ETO Year 2 UPS Assignment 942.642

Levi	Done?	Lewis	Done?	Nick	Done?	Toby	Done?	Combined
2	✔	4		3	✔	5	✔	1,5
6	✔	8		7		9	✔	
10	✔	12		11		13	✔	
14	✔	16		15		17	✔	

1. A list of the known faults including a list of three other faults found during your investigation of the UPS

	Description
Fault 1	Capacitor as part of the DC circuit of the UPS has ruptured and gone open-circuit, causing the resultant waveform to have noticeable dips on scope
Fault 2	
Fault 3	
Fault 4	Changeover switch not correctly operating upon loss of power supply, as a transistor has catastrophically failed within the unit
Fault 5	

2. Make and model (of your choice) for the existing UPS including PDF manuals.

Eaton 9140 — Brochure

9kVA — 2006

On-line double conversion with PFC

Did not meet class requirements

3. Make and model (of your choice) for a new UPS including PDF manuals explaining why you have chosen this UPS.

Eaton 9155 Marine — Brochure

9kVA — 2015

On-line double conversion with PFC

Meets DNV/BV

Digital I/O for integration with AMS

Temperature Compensation for VRLA Batteries

4. Time to remove the existing UPS and to install the new UPS.

5. Additional electrical components required to install the new UPS.

The old UPS uses a manual bypass accessible on the main interface screen however the new UPS only offers a bypass which is automatic on overload or on UPS failure. This means a bypass switch will need to be installed externally for maintenance and bypass in an emergency situation. The cabling needed to install the UPS will not need to be changed as both devices have a hardwired connection and both operate on the same nominal voltage. Communication cabling for extra information about the status of the UPS will not need to be changed as both units use a RS232 cabling. Both units use 9Ah 12V maintenance free lead acid batteries however it is unclear if the batteries are the same dimensions so new batteries along with spares should be stocked when the new UPS is purchased.

6. Cost for the new UPS.

Unit	$4,236.93
S+H	$131.99
Tax	$741.47
Total	$5,110.39

7. Alarms required.

8. Electrical Design: present an electrical drawing

9. Personnel resource required.

As indicated within the manual some parts of the old and new UPS, such as the battery banks can be quite heavy and 2 personnel will be needed to install the unit however a third person should be present to overlook the replacement of the unit.

10. Fabrication/installation resource required.

Due to the different dimensions of the new UPS systems, the following fabrication and installation is required:

1. Removal of the old UPS system -- this will require a pellet jack to lift the 300 KG.
2. Fabrication of a bracket to house the new UPS and keep it fixed against the wall.
3. Installation of the new unit, this will also require a pellet jack for the 350 KG.
4. Modifications to the alarm management system for the new Digital I/O on the UPS unit.
5. A cable run of the new alarm management system Digital I/O -- Approx. 70 metres to ECR.

We estimate this work will take 2 days plus one day for commissioning and trials and require the vessel to be laid up during this time

11. Provision for pollution control for old batteries.

12. Procurement resource required.

13. Commissioning resource required.

The new UPS offers a full system test on start up so commissioning the UPS should be automatic however testing of the bypass switch should be carried out prior to being in service. Start on battery is also available with the new UPS and operation on battery supply should also be tested.

14. Health and Safety resource required detailing permits.

Pre-Planning
- Submission of changes to class registry

Stage 1 -- Fabrication and Preparation
- Hot Work Permit -- Welding of steel structure to house new UPS
- Disabling of Fire Suppression System

Stage 1 PPE Required
- Welding equipment (visor, overalls, apron, steelcaps, bandana, respirator, hearing protection, gloves, sleeves)

Stage 2 -- Removal of Old UPS System
- General Electical Work (Under 1000 Volts)
- Working with Lift Machinery (Pellet Jack)
- Handling of Dangerous Chemical Substances (VRLA Batteries)
- Modification of Power Supplies

Stage 2 PPE Required
- Chemical PPE (Visors, nitrile gloves, overalls, hydrogen gas detector)

Stage 3 -- Installation of New UPS System
- General Electical Work (Under 1000 Volts)
- Working with Lift Machinery (Pellet Jack)
- Handling of Dangerous Chemical Substances (VRLA Batteries)
- Modification of Power Supplies

Stage 3 PPE Required
- Chemical PPE (Visors, nitrile gloves, overalls, hydrogen gas detector)

15. Vendor resource required.

16. Highlight any other items you may require by the office or personnel on-board.

17. Testing and commissioning conclusions.

The UPS is required to operate for 30 minutes and the test should be for this amount of time or longer to ensure correct operation in an emergency scenario. The new UPS has audible alarms and 4 LEDs to indicate in alarm state, this should be observed during testing to ensure correct operation. A multimeter can be used to observe correct input/output voltages and currents.