

# **company profile**

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## 01 Company Briefing

AARTCO Qatar (AQ) provides contracting services related to the installation of power and data cables.

AQ specialises in the following areas:

- **Partial Discharge Measurements**
- **Line Resonance Analysis**
- **Procurement of LV, HV and EHV cable and accessories**
- **Complete design of cable routes – drawings, calculations, etc.**
- **Cable commissioning – LV tests, VLF tests, AC HV tests**

AQ is equipped with two resonant HV test sets, a full suite of partial discharge detection/analysis equipment, equipment for Line Resonance Analysis as well as all the equipment required to perform LV commissioning, cable fault location and fiber optic installation/testing.

For cable jointing and terminating work, three fully-equipped and independently operating teams are available under normal circumstances, with additional teams and equipment being available for mobilisation on demand.

Major clients include:

- |              |                      |               |
|--------------|----------------------|---------------|
| ○ KEMA       | ○ Siemens            | ○ Marubeni    |
| ○ Prysmian   | ○ ABB                | ○ NCC         |
| ○ Nexans     | ○ Brugg              | ○ Saudi Cable |
| ○ Hyundai    | ○ General Electric   | ○ Südkabel    |
| ○ Mitsubishi | ○ J-Power Consortium | ○ VISCAS      |
| ○ LS Cable   | ○ Larsen and Toubro  |               |



## 02 Administrative Details

Company Name: AARTCO Qatar  
Company Registration #: 37035  
Contact Address: PO Box 5678, Doha, Qatar  
Fax Number: +974 4469 7861  
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Website: <http://www.aartcoqatar.com/>

Managing Director: John Woodcock  
Mobile Number: +974 6600 3654  
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Operations Manager: Harvey Gage  
Mobile Number: +974 6600 2930  
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## 03 Capabilities

AARTCO Qatar has qualified personnel and all resources required to perform High Voltage and Fiber Data Cable works. Projects within our scope of operations include:

- Line Resonance Analysis
- Partial Discharge testing and measurement
- MV cable testing: Tan Delta, DC & VLF up to 60KV peak
- 11 & 33KV GIS testing: AC Power Frequency up to 60KV peak
- XLPE power cable installation, jointing and terminating – up to 400KV
- LPOF power cable installation, jointing and terminating – up to 400KV
- GIS testing – HV testing of GIS up to 220KV, PD testing of any GIS
- Complete testing and commissioning of cable systems up to 400KV
- HV testing of cables up to 400KV
- Fiber Optic Telecommunication Cable Installation, Splicing and Terminating
- Copper Wire Telephone and Pilot Cable Installation Splicing and Terminating
- Testing and Commissioning of above Telecommunication Cable Systems
- Testing, commissioning, maintenance, repair & re-commissioning of the above



## 04 Contracts and Subcontracts

### 04.1 Contracts and Service Agreements

Date	Client	Scope of Work	Status
Nov 2013	Qatar Vinyl Company	Line Resonance Analysis on 33KV Cables	Completed
Nov 2013	QAFCO	Line Resonance Analysis and PD measurement on MV cables	Ongoing
Oct 2013	Saipem	15KV Duresca Busbar HV and PD Testing	Completed
Oct 2013	Mesaieed Power	Offline (laboratory) PD measurement on 15KV Voltage Transformers 30x Transformers	Completed
Aug 2013	Qatar Power	Online PD measurements on 220KV ODSE Terminations at RLF1 Generating Station 30x Accessories	Completed
Apr 2013	Emirates Aluminium	Online PD measurements on 220KV Terminations 60x	Completed
Nov 2012	Qatar Power Company	220KV Online PD tests 1x GIS to Transformer Circuit	Completed
Oct 2012	Qatar Power Company	220KV Online PD tests 5x GIS to Transformer Circuits	Completed




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May 2012	Mesaieed Power Co	400KV Online PD tests 5x GIS to Transformer Circuits	Completed
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May 2011	KAHRAMAA	HV test on repaired 66KV circuit Al Waab - Vegetable Market F1	Completed
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#### 04.2 Subcontracts

Date	Client	Scope of Work	Status
Apr 2014	Alstom	Repair and testing of 11KV transformer feeder QChem (VLF test with PD and Tan Delta)	Completed
Apr 2014	QTech	33KV cable VLF testing Qatalum	Completed
Apr 2014	Larsen and Toubro	PD commissioning of 66KV GIS installation Duhail S/S	Completed
Apr 2014	Larsen and Toubro	HV commissioning of 66KV GIS installation Duhail S/S	Completed
Apr 2014	Larsen and Toubro	2x 220KV cable circuit PD commissioning DIS S/S	Completed
Apr 2014	El Sewedy	Transformer oil and link works for HV testing Laqtah South (second diversion)	Completed

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Apr 2014	El Sewedy	Pilot Cable jointing and testing Laqtah South - Al Wajbah Super (second diversion)	Completed
Apr 2014	Larsen and Toubro	HV testing of 220KV GIS installation Duhail S/S	Completed
Mar 2014	Larsen and Toubro	Installation of 132KV Pfisterer terminations University South Substation	Completed
Mar 2014	KAHRAMAA	1x 220KV HV test of repaired circuit Doha South Super	Completed
Mar 2014	El Sewedy	Transformer oil and link works for HV testing Laqtah South (first diversion)	Completed
Mar 2014	El Sewedy	Pilot Cable jointing and testing Laqtah South - Al Wajbah Super (first diversion)	Completed
Mar 2014	Voltech	33KV VLF tests at QAPCO	Completed
Mar 2014	Siemens	11KV Outgoing Cable Tests Umm Al Gahab	Completed
Mar 2014	LS Cable	2x 220KV LV tests DIS - Saliyah	Completed

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Feb 2014	LS Cable	400KV Online PD Tests 1x GIS to Transformer circuit (Saliyah Super)	Completed
Feb 2014	Larsen and Toubro	HV testing of 220KV GIS installation DIS S/S	Completed
Jan 2014	Qatar Power Company	220KV Online PD tests 2x GIS to Transformer Circuits	Completed
Dec 2013	Siemens	132KV GIS HV commissioning Abu Naklah Super S/S	Completed
Dec 2013	Siemens	11KV Switchgear (Siemens) PD commissioning Umm Salal Super S/S	Completed
Dec 2013	Siemens	11KV Switchgear (Siemens) PD commissioning DIC S/S	Completed
Nov 2013	Siemens	11KV Switchgear (Siemens) PD commissioning AIF S/S	Completed
Nov 2013	Nexans	LV tests on 400KV circuits 9x circuits	Ongoing
Nov 2013	Siemens	132KV GIS HV commissioning Al Wajbah Super S/S	Completed

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Oct 2013	Saipem	15KV Duresca Busbar HV and PD Testing	Completed
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Oct 2013	NCC	1x 132KV LV and HV Cable Tests Saliyah Primary S/S	Completed
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Oct 2013	QEMC	4x 11KV LV and VLF Cable Tests Umm Al Gahab S/S	Completed
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Sep 2013	Brugg	132KV HV, LV and PD tests at QAFCO 1x Circuit	Completed
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Sep 2013	Siemens	11KV Switchgear (Siemens) PD tests 72 bays – Umm Al Gahab S/S	Completed
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Sep 2013	Hyosung	220KV GIS HV test LDS 3 S/S	Completed
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Sep 2013	Siemens	11KV Switchgear (Siemens) PD tests 72 bays – Vegetable Market S/S	Completed
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Sep 2013	Keppel Seghers	Oil Sampling and Analysis (DGA) 17x Transformers at DSWMC	Completed
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Sep 2013	LS Cable	HV Test 1x 132KV Circuit Al Wakrah	Completed
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Sep 2013	LS Cable	LV Tests, HV Test and PD Measurement 1x 400KV Circuit Saliyah Super S/S	Completed
Aug 2013	Larsen and Toubro	Installation of Pfisterer 132KV Terminations Logistics Village S/S	Completed
Aug 2013	QEMC	4x 11KV LV and VLF Cable Tests Wajbah South S/S	Completed
Jul 2013	Larsen and Toubro	HV testing of 132KV GIS installation Logistics Village S/S	Completed
Jul 2013	Siemens	11KV Switchgear (Siemens) PD tests 72 bays – Ministry of the Interior S/S	Completed
Jul 2013	QEMC	4x 11KV LV and VLF Cable Tests Gharafa S/S	Completed
Jul 2013	Siemens	11KV Switchgear (Siemens) PD tests 72 bays – Al Wajbah South S/S	Completed
Jun 2013	QEMC	4x 11KV LV and VLF Cable Tests Ministry of the Interior S/S	Completed
Jun 2013	QEMC	5x 11KV VLF Cable Tests Bin Mahmoud S/S	Completed

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May 2013	Winstar	11KV Switchgear (Siemens) PD tests 72 bays	Completed
May 2013	Brugg	Installation of 132KV Joints at QAFCO	Completed
Apr 2013	Keppel Seghers	Protection Relay Testing at DSWMC	Completed
Apr 2013	Prysmian	1x 220KV HV, LV and PD tests West Bay Super S/S – Ras Abu Aboud S/S	Completed
Mar 2013	Prysmian	1x 220KV HV, LV and PD tests Doha North Super – Bani Hajir Super S/S	Completed
Mar 2013	QChem	MV Cable Fault Locations 3x	Completed
Mar 2013	RasGas	MV Cable Fault Locations AGI Plant	Completed
Mar 2013	SEG	LV cable fault locations at RLSEC	Completed
Mar 2013	QEMC	11KV Raychem Terminations (13 Kahramaa Substations) 832x	Ongoing

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Feb 2013	Siemens WLL	11KV Switchgear PD tests 72 bays	Completed
Feb 2013	Brugg at QAFCO	132KV LV, HV and PD tests 1x GIS to Transformer Circuit	Completed
Feb 2013	ABB Sweden	220KV LV, HV and PD tests 1x GIS to Transformer Circuit	Completed
Feb 2013	Hyundai	220KV GIS HV Test	Completed
Jan 2013	Hyundai	220KV GIS HV Test	Completed
Jan 2013	ABB Sweden	220KV LV, HV and PD tests 1x GIS to Transformer Circuit	Completed
Jan 2013	Prysmian Italy	LV, HV and PD test 1x 220KV 9KM submarine circuit	Completed
Dec 2013	ABB Sweden	220KV LV, HV and PD tests 1x GIS to Transformer Circuit	Completed
Nov 2012	Saudi Cable	15x Sheath Fault Locations	Completed

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Nov 2012	Larsen and Toubro	2x VLF tests on 11KV Circuits	Completed
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Nov 2012	Hyosung	4x VLF tests on 11KV Circuits	Completed
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Nov 2012	LS Cable	400KV LV, HV and PD Tests 2x GIS to Transformer Circuit	Ongoing
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Nov 2012	ABB Sweden	220KV LV, HV and PD tests 1x GIS to Transformer Circuit	Completed
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Oct 2012	Brugg	3x 132KV Cable Terminations 2x 132KV LV, HV and PD tests	Ongoing
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Oct 2012	ABB Sweden	220KV LV, HV and PD tests 1x GIS to Transformer Circuit	Completed
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Sep 2012	NCC	4x 11KV & 2x 66KV internal circuits LV and HV/VLF tests	Completed
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Sep 2012	Larsen and Toubro	2x 132KV GIS HV tests	Completed
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Sep 2012	Hyundai	132KV GIS HV test at Bani Hajir Super S/S	Completed
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Aug 2012	RasGas	132KV conductor fault location, repair and HV test	Completed
Aug 2012	LS Cable	LV, HV and PD testing at Saliyah Super S/S 2x 220KV internal circuits	Completed
Aug 2012	Saudi Cables	PD testing at Mesaieed Super S/S 1x 220KV internal circuit	Completed
Jul 2012	El Sewedy Cables	3x LV and HV tests on 132KV internal circuits Umm Ghuwalina SS	Completed
Jun 2012	Siemens WLL	3x LV and HV tests on 66KV internal circuits Umm Ghuwalina SS	Completed
Jun 2012	Siemens WLL	2x LV and HV tests on 66KV internal circuits Merghab Mall SS	Completed
Apr 2012	Prysmian	AC Test on 11KV Cable at RasGas	Completed
May 2012	Hyosung	66 and 132KV GIS HV commissioning tests	Completed
Mar 2012	Siemens WLL	3x LV and HV tests on 66KV internal circuits Old Al Ghanem SS	Completed

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Mar 2012	Siemens WLL	2x LV and HV tests on 66KV internal circuits Khalifat SS	Completed
Mar 2012	Brugg	HV and PD testing on 3x 132KV circuits QAFCO 6	Completed
Mar 2012	ABB - AB	LV, HV and PD test on 220KV internal circuit Dukhan Road Super S/S	Completed
Jun 2011	Siemens WLL	60x 66KV Pfisterer Connex terminations at Khalifat, Old Al Ghanem, Merghab Mall & Umm Ghuwalina Substations  <b>GTC/240D/2008 (Phase 9, Package S3)</b>	Completed
Feb 2012	Larsen and Toubro	VLF Testing of 11 and 33KV Cables Qatar Petroleum sites in Ras Laffan	Completed
Feb 2012	Prysmian	LV and PD test on 400KV 22KM circuit Lusail	Completed
Jan 2012	Siemens POD	HV test on 2x 132KV 14KM circuit	Completed
Dec 2011	Prysmian Italy	LV, HV and PD test 2x 220KV 9KM submarine circuits	Ongoing
Dec 2011	Technical Cadres Co	132KV Sheath Fault Locations (various)	Completed



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Dec 2011	EEE Dubai	PD test on 2x 132KV 200m circuits in Dubai RGBN – RGBN B-Station	Completed
Dec 2011	ABB - AB	Online PD test on 220KV joints	Completed
Dec 2011	ABB - AB	LV, HV and PD test on 220KV internal circuit	Completed
Nov 2011	El Sewedy	LV and HV test on 2x 66KV 8KM circuits including Transformer & GIS works	Completed
Nov 2011	Prysmian	LV and PD test on 400KV 22KM circuit	Completed
Sep 2011	KEMA	11KV Generator Busbar PD & HV testing at The Pearl GTL, Qatar	Completed
Aug 2011	Larsen and Toubro	33KV GIS HV testing at Ras Laffan S/S 2	Completed
Aug 2011	Prysmian	LV, HV and PD test on 220KV circuit after previous PD detection and section replacement	Completed
Aug 2011	Prysmian	3x Sheath Fault locations on Lusail 400KV circuit	Completed

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Jul 2011	Siemens WLL	3x LV and HV tests on 66KV internal circuits Umm Ghuwalina SS	Completed
Jun 2011	Siemens WLL	18x 66KV Pfisterer Connex terminations Umm Ghuwalina SS	Completed
Jun 2011	ABB-AB	1x LV, HV and PD test on 220KV Circuit DRS to ODSE compound	Completed
Jun 2011	LS Cable	1x LV and PD test on 220KV Circuit after repair NDJ to DNS	Completed
May 2011	Keppel Seghers	Transformer Oil Sample Analysis 66 & 6.6KV transformers	Completed
May 2011	Keppel Seghers	14x 6.6KV cable HV tests DSWMC	Completed
Apr 2011	Marubeni	HV, LV and PD tests on 2x 220KV feeder circuits	Completed
Apr 2011	VISCAS	HV, LV and PD tests on 5x 220KV internal transformer feeders and 2x 220KV feeder circuits.	Completed
Mar 2011	Marubeni	4x LV tests on various 220KV circuits	Completed

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Mar 2011	Prysmian	PD identification and location on 220KV circuit BHS - DNS F2	Completed
Feb 2011	GE	2x AC and DC test on 200MVA generator stator Mesaieed Power Plant	Completed
Mar 2011	Prysmian	HV, LV and PD tests on 1x 132KV and 4x 220KV feeder circuits	Completed
<b>Qatar Expansion Phase 8</b>			
Nov 2010	Prysmian	Provision of jointing assistants for 132, 220 and 400KV cable installation	Ongoing
<b>Qatar Expansion Phase 8</b>			
Dec 2010	Areva, Dubai	Confirmation of PD source on 1x 132KV termination for DEWA	Completed
Dec 2010	Danway, Dubai	PD tests on 36 132KV terminations (GIS and transformer) for DEWA	Completed
Dec 2010	NCC, Dubai	PD tests on 48 132KV terminations (GIS and transformer) for DEWA	Completed
Dec 2010	Areva, Dubai	PD test on 1x 132KV termination after replacement for DEWA	Completed
Nov 2010	ETA Star	PD tests on 2x 220KV substation internal circuits for DEWA	Completed



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Sep 2010	NCC	HV, LV and PD tests on 4x 132KV feeder circuits, 6x 66KV feeder circuits and 4x 66KV internal substation circuits HV and LV tests on 4x 11KV circuits	Completed
<b>Qatar Expansion Phase 8</b>			
Jul 2010	ETA Star	Single-phase HV test on 66KV circuit	Completed
Jun 2010	Brugg	HV and PD tests on 9x 132KV & 4x 66KV circuits at QAFCO, Qatar	Completed
Jun 2010	Larsen and Toubro	HV and PD testing on 66KV GIS installations at 3 substations in Qatar	Completed
Jun 2010	Mitsubishi	HV tests on 12x 400KV substation internal circuits	Completed
May 2010	LS Cable	2x 132KV HV + LV tests on substation internal circuits	Completed
Mar 2010	Marubeni	2x 220KV LV + HV + PD tests on substation internal circuits 6x 220KV LV tests on feeder circuits 4x 11KV HV + LV tests on substation internal circuits 2x 132KV LV + HV + PD tests on substation internal circuits	Completed

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Mar 2010	Saudi Cable Company	Partial Discharge Tests on 9KM 220KV feeder at Ras Laffan Industrial City, PD measurements conducted at 15 joint bays with integrated sensors plus GIS terminations	Completed
Feb 2010	Saudi Cable Company	Partial Discharge Tests on 9KM 220KV feeder at Ras Laffan Industrial City, PD measurements conducted at 17 joint bays with integrated sensors plus GIS terminations	Completed
Dec 2009	Hyundai	HV testing on 66, 132 and 220KV GIS at 3 substations in Qatar	Completed
Dec 2009	Saudi Cable Company	Partial Discharge Tests on 9KM 220KV feeder at Ras Laffan Industrial City, PD measurements conducted at 14 joint bays with integrated sensors plus GIS terminations	Completed
Nov 2009	Larsen and Toubro	2x 132KV HV tests in Azaiba, Oman	Completed
Nov 2009	Saudi Cable Company	Partial Discharge Tests on 2x 4KM 220KV feeder at Mesaieed Industrial City, PD measurements conducted at 5 joint bays with integrated sensors plus GIS terminations	Completed
Jun 2009	Suedkabel	HV and LV tests on 1x 400KV circuit at Qatalum, Qatar	Completed
May 2009	ABB AB	Electrical, HVAC and Partial Discharge tests on 220KV Transformer/GIS circuit at Ras Laffan Common Cooling Water Plant (CCWP).	Completed

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May 2009	ABB AB	Electrical, HVAC and Partial Discharge tests on 220KV Transformer/GIS circuit at Ras Laffan Common Cooling Water Plant (CCWP).	Completed
May 2009	Prysmian EMEA	Electrical, HVAC and Partial Discharge tests on 220KV Transformer/GIS circuit at Ras Laffan Common Cooling Water Plant (CCWP).	Completed
Apr 2009	Prysmian Espana	HVAC and Electrical tests on 400KV internal circuits at Mesaieed Power Plant 2.	Completed
Mar 2009	Mitsubishi (JPower / VISCAS)	HVAC, Electrical and Partial Discharge tests on 2 x 220KV 11KM feeders within Doha, PD measurement at 20 joint bays with integrated sensors plus at GIS and Transformer terminations.	Completed
<b>Qatar Expansion Phase 7</b>			
Mar 2009	Prysmian EMEA	HVAC and Partial Discharge tests on 4 x 220KV Transformer/GIS circuits at Ras Laffan Common Cooling Water Plant (CCWP).	Completed
Mar 2009	ABB-AB Doha	HVAC, Electrical and Partial Discharge tests on 1 x 220KV Transformer/GIS circuits at Ras Laffan Common Cooling Water Plant (CCWP).	Completed
Sep 2008	ABB-AB Doha	400KV HV, LV and partial discharge tests, 5 count  220KV HV, LV and partial discharge tests, 23 count	Completed
<b>Qatar Expansion Phase 7</b>			



Sep 2008	SEC-EOA	Construction of the U/G and O/H T/L for Al Fursan 115/13.8KV substation. Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed
Aug 2008	ABB-AB	LV & HV Test 8 nos. of 66KV underground cable circuits.	Completed
<b>Qatar Expansion Phase 7</b>			
Jul 2008	Siemens Doha	220KV GIS, ODSE and transformer terminations, 60 count.  132KV GIS, ODSE and transformer terminations, 60 count.  66KV ODSE terminations, 20 count.  220KV Partial Discharge Tests, 15 count  220KV HV & LV tests, 15 count 132KV HV & LV tests, 15 count 66KV HV & LV tests, 20 count	Completed
<b>Qatar Expansion Phase 7</b>			
Jul 2008	ABB-AB	LV & HV tests inc. PD measurement on 26 nos. of 400KV & 220KV underground cable circuits.	Completed
<b>Qatar Expansion Phase 7</b>			
May 2008	Daewoo Ras Laffan	Locate conductor fault on 33KV cable.	Completed
May 2008	Marubeni	Outer sheath integrity tests by AC voltage, zero sequence impedance measurement & earth resistivity measurements on 220KV cable circuit.	Completed



Apr 2008	Isolux	Repair 3 <sup>rd</sup> party damage by jointing 66KV Khalifat – Salata F2. Perform LV & HV tests.	Completed
Feb 2008	Isolux	Locate & repair multiple outer sheath faults, x-bond correction & verification, impedance measurement on Naeaja to SED T2 132KV circuit.	Completed
Feb 2008	Nexans	LV & HV Test 2 nos. of 66KV underground cable circuits. Locate conductor fault on 2 nos. 66KV underground cable circuits.	Completed
<b>Qatar Expansion Phase 7</b>			
Dec 2007	ABB-AG	LV & HV Test 8 nos. of 66KV & 2 nos. 132KV underground cable circuits.	Completed
<b>Qatar Expansion Phase 7</b>			
Mar 2007	Siemens Doha	LV & HV Test 56 nos. of 66KV underground cable circuits.	Completed
<b>Qatar Expansion Phase 6</b>			
Mar 2007	Marubeni	LV tests on 2 nos. 220KV and LV & HV Tests on 4 nos. 66KV underground cable Circuits.	Completed
<b>Qatar Expansion Phase 7</b>			
Jun 2006	SEC-EOA	Installation of 115KV, XLPE Cable Circuits for Saihat S/S. Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed



Dec. 2004 – Nov. 2006	SEC-EOA	69 KV U/G T/L Cables and F/O Cables between Dammam P/P and Muthalath S/S. Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed
Jan. 2005 – Apr. 2007	SEC-EOA	69 KV U/G T/L Cables and F/O Cables between Khobar BSP and As-Salam S/S. Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed
Dec. 2005	SEC-COA/NEBRAS AL SHARK	Install, terminate and joint the 132KV, 1200mm2 XLPE cables type SEFAG including HV test and non Hipot test. Installation of 36F FO Splitter and Termination box including testing and commissioning. Circuit 8118-9015 (A&B)	Completed
Jan. 2006	SEC-EOA/NCC	Install and terminate the 132KV cable, 300mm2 Oil Immersed Termination including HV and Non-Hipot test at Arar S/S and Markaz Zallum S/S	Completed
Aug 2005	SEC-EOA/ARABIAN BEMCO	Install and terminate the 115KV cable, 1600mm2 and 630mm2 Cu. XLPE GIS Sealing End Outdoor Sealing End (G&W). Construction of new 115KV/13.8KV Al Nuza S/S.	Completed
Jun 2004	SEC-EOA/ARABIAN BEMCO	Install and terminate the 69KV 630mm2 XLPE cable GIS Sealing End and 69KV Outdoor/Indoor Heat Shrikable termination at Sahilia S/S and Bayonia S/S #2.	Completed
Nov 2004	SEC-EOA/LARSEN & TOUBRO	Cable Laying of 230KV and 115KV cable, 1x2000mm2 XLPE cable between Transformer to GIS. Ghazlan P/P and New 230KV/115KV Juaymah BSP	Completed





Feb. 2003 – Feb. 2004	SEC-EOA/National Contracting Co. Ltd.	Installation of 69KV Power Cable and Fiber Optic Cable to Thuqbah BSP – Al-Jazeera S/S, Dammam BSP – Anood S/S and Ta’lemi S/S – Khobar Local Office. Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed
Jun. 2002 – Oct. 2004	SEC-EOA	69KV Underground Transmission Line Cables Replacement between Dammam BSP – Saihat, DIE 1A – DIE 1B S/Ss and DIE 1B – DIE 1C S/Ss. Turnkey engineering-procurement-construction. Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed
Jun. 2002 – Oct. 2004	SEC-EOA	69KV U/G & F/O Cables to Rakah BSP – KFU S/S & Sports City S/S, Ibn Khaldoun BSP - Al- Mazroyah S/S & Khobar BSP - Khobar Industrial S/S. Turnkey engineering-procurement- construction. Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed
Mar 2004 – May 2004	NSIF/SEC-EOA	69KV Underground Cables from Transition Structure to NSIF S/S. Construction Includes all Civil, HV cable and Fiber Optic cable works plus testing and commissioning.	Completed
Feb – Aug. 2003	ABB Cont. Co., Riyadh	115KV Power Supply for SIPC Substation Install cable, Joint, Terminate and test including Fiber Optic Cable Installation, Splice and Test.	Completed
Dec. – May 2003	ABB Cont. Co., Riyadh	Install 2500mm <sup>2</sup> 230KV cables, splicer assistance, testing.	Completed



## 05 Key Personnel

### 05.1 John Woodcock – Managing Director, Testing and Commissioning Specialist

#### 05.1.1 Experience

Line Resonance Analysis  
PD measurement – online  
PD measurement – offline  
HV testing with Wuhan Fanke FKTF 300KV and FKVF 80KV resonant test set  
LV testing  
Cable Fault Location

### 05.2 Harvey Gage – Operations Manager, Testing and Commissioning Specialist

#### 05.2.1 Qualifications

BSc w/ Hons (Computing)

#### 05.2.2 Experience

Line Resonance Analysis  
PD measurement – online  
PD measurement – offline  
HV testing with Wuhan Fanke FKTF 300KV and FKVF 80KV resonant test set  
HV testing with HighVolt WRV-T resonant test set including parallel operation  
LV testing  
Cable Fault Location

### 05.3 Murugesan Subramaniam – Testing and Commissioning

#### 05.3.1 Qualifications

BSc (1st Class) (Electrical Engineering)

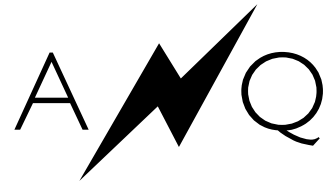
#### 05.3.2 Experience

Line Resonance Analysis  
PD measurement – online  
PD measurement – offline  
HV testing with Wuhan Fanke FKTF 300KV and FKVF 80KV resonant test set  
HV testing with HighVolt WRV-T resonant test set  
VLF testing with Wuhan Fanke VLF-60 VLF test equipment  
LV testing  
Cable Fault Location

### 05.4 Lakshmanan Alagappan – Testing and Commissioning

#### 05.4.1 Qualifications

Dipl. Eng. 1st Class (Electrical Engineering)



#### 05.4.2 Experience

Line Resonance Analysis  
PD measurement – online  
PD measurement – offline  
HV testing with Wuhan Fanke FKTF 300KV and FKVF 80KV resonant test set  
VLF testing with Wuhan Fanke VLF-60 VLF test equipment  
LV testing  
Cable Fault Location

### 05.5 Alex Galanida – Testing and Commissioning

#### 05.5.1 Qualifications

BSc (Electrical Engineering)

#### 05.5.2 Experience

Line Resonance Analysis  
PD measurement – online  
PD measurement – offline  
HV testing with Wuhan Fanke FKTF 300KV and FKVF 80KV resonant test set  
VLF testing with Wuhan Fanke VLF-60 VLF test equipment  
LV testing  
Cable Fault Location

### 05.6 Emil Jonas Urquico – Testing and Commissioning

#### 05.6.1 Qualifications

BSc (Electrical Engineering)

#### 05.6.2 Experience

Line Resonance Analysis  
PD measurement – online  
PD measurement – offline  
HV testing with Wuhan Fanke FKTF 300KV and FKVF 80KV resonant test set  
VLF testing with Wuhan Fanke VLF-60 VLF test equipment  
LV testing  
Cable Fault Location

### 05.7 Rustan Buenavista – Testing and Commissioning

#### 05.7.1 Experience

Line Resonance Analysis  
PD measurement – online  
PD measurement – offline  
HV testing with Wuhan Fanke FKTF 300KV and FKVF 80KV resonant test set



VLf testing with Wuhan Fanke VLF-60 VLF test equipment  
LV testing  
Cable Fault Location

## **05.8 Kevin Steen – Jointing and Terminating**

### **05.8.1 Experience**

230KV LPOF Siemens Joints & GIS Terminations  
220KV High Pressure Pipe Type Cable jointing and terminating  
138KV NEXANS XLPE submarine cable outdoor terminations  
150KV and 66KV LPOF submarine cable  
132KV XLPE; 33KV PILC; 22KV EPR  
66KV LPOF to XLPE cable transition joints  
33KV Pfisterer GIS & ODSE  
33KV Raychem ODSE

### **05.8.2 Certificates**

Brugg Cables – installation of XLPE cable accessories up to 245KV

## **05.9 Peter Farrant – Jointing and Terminating**

### **05.9.1 Experience**

245KV Brugg XLPE Joints, GIS Terminations, Oil Immersed Terminations & ODSE  
220KV NEXANS XLPE SF6 dry terminations  
220KV NEXANS XLPE oil immersed transformer ends (silicon oil filled)  
220KV NEXANS XLPE outdoor sealing ends  
161KV NEXANS XLPE pre-moulded one piece joints  
66, 132 and 161KV ELASTIMOLD one-piece joints  
132KV G&W XLPE SF6 dry type terminations  
132KV G&W XLPE SF6 silicon oil filled terminations  
132KV G&W XLPE Oil immersed transformer ends (silicon filled)  
132KV G&W XLPE Outdoor sealing ends  
66KV FURUKAWA XLPE mig welding joints, GIS and transformer terminations.  
MIG Welding on Aluminium Conductors  
33KV XLPE straight joints, pole terminations and transition joints  
33KV PILC straight joints, pole terminations and transition joints  
11 KV XLPE straight joints, pole terminations and transition joints  
11 KV PILC straight joints, pole terminations and transition joints

### **05.9.2 Certificates**

Brugg Cables – installation of XLPE cable accessories up to 245KV

## **05.10 Jesus Moreno – Jointing and Terminating**

### **05.10.1 Experience**

220KV LG



132KV Brugg  
132KV Elastimold  
132KV G&W  
132KV LG  
132KV Pfisterer

**05.10.2 Certificates**

138KV Elastimold  
138KV G&W

**05.11 Henry Moreno – Jointing and Terminating**

**05.11.1 Experience**

132KV G&W Oil Immersed and GIS  
132KV Pfisterer  
33KV Elastimold, Raychem

**05.11.2 Certificates**

72.5KV, 145KV – Pfisterer Ixosil  
138KV Elastimold  
138KV G&W  
Raychem MV  
3M MV



## 06 Equipment

### 06.1 Testing and Commissioning Equipment (for HV and LV cables)

Function	Manufacturer	Model	Capability
AC HV Testing Series Resonance	Wuhan Fanke Transformer Company	1x FKVF-9000/400	400KV 9000KVA
AC HV Testing Series Resonance	Wuhan Fanke Transformer Company	1x FKTF-80/80	80KV 80KVA
VLF MV Testing	Wuhan Fanke Transformer Company	1x VLF-60	60KV peak / 42KV RMS 0.1-0.02 Hz up to 2.5 $\mu$ F
AC MV Testing	Wuhan Fanke Transformer Company	1x CQSB 6/60	60KV RMS 6KVA
Tan Delta	Wuhan Fanke Transformer Company	1x FKGST	10KV
Partial Discharge Measurement	OMICRON	8x MPD-600/MCU-502	0-32 MHz 500-900 MHz
Line Resonance Analysis	Wirescan	1x LIRA Portable	0-100MHz Up to 200KM
Insulation Resistance & Capacitance	NIEAF	2x ISOAnalyser 5KV	5KV, 5T $\Omega$ 1mF – 20 $\mu$ F
Contact Resistance & DC Conductor Resistance	AVO	2x DLRO-10	0.1 $\mu\Omega$ – 1 $\Omega$
Earth Resistance	NIEAF	2x ERT-S	0 – 50K $\Omega$
DC HV and Fault Location	Bicotest	2x S271T	0 – 12KVDC 0 – 500mA
DC HV	SEBA-KMT	1x HV Tester 25KV	0 – 25KVDC 2mA
Impedance Measurement Power Multi-Meter	AVO	2x PMM-1	600V; 100A; 360°
Digital Multimeter	Fluke	3x 179	1KV; 10A; 50M $\Omega$ ; 2kHz; 400°C
Digital Clamp-On Meter	HIOKI	3x 3285	600V; 2000A.



## 06.2 Fault Location Equipment (for HV and LV cables)

Bridge	BAUR Mitsubishi	1x DMB-5 1x I01 I	2.5KV 5KV
Surge Generator	SEBA-KMT	1x Surgeflex 25	25KV, 1000J
TDR	SEBA-KMT	1x Teleflex T30E	
TDR	Megger	TDR2000	
Seismophone	BAUR	n/a	
Fault Signal Receiver	BAUR	UL30	
DC HV Pulse Generator	Bicotest	2x S271T	0 – 12KVDC 0 – 500mA



### 06.3 Cable Jointing and Terminating Equipment

For jointing and terminating work we hold the following equipment in quantities sufficient to outfit 3 or 4 teams working simultaneously:

- Cable stripping tools and XLPE profiling tools
- 60, 100 and 200 tonne hydraulic presses and dies
- Air conditioned jointing shelters (container type)
- Mobile workshops and secure storage containers
- 20KVA portable diesel generators
- Lifting equipment – chain blocks ½ ton, ¼ ton and other similar
- All required hand tools
- Propane gas torches, pressure regulators, gas cylinders.
- Band-saws
- Cable supports