



OMAN ELECTRICITY SECTOR PROTECTION ASSESSMENT

Muscat, February 2017- Following a large number of power system incidents that resulted in interruptions to supplies to customer, the Authority decided to audit the power system protection capabilities of sector companies. The Authority commissioned Vector Power Solutions Ltd. (VPS) to conduct the assessment. This audit was undertaken against the Appropriate Person criteria, i.e. to determine whether the companies had the technical resources available to undertake the power system protection duties required under their licences. The initial audit in 2013 found that none of the companies met the requirements of an appropriate person for power system protection.

As a result of that work, specific and targeted recommendations were made to enhance the capability of the companies and their contractors. This process has been successful for those companies that engaged fully with the process. The Authority conducted follow-up audits in 2015 and 2016 to monitor the progress that has been made. The Authority has published a summary report for the 2016 follow-up audit in an anonymized form which shows that significant progress and improvements have been delivered by the sector, with targeted programmes for staff competency development and the adoption of best practices. However, the report also shows that in some cases there remains room for further improvement and three companies have not yet reached the required technical standard.

Eng. Ibrahim Al Harthi, Director of Technical Directorate said, “The release of the assessment report ensures the continued transparency of the electricity sector and showcases the level of progress that has been achieved in power system protection in Oman to prevent supply interruptions that aren’t necessary. It intends to provide electricity customers and sector company employees with a comprehensive overview of the work that is being done to improve Power System Protection capability. Competency programs

established by this work has significantly increased the number of professionally accredited Omanis in power system protection”

The assessment report contains a high-level summary of improvements made by all sector companies after implementing the Authority’s recommendations. The public can view the report on AER’s website: <http://www.aer-oman.org>

Assessment Report**Title: Oman Electricity Sector Protection Assessment 2016****Assessment of Protection Capability Performance Improvements
Delivered against Initial Report Recommendations****Date: 18 December 2016****Revision: 1****Summary:**

In 2013 the Authority of Electricity Regulation (AER) had commissioned Vector Power Solutions Ltd. (VPS) to assess the extent to which licensed activities related to power system protection were being performed in each of the licensed Sector Companies. Reports were issued for each of the companies, which detailed the VPS assessment of performance against the appropriate person license requirement.

During March 2015 AER requested VPS to conduct further assessments of progress made in the implementation of the 2013 report recommendations. These were made by initially reviewing evidence provided by the companies in response to an AER request and through follow up meetings.

During September 2016 AER requested VPS to conduct further assessments of progress made in the implementation of the 2013 & 2015 report recommendations. Again, the assessments were made by initially reviewing evidence provided by the companies in response to an AER request and through follow up meetings with each sector company.

This report contains a high-level summary of the improvements made by all sector companies.

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Oman Electricity Sector Protection Assessment – Re-Audit Report

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1. INTRODUCTION

In 2013 the Authority for Electricity Regulation (AER) requested Vector Power Solutions Ltd (VPS) to assess the extent to which licensed activities relating to power system protection were being performed in each of the sector companies.

The initial assessments were carried out during August 2013 and were based on an assessment of company responses to a survey questionnaire and follow up visits to each of the sector companies.

Following the visits a report was produced for each of the companies detailing the VPS assessment of performance against the appropriate person license requirement.

Each report set out the VPS audit methodology, the results of assessment and a comprehensive set of conclusions and recommendations designed to deliver performance improvements.

During March 2015, AER requested VPS to conduct further assessments of progress made in the implementation of the initial report recommendations.

These assessments were made by reviewing evidence provided by the companies in response to an AER request and then by follow up meetings with each company.

During September 2016 AER requested VPS to conduct further assessments of progress made in the implementation of the 2013 and 2015 report recommendations. Again, the assessments were made by conducting an initial review of evidence provided by each of the companies in response to an AER request and through follow up meetings with each sector company.

This report provides a high-level summary of the improvements made by all sector companies.

2. SCOPE

The scope of the VPS/AER 2016 follow-up audit was to assess the progress that each licensee had made in implementing the recommendations set out in the previous VPS assessment reports. This was to determine the level of progress made by each company towards meeting its license obligation relating to appropriate person criteria, with regard to power system protection activities.

3. OBJECTIVES

Following the VPS assessments carried out in 2013 & 2015, the Assessment objectives were as follows:

- 1) To reassess the qualifications and experience of persons responsible for all aspects of system protection activity within licensed transmission and network business in Oman.

- 2) To assess the appropriateness of the policies and procedures to determine the protection requirements for each company.
- 3) To reassess the appropriateness of processes and policies used to verify the capability of persons who are permitted to undertake protection work in the companies
- 4) To assess the effectiveness of incident reporting classification, policies and procedures and evaluate how effective each company is at learning lessons to prevent re-occurrence of incidents.

Based on the preceding assessments:

- 1) To evaluate the extent to which each company has embraced the recommendations in the 2013 & 2015 VPS reports, and improved performance in order to satisfy the appropriate person criteria with respect to the management of power system protection activities within the business and
- 2) To make recommendations on any further steps to be taken to improve the capability and capacity of power system protection activity within each company

4. ASSESSMENT METHODOLOGY

A review of the 2013 & 2015 VPS reports was undertaken.

AER requested evidence from each company of progress made against previous report recommendations.

VPS conducted a desktop analysis of information and evidence provided by each of the companies.

Meetings for each of the company's management and protection staff were arranged with VPS and AER staff. The objective of the meetings was to seek clarification on the company's response to the AER data request and to seek to further quantify any performance improvements achieved.

5. SUMMARY OF VPS ASSESSMENTS OF NETWORK BUSINESS

5.1 Company A

5.1.1 Overview

Company A has delivered a significant amount of improvement by engaging the services of a very experienced, technically sound and very well respected consultant, who understands the problems and issues associated with the management of power system protection activities.

Although significant improvements have been made by Company A in a relatively short period of time, for which great credit is given, it must be recognised that there was a significant amount of work required to be completed. Therefore, whilst Company A is not considered to meet the requirements of an appropriate person with respect to its power

system protection function, the VPS audit team are of the view that Company A can achieve appropriate person status if they continue to deliver the necessary improvements and fully implement outstanding recommendations. However, it is essential that the policies and procedures developed by the Consultant are now implemented by Company A staff.

5.1.2 RECOMMENDATIONS

5.1.2.1 Embedding Policies and Procedures Within the Business

The policies and procedures produced are new and need to be embedded into business operations as soon as possible.

5.1.2.2 Maintenance

Maintenance activities are currently undertaken by contractors.

The VPS team recommend that these activities are managed and controlled in the same way as internal activities.

5.1.2.3 Policy Reviews

A system for regular review of policy and procedures should be implemented.

5.1.2.4 Protection Consultant

The protection consultant's contract has come to an end.

This leaves a significant skills gap in the company that will need to be monitored – at least until outstanding recommendations have been actioned.

5.1.2.5 Defect Reporting Process

The auditors are aware that a defect reporting process has been produced, but it is currently not implemented because of an issue in System Control. It is essential that this process is implemented as a priority.

5.1.2.6 Accident and Incident Investigation

Whilst acknowledging the progress made by Company A with developing policies and procedures to ensure that Accident and Incident Investigation reports would be produced in a timely manner, it is clear that there is more work to do to embed these within the business process.

After having reviewed reports submitted by the company, in response to the questionnaire, plus others submitted to AER that had not been submitted to the Auditors, there is some concern regarding the consistency of technical quality of reports that are produced. Company A needs to ensure that the root causes of incidents are fully understood and that the recommendations from investigations are rigorously and effectively implemented in a timely manner.

5.1.2.7 Technical Services Manager

The auditors are pleased with the appointment of the Head of Protection and are confident in his ability.

However, there is a concern that with the departure of the specialist consultant some momentum may be lost.

As such, consideration should be given to the appointment of a Technical Services Manager, to at least one grade above the Head of Protection, who will have the huge task of implementing the recommended policies and procedures.

5.1.2.8 Settings Review

The VPS audit team recommends that a system-wide settings review is carried out urgently and as a priority.

5.1.2.9 Operational Interface with Company F

Company A needs to enhance its operational relationship with Company F. The auditors are aware of some Company F interface issues and that a pilot project, to regrade two grid substations, has been selected to try and improve interfacing.

The companies need to build on the pilot project outcome and co-operate more closely when required.

5.2 Company B

5.2.1 Overview

The VPS audit team recognises that Company B is unique in Oman, being operationally diverse and facing some different challenges to other network operators, in that it is a vertically integrated company where the assets are often stand-alone systems and geographically dispersed over a wide area.

However, the VPS audit team are of the view that Company B does not meet the appropriate person criteria for its power system protection functions. The company had delivered only minimal progress since the last assessment visit – mainly due to organisational factors, budget constraints and a key member of staff having left.

This situation must be rectified if Company B are to achieve the goal of appropriate person status. It is critical that Company B gives complete and serious commitment to fully completing the outstanding recommendations.

5.2.2 Recommendations

5.2.2.1 Training & Competence

- It is essential that the training modules are delivered as a priority
- The 2017 training plan must be adequately resourced and delivered as a priority
- The current skills gap in generator protection and distribution must be closed without delay.

5.2.2.2 Accident & Incident Reporting

The accident and incident investigation policy must be completed and embedded into the business as a priority and actions emanating from reports should be monitored by senior management and closed in a timely manner.

5.2.2.3 Protection Policy & Codes of Practice

The protection policy and codes of practice must be completed and issued as a priority.

5.2.2.4 Manpower Levels Against Current and Future Workload

- It is essential that this matter is urgently reviewed and actions taken accordingly.
- The skills necessary to operate and maintain 132kV transmission protection must be recognised by the company.
- The skills gap must be closed as a matter of urgency.
- Protection activities must be adequately resourced to enable the company to meet its license obligations.

5.2.2.5 OPERATIONAL AUDIT POLICY & PROCEDURE

A comprehensive operational audit policy and procedure has yet to be produced. This should be accomplished within the timescale stated in the Auditor's company-specific report.

5.3 Company C

5.3.1 Overview

Company C has made good and sustainable progress since the last assessment and the VPS team are of the view that it is close to achieving appropriate person status in the management of power system protection activities.

The VPS team are of the opinion that Company C has not yet fully satisfied the appropriate person criteria, but that this can be achieved if focus and momentum are maintained and the following recommendations are implemented.

5.3.2 Recommendations

5.3.2.1 Training & Competence

Progress against delivery of the training plan should be regularly reviewed.

5.3.2.2 Accident/Incident Reporting & Investigation

A formal policy is required and attention should be given to root cause analysis, prioritisation of remedial actions and monitoring and close out of those actions.

5.3.2.3 Protection Policy and Codes of Practice

The policy and codes need to be embedded into the business.

5.3.2.4 Protection Settings Database

Some impending internal IT problems should be resolved and the DigSILENT Stationware database should be populated.

5.3.2.5 Operational Audit

A rigorous and robust operational audit policy and procedure should be developed.

5.4 Company D

5.4.1 Overview

The VPS team are pleased to conclude that Company D remains fully engaged in the process and can now be deemed to have achieved appropriate person status for the management of its protection activities.

The evidence provided of project tracking, protection performance reports, process, mapping of activities, project closure, appraisal and protection scheme improvement can all be classed as industry-leading.

5.4.2 Recommendations

In terms of next steps, Company D needs to stay focused and maintain momentum.

Key to this will be completing further work on manpower assessment, the provision of resources to complete training programmes, revisiting the area of operational audit and completing the action on organisational structure.

5.5 Company E

5.5.1 Overview

The VPS audit team are pleased to note that very good progress has been made since the last assessment. Company E has delivered good and best practice in the majority of areas identified for improvement.

The auditors are therefore pleased to conclude that Company E has achieved appropriate person status for the management of its power system protection activities.

5.5.2 Recommendations

In terms of next steps Company E must remain focused and committed to delivering further improvements, especially in relation to.

- The delivery of the training and development plan must be completed.
- The operational audit policy and procedure must be developed and implemented.
- The protection awareness training for technical and operational staff must be completed.

5.6 Company F

5.6.1 Overview

The VPS team were pleased to report in 2015 that Company F had achieved appropriate person status for the management of its power system protection activities.

The auditors are pleased to report that this status has been retained and note the improvements made since our 2015 visit as industry-leading.

6. SECTOR COMPANY RANKING

The following table ranks the extent to which the sector network companies have embraced the audit process and progressed recommendations contained in the VPS initial audit reports.

COMPANY	RANKING	PROGRESS TO DATE	LIKELIHOOD OF ACHIEVING APPROPRIATE PERSON STANDARD
Company F	1	Excellent	Retained
Company D	2	Excellent	Achieved
Company E	3	Excellent	Achieved
Company C	4	Very Good	Certain
Company A	5	Very Good	Possible
Company B	6	Disappointing	Possible

7. CONCLUSION & NEXT STEPS

The auditors are pleased to note that all companies in the sector have improved since the last progress review in 2015.

It is also pleasing to note that all companies are now fully engaged in the process.

All of the companies can continue to improve.

Some companies have requested further clarification from the auditors regarding operational audit and manpower assessment. This has been provided.

The DCRP assessment process is working well but can be improved - particularly with regard to the handling of Contractors.

The auditors are pleased to report that all companies should be able to achieve the required standard if they implement the recommendations made.

The auditors would like to record their appreciation of the co-operation given by the sector companies.