, burning and melting of metal objects and explosion of any charging gases. Electric shocks can also be received both from the batteries and from the charging equipment.
- **Explosion**: Hydrogen gas is given off by the battery during charging. There is a risk of fire and/or explosion if flammable mixtures of hydrogen with air accumulate.
- **Handling**: Batteries can be heavy. Mishandling may cause personal injury or damage to the battery or other equipment.

6. SAFE WORKING PRACTICES

6.1 Chemical

- Provision/awareness of eyewash or drench facilities etc.
- Protective clothing (face mask or goggles, apron, gloves)·
- Spillage handling equipment & procedures·
- Advice re: - washing off spillage from clothes/ skin

6.2 Electrical

- Switch charger off before the battery is connected to it, or disconnected from it
  Use insulated tools
- No tools or other conductive objects to be placed on top of the battery
- Remove any metallic items from hands, wrists, neck (e.g. rings, chains etc.), which may cause accidental short circuits.
- Always disconnect the earthed terminal first (often the negative terminal, but not always. SO CHECK) and reconnect it last.
- Ensure knowledge of actions in the event of electric shock.

6.3 Explosion

- Provide good ventilation located at a high level immediately above the batteries·
- Designate the charging area 'No Smoking' and 'No Naked Lights'·
- Make sure the battery is topped up to the correct level·
- Ensure all connections are secure before switching on·
- Electrical equipment/sources of ignition to be well away from the charger and below the level of the battery.

6.4 Handling

- Keep batteries upright and properly secured during charging·
- Use the lifting holes provided on the battery container·
- Wear protective clothing and footwear

7. SAFETY EQUIPMENT

Operators to be issued with, or have ready access to, the following:

- Goggles
- Rubber or plastic gloves
- Overalls
- Rubber or plastic aprons
- Safety footwear
- Eyewash bottle/station
- Fresh water supply
- First aid facilities

8. OTHER PRECAUTIONS

- Maintenance records – Ensure that an accurate account of all battery related maintenance activities is recorded in a register or by suitable means.
- Training of operators – Once Operators are trained, it must be recorded and filed.

9. SAFETY SIGNS

Warning Danger - Electric Shock
Danger - Acid

Prohibition No Smoking
No Naked Flame

Mandatory Eye/Hand/Food Protection
Protective Clothing

Information Use of Personal Protective Equipment
Electrical Incident - What to do

10. DISPOSAL

This should be done through an authorized dealer. Batteries should be correctly labelled and stored upright and secure in a safe area.