

SINCE 1970

DYCE
G L O B A L

Company Profile



DONG YANG CORROSION ENG.CO.,LTD.

DYCE
G L O B A L

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1.0 Company Overview

1.0 Company Overview



ABOUT US

Since its founding in 1970, Dong Yang Corrosion Engineering (DYCE) has focused on providing corrosion prevention and management products and services of the highest quality. From our beginning, we have always sought to combine practical engineering knowhow with deep technical knowledge. This has allowed us to consistently deliver results that exceed customers' expectations. The result of our dedication as a customer service-focused organization has been our steady, careful growth into a global company.

Because of this growth, Dong Yang Corrosion Engineering has changed its name to DYCE Global with offices in South Korea, Kuwait, UAE, Saudi Arabia, Singapore, and the United States.

Our mission is to provide world-class products and services to the oil and gas, water and wastewater, and ports and terminals industries. Our work encompasses corrosion prevention of on-shore and off-shore pipelines, subsea equipment, terminals, floating production and processing facilities, and on-shore refining and processing facilities. We are able to provide world-class, cost-effective solutions through our dedicated staff by understanding our customers' needs, including the regulatory and legal situations our customers operate in, and never compromise on quality or safety.

[With our proven track record and history, you can be confident that in all that we engage in, your satisfaction is paramount. We value your time and trust in us and we look forward to being a valuable part of your corrosion prevention and management team.](#)



1970s

Founded Dong Yang Cathodic Protection Construction Co., Ltd

Acquired Patent No.3822(Zinc Alloy Anode)

- No.3822(Zinc Alloy Anode)
- No.3825(Pi-Ti Anode)
- No.3885(Al Alloy Anode)

Made inroads into market of the kingdom of Saudi Arabia.

1980s

Designated as localizing manufacturer of Cathodic Protection material & equipment for KEPCO.

Awarded Citation of Prime Minister on the Marine Transportation Day.

Nominated as a Nuclear Power plant Equipment Manufacturer.

1990s

Awarded Technology Award of Korean Association for Corrosion Study

Obtained ISO 9001 Certification(KSA-QA)

Obtained Quality Certificate for Ali-anode from Japan Scope

2000s through Beyond

Registered vendor for

- Saudi Arabia : SAUDI ARAMCO. Saudi Electricity Company, SABIC
- Kuwait : KOC, KNPC, MEW
- U. A. E : TAKREER, GASCO, ADCO
- Qatar : Qatar Petroleum
- Libya : MMRA

Presently, a family of 5 companies & 8 Agents

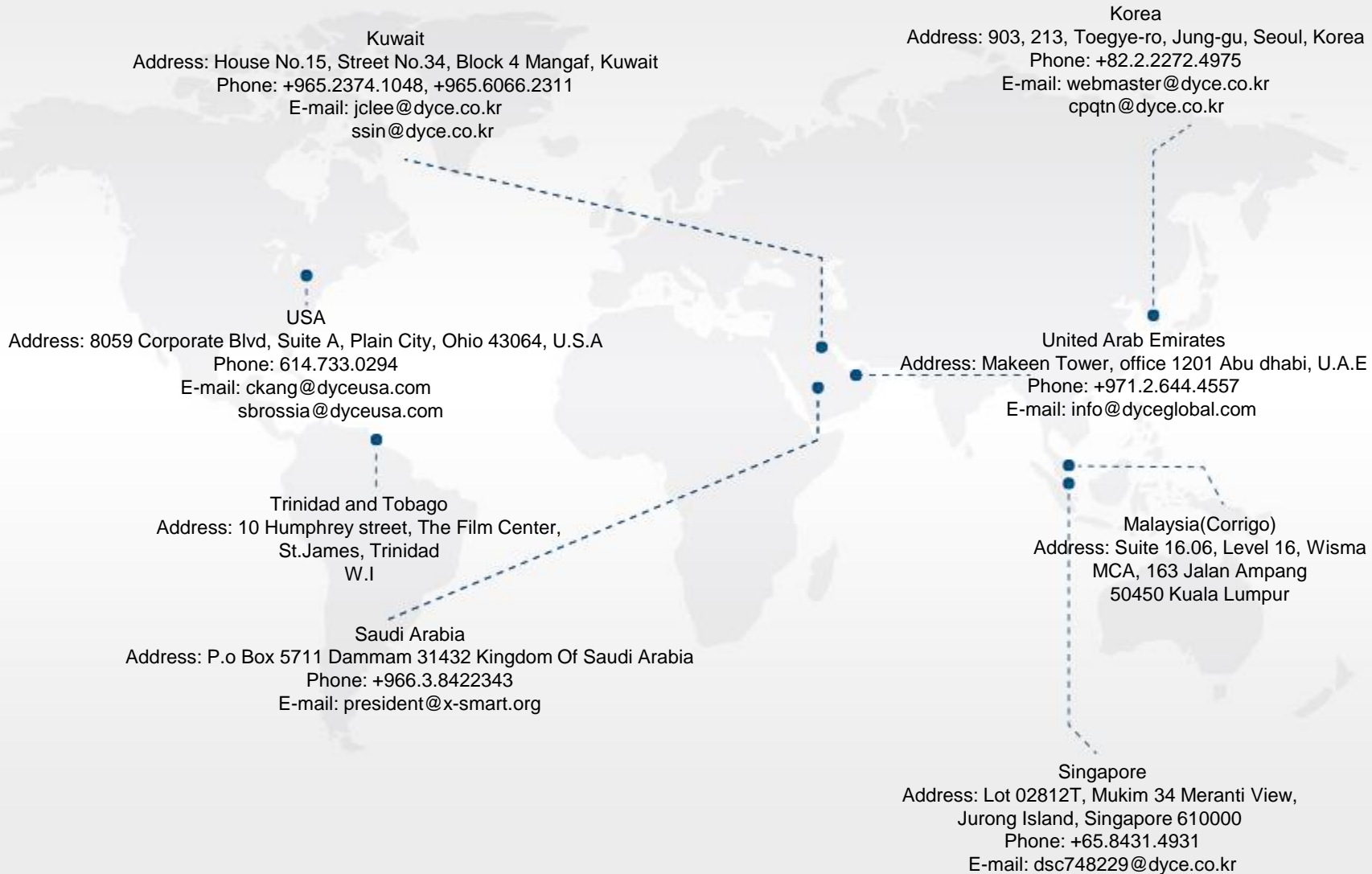
Companies

- DYCE KOREA
- DYCE USA
- DYCE KUWAIT
- DYCE UAE
- DYCE SINGAPORE

Agent

- K. Y. F in KUWAIT
- PETROMA in UAE
- TYLUS ENTERPRISE DTE in SINGAPORE
- TRECO in LIBYA
- SMART in SAUDI ARABIA
- TOKYO BOEKI in JAPAN
- Corrigo Technical Services in MALAYSIA
- Concepts and Services in TRINIDAD AND TOBAGO

1.1 Company addresses and information



1.2 Local Network for KSA

◆ Specialized Manufacturing and Reliable Technical Services Company (Agent of Dong Yang Corrosion Engineering Co., Ltd.)

■ CR No: 050038172

■ SECO Bidder ID: 0005008452

■ Zachariah M. Thomas

■ Tel : +966 13 367 2811/2812

■ Fax : +966 13 367 2814

■ Email : sales@x-smart.org

■ Address: 1st Floor, SMART Camp-Office Building, Abu Hadriya Road,
Near KPS-5 Petrol Station, Jubail-2,
Kingdom of Saudi Arabia.

◆ Work Scope

1. After Service
2. Engineering Service
3. Supervision

1.3 Local Network for UAE

DYCE-Abu Dhabi

■ **Member ship No.:568056**
 (Chamber of Commerce)

■ **Registration No.: CN-1255066**

■ Amit Pachisia / President

■ **Tel :** +971 2 6444557

■ **Fax :** +971 2 6455033

■ **Mob :** +971 50 6118904

■ **Email :** Amit@petromar.ae

■ C.S. Yu / Lead Engineer

■ **Tel :** +971 56 338 9152

■ N.S. Han / Lead Engineer

■ **Tel :** +971 50 243 3631

◆ Work Scope

1. After Service
2. Engineering Service
3. Supervision

Korea
 Address: 903, 213, Toegye-ro, Jung-gu, Seoul, Korea
 Phone: +82.2.2272.4975
 E-mail: webmaster@dyce.co.kr
 cpqtn@dyce.co.kr

United Arab Emirates
 Address: Makeen Tower, office 1201 Abu Dhabi, U.A.E
 Phone: +971.2.644.4557
 E-mail: info@dyceglobal.com

Malaysia(Corrigo)
 Address: Suite 16.06, Level 16, Wisma
 MCA, 163 Jalan Ampang
 50450 Kuala Lumpur

Singapore
 Address: Lot 02812T, Mukim 34 Meranti View,
 Jurong Island, Singapore 610000
 Phone: +65.8431.4931
 E-mail: dsc748229@dyce.co.kr

1.4 Local Network for Kuwait

DYCE-Kuwait Branch

■ Registration No.: N1893-AA2-AM

J. C. Lee / Director

■ Tel : +965 2374 1048
 : +965 6066 2311
 ■ Email : jclee@dyce.co.kr

◆ Work Scope

1. After Service
2. Engineering Service
3. Supervision
4. Maintenance
5. Consulting

Address: House No. 15, Street No. 34, Block 4 Mangaf, Kuwait
 E-mail: jclee@dyce.co.kr
 ssin@dyce.co.kr

Address: 8059 Corporate Blvd, Suite A, Plain City, Ohio 43064, U.S.A
 Phone: 614.733.0294
 E-mail: ckang@dyceusa.com
 chrossia@dyceusa.com

Address: P.o Box 5711 Dammam 31432 Kingdom Of Saudi Arabia
 Phone: +966.3.8422343
 E-mail: president@x-smart.org

Korea
 Address: 903, 213, Toegye-ro, Jung-gu, Seoul, Korea
 Phone: +82.2.2272.4975
 E-mail: webmaster@dyce.co.kr
 cpqtn@dyce.co.kr

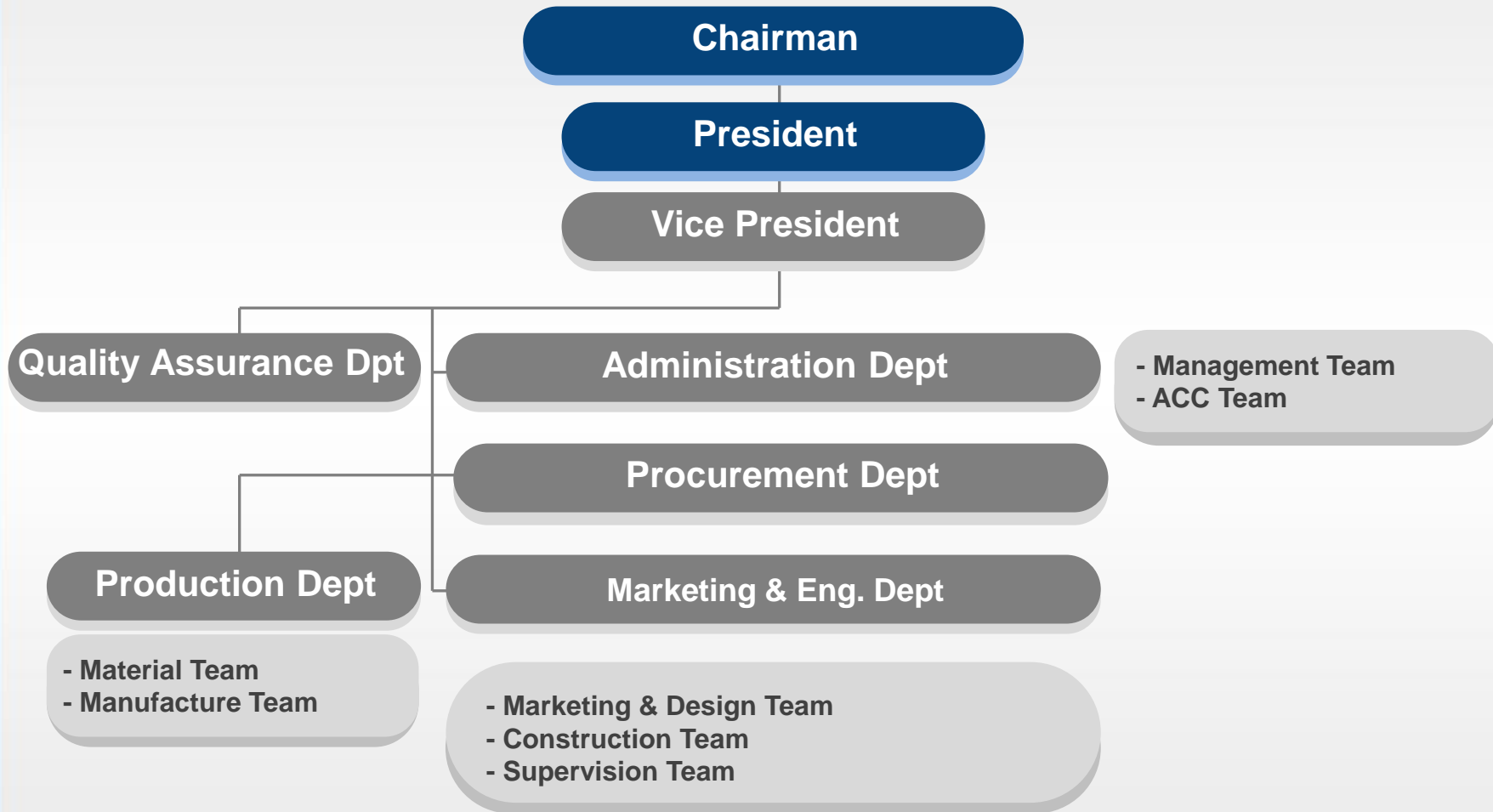
Kuwait
 Address: House No. 15, Street No. 34, Block 4 Mangaf, Kuwait
 E-mail: jclee@dyce.co.kr

Malaysia(Corrigo)
 Address: Suite 16.06, Level 16, Wisma MCA, 163 Jalan Ampang
 50450 Kuala Lumpur

Singapore
 Address: Lot 02812T, Mukim 34 Meranti View,
 Jurong Island, Singapore 610000
 Phone: +65.8431.4931
 E-mail: dsc748229@dyce.co.kr

2.0 Organization Structure

2.0 Organization Structure



2.1 Contact Point

Chairman

- Name : JUNG, SANG WHA
- E-mail : webmaster@dyce.co.kr
- Tel No. : +82-2-2272-4975

President

- Name : HONG, SEUNGMIN
- E-mail : smhong@dyce.co.kr
- Tel No. : 070-4672-4911

Vice President

- Name : JUNG, JIWON
- E-mail : jiwon@dyce.co.kr
- Tel No. : 070-4672-4922

Marketing & Eng'R Dept

- Name : KIM, DAE JUNG
- E-mail : hupo@dyce.co.kr
- Tel No. : 070-4672-4913

Administration Dept

- Name : KIM, YONG MAN
- E-mail : suhoman@dyce.co.kr
- Tel No. : 070-4672-4999

Procurement Dept

- Name : LEE, WON KOO
- E-mail : bsky19@dyce.co.kr
- Tel No. : 070-4672-4955

Production Dept

- Name : JUNG, DAE YEOL
- E-mail : dyjung@dyce.co.kr
- Tel No. : +82-41-621-1761

Quality Assurance Dept

2.2 QA/QC Organization Structure

The HEAD of Quality Department

- Name : Dong-hee Han
- E-mail : heedong@dyce.co.kr
- Tel No. : +82-10-4813-3202

QA Manager

- Name : Seong-sik JU
- E-mail : ssju@dyce.co.kr
- Tel No. : 070-4672-4966

- Name : Sunhwan Jo
- E-mail : sunhwan@dyce.co.kr
- Tel No. : 070-4672-4966

QC Manager

- Name : Kwan-hyoung CHO
- E-mail : cho0458@dyce.co.kr
- Tel No. : +82-10-9936-0458

- Name : Wan-soo Shin
- E-mail : wansoo@dyce.co.kr
- Tel No. : +82-10-8547-9797

2.3 HSE Organization Structure

Reference Doc.: HSE Manual 5.0 Organization and Responsibilities



3.0 Human resources

3.0 Direct/Indirect Manpower in HEAD Office

1. Direct Manpower

| Position | No. of Persons | Remark |
|------------------------|----------------|--------|
| C.E.O | 1 | |
| Executives | 6 | |
| Engineering division | 49 | |
| Procurement division | 3 | |
| QA/QC | 5 | |
| Manufacturing division | 7 | |
| Admin division | 5 | |
| Total | 76 | |

2. Indirect Manpower

| | | |
|---------------------------------------|----|--|
| Manufacturing / Construction division | 30 | |
|---------------------------------------|----|--|

4.0 Engineering

4.0 NACE Gold member

Certificate of Corporate Membership

presented to

Dong Yang Corrosion Engineering Co., Ltd

*as a corporate member in good standing of this association, which is dedicated
to maintaining the highest professional standards in our commitment to
protecting people, assets and the environment from the effects of global corrosion.*

Harvey Hack
NACE President 2014-2015



4.0 Engineering

1. Classification by Experience in CP Field

| Experience | 1~5 years | 5~10 years | 10~20 years | 20~30years |
|----------------|-----------|------------|-------------|------------|
| No. of Persons | 7 | 10 | 20 | 12 |

2. Certification Recognized by Korean Government

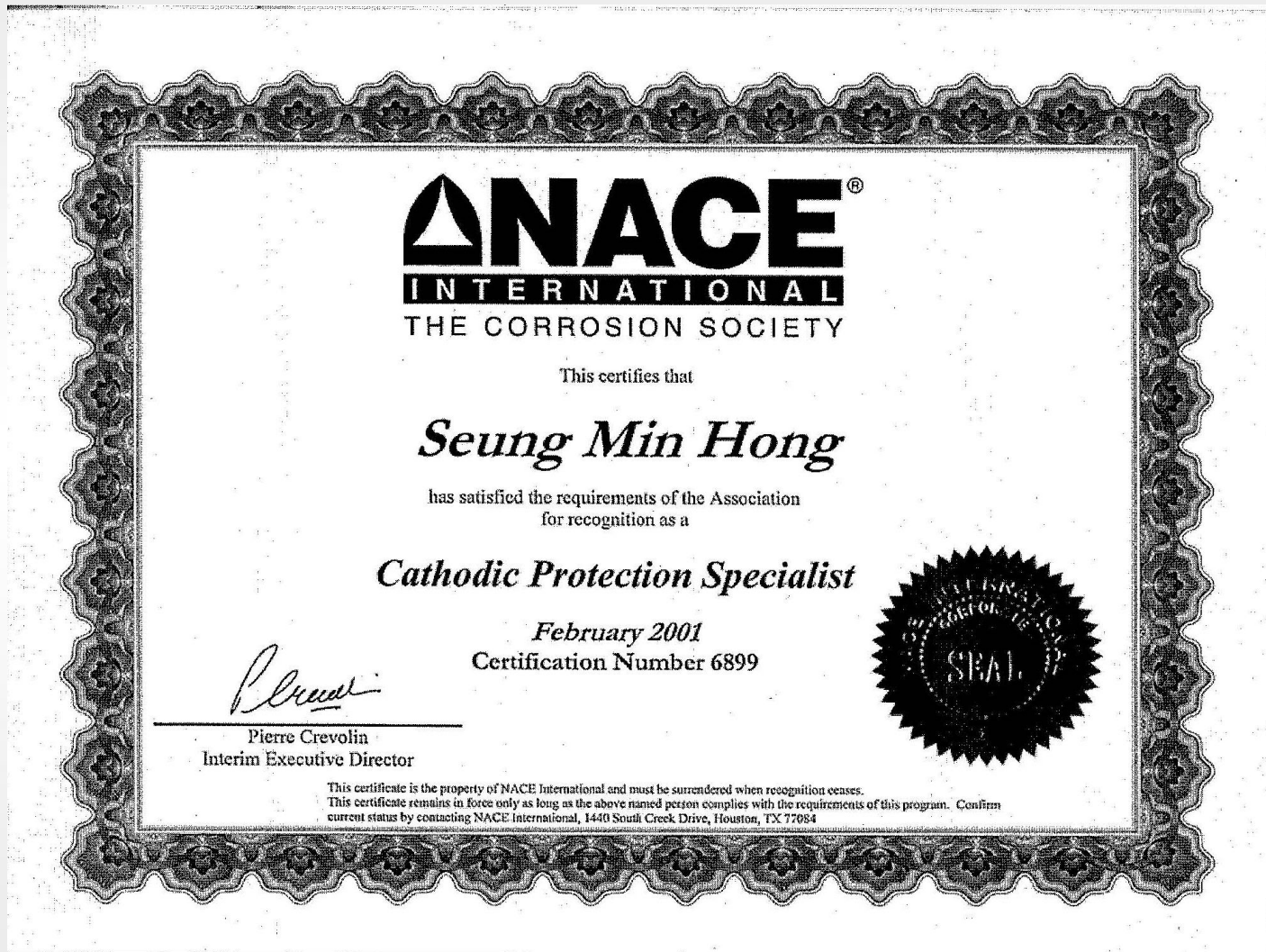
| Name of Certification | No. of persons | Remark |
|--|----------------|--------|
| Engineer Electric Work | 5 | |
| Engineer Electricity | 2 | |
| Engineer Radio Telecommunication Equipment | 1 | |
| Engineer Fire Fighting Facilities | 1 | |
| Industrial Engineer Electrical Work | 3 | |
| Craftsman Hazardous Material | 2 | |

4.0 Engineering

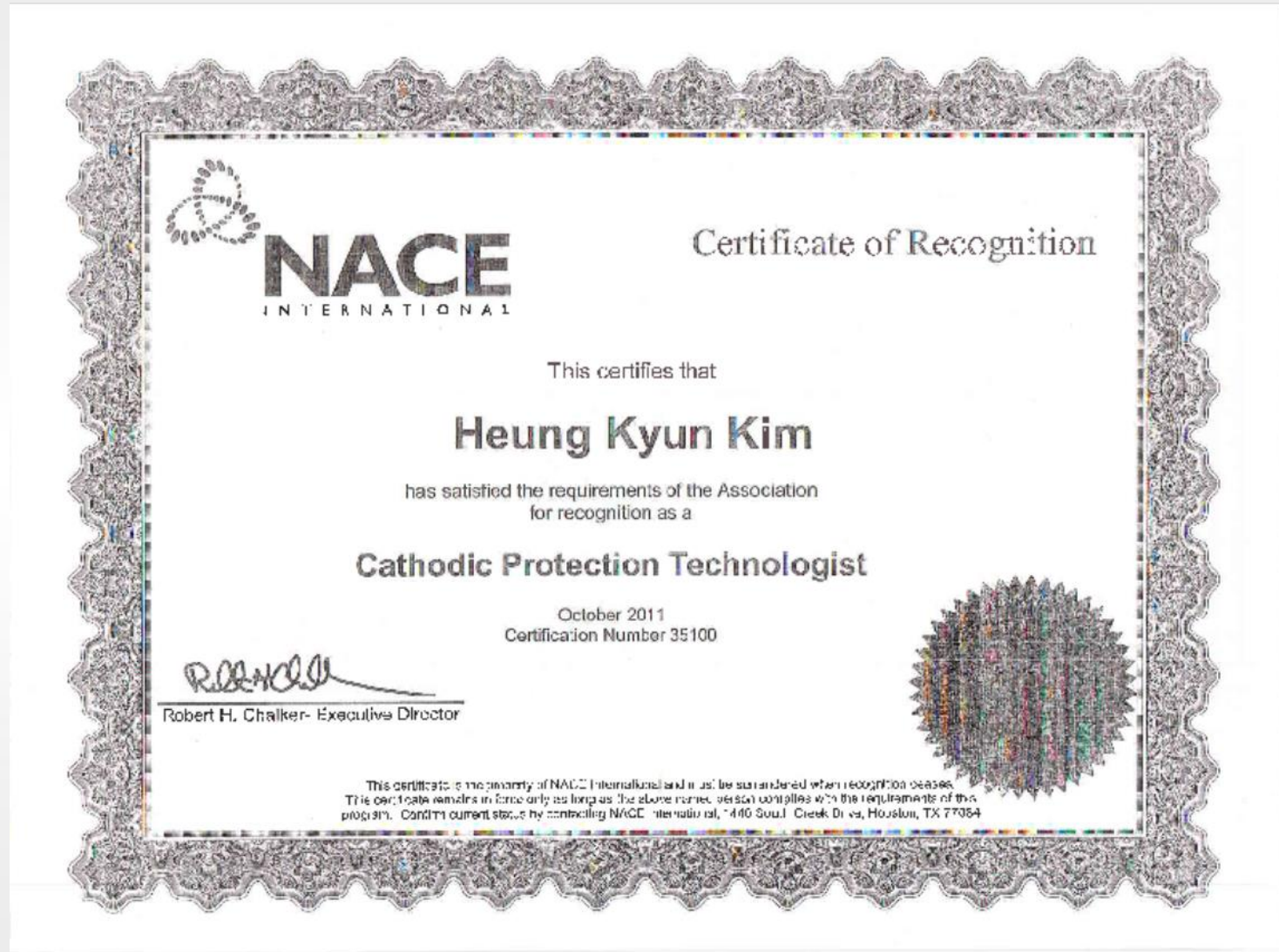
3. Certification Recognized by NACE

| Name of Certification | No. of persons | Remark |
|-----------------------------|----------------|--------|
| Cathodic Protection Level-4 | 1 | |
| Cathodic Protection Level-3 | 3 | |
| Cathodic Protection Level-2 | 20 | |
| PCS Level-1 | 8 | |

4.0 Engineering



4.0 Engineering



4.0 Engineering



5.0 Facilities & Equipment

5.0 Facilities & Equipment

Production Facilities



- Automatic Furnace
- Foundry Furnace
- Mold (Various Mold)
- Extrusion Machine for Zn Ribbon Anode
- Digital Thermal Temperature Tester (SDT-803)
- Conveyer System
- Lifter (FD 20)
- Backfill Machine (5 Ton)
- Oil Presser

5.1 Plant Capacity

1. Sacrificial Anode Cathodic Protection(per year)

| | |
|-----------------|--------------------------|
| Al Anode | Max. 1,200 ton |
| Zn Anode | Max. 3,000 ton |
| Zn Ribbon Anode | Max. 1,500 Km(2,700 ton) |
| Mg Anode | Max. 500 ton |

2. Impressed Current Cathodic Protection(per year)

| | |
|------------------------------------|--------------|
| Remote Monitoring & Control System | As Required |
| Automatic System | Max. 300 set |
| Manual System | Max. 400 set |

5.1 Plant Capacity

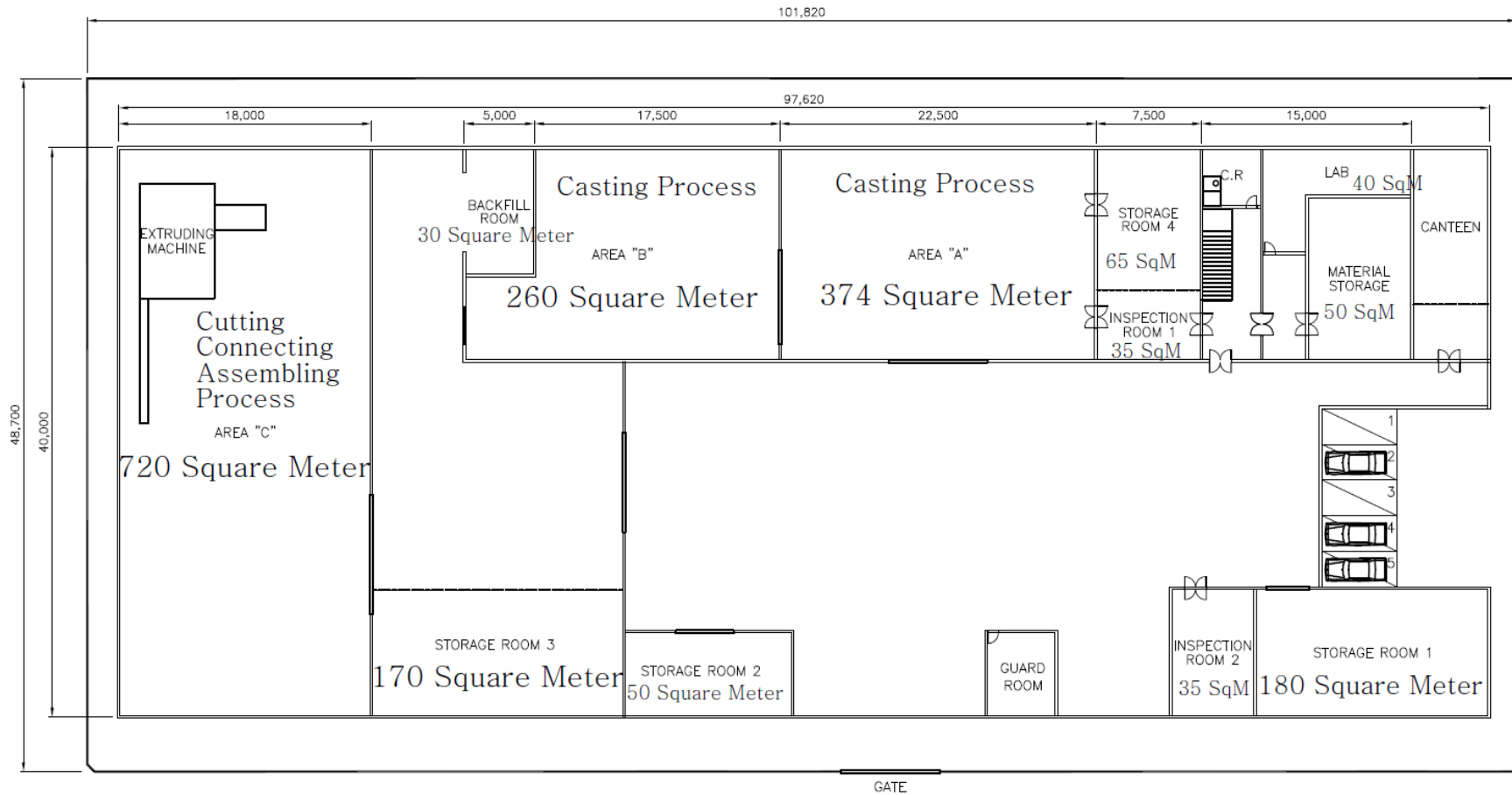
3. Workshop/Warehouse Areas

1st Factory(49,610 ft²) : Anodes, Test & Inspection and Laboratory

2nd Factory(20,210 ft²) : Rectifier & Monitoring equipment

3rd Factory : Storage (Raw material, const. Equipment)

5.2 Factory Layout



6.0 Quality Assurance System

6.1 ISO Quality Management system certificate



ISO 9001:2008

CERTIFICATE OF REGISTRATION

THIS IS TO CERTIFY THAT THE
QUALITY MANAGEMENT SYSTEM OF

Dong Yang Corrosion Engineering Co., Ltd.

Head Office : (Chungmuro4(sa-ga), 213, Toegye-ro, Jung-gu, Seoul, Korea
Factory : (Chaam-dong, Cheonan 2nd Industrial complex) 64, 2gongdan5-ro,
Cheonan-si, Seobuk-gu, Chungcheongnam-do, Korea
Branch Office : Makeen Tower, Office 1201 Abu Dhabi U.A.E

Has been assessed and registered as complying with the requirements of the
International Standard shown above for the following Goods and Services. Further
clarifications regarding the scope of this certificate and the applicability of
ISO 9001:2008 requirements may be obtained by consulting the organisation.

**Design, Development, Production, Sales, Installation and Servicing
of Cathodic Protection Equipment(I.C.C.P & Sacrificial-Anode).
Originally Certified on 22 September 2009**



JAS-ANZ



www.jas-anz.org/register

Seong-Pyo Hong
CEO-ISC KOREA
ISC (Global), License #1150/2011 CC
KISC Co., Ltd. K.B.N. 105 86 10656

Registration Number: QAC/R82/2171
Original Registration Date: 18-Oct-2012
Re-certification Date: 31-Aug-2015
Expiry Date: 21-Sep-2018
Amendment Date:

ISC (Global), Building 11, 7th Floor, Bay Square, Business Bay, Dubai, UAE.



This certificate is valid until the Expiry Date on the condition that audits are conducted and paid for as per the Certification Agreement. Should this condition not be met, cancellation procedures will be initiated and the client will be removed from the JAS-ANZ register. This Certificate remains the property of International Standards Certifications (Global) FZ LLC and must be returned upon request. It must not be altered in any way. Intentional misuse of this certificate will result in cancellation without prior notification.

6.2 Procedures for Quality Management system

| No. | Document No. | Procedure Title | No. | Document No. | Procedure Title |
|-----|--------------|---|-----|--------------|-------------------------------------|
| 1 | DYP-01-01 | Organization and Duty-Sharing | 18 | DYP-09-03 | Mold Control Procedure |
| 2 | DYP-01-02 | Management Review & Policy Control | 19 | DYP-09-04 | Construction & Installation Control |
| 3 | DYP-01-03 | Effectiveness Evaluation | 20 | DYP-10-01 | Inspection Procedure |
| 4 | DYP-02-02 | Document Preparation | 21 | DYP-11-01 | Verification & Calibration Control |
| 5 | DYP-02-02 | Document Form Control | 22 | DYP-12-01 | Inspection and test status Control |
| 6 | DYP-02-06 | Preparation, Revision and Management of Nuclear QA Plan | 23 | DYP-13-01 | Nonconformance Control |
| 7 | DYP-03-01 | Contract Review Procedure | 24 | DYP-14-01 | Corrective and Preventive Action |
| 8 | DYP-04-01 | Design Control Procedure | 25 | DYP-15-01 | Storage Control Procedure |
| 9 | DYP-04-02 | Drawing Control Procedure | 26 | DYP-15-02 | Packing & Shipping Control |
| 10 | DYP-04-03 | Purchase Specification Preparation | 27 | DYP-16-01 | Quality Record Control Procedure |
| 11 | DYP-05-01 | Document Control Procedure | 28 | DYP-17-01 | Quality Assurance Audits Procedure |
| 12 | DYP-06-01 | Purchase Control Procedure | 29 | DYP-17-02 | Conformity Assessment Procedure |
| 13 | DYP-06-02 | Supplier Control Procedure | 30 | DYP-18-01 | Education and Training Procedure |
| 14 | DYP-07-01 | Customer Article Control Procedure | 31 | DYP-18-02 | Personnel Qualification Procedure |
| 15 | DYP-08-01 | Identification and Traceability | 32 | DYP-19-02 | Customer Satisfaction Control |
| 16 | DYP-09-01 | Manufacturing Work Procedure | | | |
| 17 | DYP-09-02 | Facility Control Procedure | | | |

7.0 HSE Management System

7.1 HSE Certificates



ISO 14001

International Standards
Certifications

ISO 14001:2004

CERTIFICATE OF REGISTRATION

THIS IS TO CERTIFY THAT THE
ENVIRONMENTAL MANAGEMENT SYSTEM OF

Dong Yang Corrosion Engineering Co., Ltd.

Head Office : (Chungmuro4(sa)-ga), 213, Toegy-e-ro, Jung-gu, Seoul, Korea
Factory : (Chaam-dong, Cheonan 2nd Industrial complex), 64, 2gongdan5-ro,
Cheonan-si, Seobuk-gu, Chungcheongnam-do, Korea
Branch office : Makeen Tower, office 1201 Abu Dhabi U.A.E

Has been assessed and registered as complying with the requirements of the
International Standard shown above for the following Goods and Services. Further
clarifications regarding the scope of this certificate and the applicability of
ISO 14001:2004 requirements may be obtained by consulting the organisation.

**Design, Development, Production, Sales, Installation and Servicing
of Cathodic Protection Equipment(L.C.C.P & Sacrificial-Anode).**
Originally certified on 11 October 2011



www.jas-anz.org/register

Alex Wilde

Tony Wilde
Group Chairman
ISC Pty Ltd, A.B.N. 31 245 846 984

Registration Number: EMS/A82/2171
Original Registration Date: 16-Apr-2014
Re-certification Date: 10-Oct-2014
Expiry Date: 10-Oct-2017
Amendment Date::

ISC Pty Ltd., 2/10 Gladstone Road, Castle Hill NSW 2154, Sydney, Australia.



This certificate is valid until the Expiry Date on the condition that audits are conducted and paid for as per the Certification Agreement. Should this condition not be met, cancellation procedures will be initiated and the client will be removed from the JAS-ANZ register. This Certificate remains the property of International Standards Certifications Pty Ltd and must be returned upon request. It must not be altered in any way. Intentional misuse of this certificate will result in cancellation without prior notification.



OHSAS 18001

International Standards
Certifications

OHSAS 18001:2007

CERTIFICATE OF REGISTRATION

THIS IS TO CERTIFY THAT THE
OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM OF

Dong Yang Corrosion Engineering Co., Ltd.

Head Office : (Chungmuro4(sa)-ga), 213, Toegy-e-ro, Jung-gu, Seoul, Korea
Factory : (Chaam-dong, Cheonan 2nd Industrial complex), 64, 2gongdan5-ro,
Cheonan-si, Seobuk-gu, Chungcheongnam-do, Korea
Branch office : Makeen Tower, office 1201 Abu Dhabi U.A.E

Has been assessed and registered as complying with the requirements of the
International Standard shown above for the following Goods and Services. Further
clarifications regarding the scope of this certificate and the applicability of
OHSAS 18001:2007 requirements may be obtained by consulting the organisation.

**Design, Development, Production, Sales, Installation and Servicing
of Cathodic Protection Equipment(L.C.C.P & Sacrificial-Anode).**
Originally certified on 11 October 2011



www.jas-anz.org/register

Seung-pyo Hong

Seong-Pyo Hong
CEO-ISC KOREA
ISC Pty Ltd, A.B.N. 31 245 846 984
KISC Co., Ltd. K.B.N. 105 86 10656

Registration Number: OHS/A82/2171
Original Registration Date: 16-Apr-2014
Re-certification Date: 10-Oct-2014
Expiry Date: 10-Oct-2017
Amendment Date

ISC Pty Ltd., 2/10 Gladstone Road, Castle Hill NSW 2154, Sydney, Australia.
KISC Co., Ltd., 7F, Ingok B/D, 107, Yangsan-ro, Yeongdeungpo-gu, Seoul, Korea.



This certificate is valid until the Expiry Date on the condition that audits are conducted and paid for as per the Certification Agreement. Should this condition not be met, cancellation procedures will be initiated and the client will be removed from the JAS-ANZ register. This Certificate remains the property of International Standards Certifications Pty Ltd and must be returned upon request. It must not be altered in any way. Intentional misuse of this certificate will result in cancellation without prior notification.

7.2 Procedures for Environment system

| No. | Document No. | Procedure Title |
|-----|--------------|---|
| 1 | DYP-02-03 | Environmental impact assessment |
| 2 | DYP-02-04 | Environmental law control |
| 3 | DYP-02-05 | Operational control Procedure |
| 4 | DYP-05-05 | Communication Control Procedure |
| 5 | DYP-11-02 | Monitoring and measuring |
| 6 | DYP-15-03 | Waste Control Procedure |
| 7 | DYP-15-04 | Wastewater control Procedure |
| 8 | DYP-15-05 | Air Pollution Control Procedure |
| 9 | DYP-15-06 | Noise vibration control Procedure |
| 10 | DYP-18-03 | Emergency Preparedness and Response Procedure |

7.3 Procedures for Health & Occupational Safety

| No. | Document No. | Procedure Title |
|-----|--------------|---|
| 1 | A-100 | Safety & health management policy |
| 2 | B-100 | Risk identification and assessment rules |
| 3 | B-200 | Safety & health laws management rules |
| 4 | B-201 | Laws and regulations identification guidelines |
| 5 | B-300 | Rules of goals and specified goals of safety & health |
| 6 | B-400 | Rules of establishment of annual safety & health work plan |
| 7 | C-100 | Rules of organization and segregation of duties |
| 8 | C-200 | Education and training rules |
| 9 | C-300 | Rules of management of occupational safety and health committee |
| 10 | C-400 | Rules of information receipt and delivery |
| 11 | C-500 | Rules of documentation and document management |
| 12 | C-501 | Rules for document management |
| 13 | C-600 | Operation management rules |
| 14 | C-601 | Workplace safety guidelines |
| 15 | C-602 | Guidelines on transportation & unloading safety work |
| 16 | C-700 | Personal protective equipment control rules |
| 17 | C-800 | Rules of maintenance of machinery, equipment and facility |
| 18 | C-801 | Standard of protection measures against hazardous machinery and equipment |
| 19 | C-802 | General standard of machinery |
| 20 | C-900 | Hazardous material management rules |
| 21 | C-901 | Organic solvents rules |

7.3 Procedures for Health & Occupational Safety

| No. | Document No. | Procedure Title |
|-----|--------------|---|
| 22 | C-902 | Hazardous material rules |
| 23 | C-1000 | Working environment measurement and occupational health rules |
| 24 | C-1100 | Self-inspection rules |
| 25 | C-1200 | Electric shock protection rules |
| 26 | C-1300 | Gas safety rules |
| 27 | C-1400 | Rules of equipment subject to inspection |
| 28 | C-1500 | Fire safety rules |
| 29 | C-1501 | Guidelines for preparing fire-fighting plan |
| 30 | C-1600 | Rules of activities of honorary occupational safety inspector |
| 31 | C-1700 | Rules of safety work approval |
| 32 | C-1701 | Guidelines for safety work approval |
| 33 | C-1800 | Rules of subcontractors management |
| 34 | C-1900 | Emergency prevention and countermeasures rules |
| 35 | D-100 | Rules for performance appraisals |
| 36 | D-200 | Rules for corrective and preventive actions |
| 37 | D-300 | Record Control rules |
| 38 | D-400 | Internal Audit rules |
| 39 | D-401 | Guidelines for Internal Audit check list |
| 40 | E-100 | Rules of safety & health management system efficiency |
| 41 | A-000 | Driving Safety procedure |
| 42 | C-902 | Hazardous material rules |

7.4 HSE Training Course

| DYCE | | 2013 TRAINING PLAN (OVERALL) | | | | | Prepared by | Reviewed by | Approved by | |
|-------|--------------|----------------------------------|--------|--------------------------|----------------|--|-----------------------------|--------------------|--------------------|--------------------|
| | | Related Document : DYP - 18 - 01 | | | | | approval | <i>[Signature]</i> | <i>[Signature]</i> | <i>[Signature]</i> |
| Month | Title | Trainee | Time | Place | Lecturer | Contents | References | Note | | |
| Jan. | Job training | Engineering & Marketing Dept. | 2hours | Head office | Byoung-Ho Park | Orientation for business plans &c construction plan HSE management system Basic course | Procedure&Related documents | HSE training | | |
| Feb. | Job training | Production Department | 3hours | Branch office in Cheonan | Dea-yeoul Jung | Specific procedure & company standard Air pollution control procedure | Procedure | HSE training | | |
| Feb. | Job training | Administration | | | | | | | | |

| DYCE | | 2013 TRAINING PLAN (OVERALL) | | | | | Prepared by | Reviewed by | Approved by | |
|-------|--------------------------------------|--|-------------------------------|--------------------------|--------------------------|--|---|---------------------------------------|---------------------------------------|--------------------|
| | | Related Document : DYP - 18 - 01 | | | | | approval | <i>[Signature]</i> | <i>[Signature]</i> | <i>[Signature]</i> |
| Month | Title | Trainee | Time | Place | Lecturer | Contents | References | Note | | |
| Mar. | HSE training | | | | | | | | | |
| Mar. | Job training | | | | | | | | | |
| Mar. | Qualification training | | | | | | | | | |
| Mar. | Regulations training | Nuclear Power Plant Quality Assurance | Quality Assurance Department | 3hours | Branch office in Cheonan | Dong-hee Han | Inspection, test, check, test equipment etc. | Related documents | | |
| Apr. | Design review investigation training | Quality training | Administration Department | 2hours | Head office | Dong-hee Han | Quality training (NPP included) | Procedure | | |
| Apr. | Quality training | Job training | Procurement Department | 4hours | Head office | Wongu Lee | Commerce & Procurement | Related documents | | |
| Apr. | Quality training | FME training | | | | | | | | |
| Apr. | Job training | Auditor training | | | | | | | | |
| May | Inspector training | Job training | | | | | | | | |
| May | Inspector training | Safety training | | | | | | | | |
| Jun. | Job & HSE training | All employees of Engineering & Marketing Dept. | 5hours | Head office | Byoung-Ho Park | Safety and accident case Design control procedure | Procedure&Related documents | | | |
| Jul. | Inspector training | NPP QA training | Engineering & Marketing Dept. | 4hours | Head office | Dong-hee Han | Nuclear quality training & standard&program&Procedure | Related documents | | |
| Aug. | QA training | Job training | Procurement Department | 4hours | Head office | Wongu Lee | Procurement Procedure&standard nuclear materials procurement, management method | Related documents | | |
| Aug. | HSE training | Job training | Production Department | 3hours | Branch office in Cheonan | Dea-yeoul Jung | Sacrificial anode system impressed current system | PIPE LINE CORROSION | Including environment system training | |
| Oct. | Regulations | One person for each department | 1hours | Head office | Yong-Man Kim | Regulations (labor law & work regulations) | Related documents | Including environment system training | | |
| Nov. | Inspector training | Related employee | 8hours | Branch office in Cheonan | Dong-hee Han | Nuclear PP quality assurance, Procedure Inspection standard, quality management method | Procedure&Related documents | | | |
| Nov. | NPP QA training | Related employee | 8hours | Head office | Dong-hee Han | Quality assurance manual, Procedures general inspection | Related documents | | | |
| Dec. | Designer Qualification | Related employee | 4hours | Head office | Byoung-Ho Park | Designer qualification training | Documents | | | |
| Dec. | NPP QA training | Production Department | 5hours | Branch office in Cheonan | Dong-hee Han | NPP QA manual, procedure, guides | Procedure | | | |
| Dec. | Job training | Administration Department | 2hours | Head office | Yong-Man Kim | Year-end settlement training | Documents | | | |



DYCE HSE Training Plans and Implementation

8.0 Client Approval

8.0 Client Approval

04-JUN-2009 07:27 PROC SUPPORT PCD TAKREER 5712 6027442 P.01/01


 شركة أبوظبي لتكرير النفط
 We Refine Right

FACSIMILE MESSAGE

To : M/s. Petromar Energy Services
 Attn.: Mr. Salim Shaikh - General Manager

From : Procurement Support Department Manager

Fax No.: 6455033
 Abu Dhabi

Fax No.: 6027442

Abu Dhabi Oil Refining Company (TAKREER)
 P.O. Box 5593 - Tel. (9712) 5027000 - Abu Dhabi, U.A.E.

Ref. No.: TKR/S/S/ 29/FES/2009 Date : 04 JUN 2009
 Subject : REGISTRATION & PRE-QUALIFICATION STATUS

Reference to the Documents of your Principal M/s. Dong Yang Corrosion Engineering Co. Ltd. - Korea, submitted by you as a *Manufacturer*. Please be informed that based on the evaluation, the above principal has been included in TAKREER records as a possible source for supply of the following products:

- > Cathodic Protection Systems
- > Corrosion Monitoring System
- > Cathodic Protection Materials

Please note that at the time of release of enquiries, a further short listing takes place based on exhibited interest at that time and the specifics of material / equipment in question as the need may be.

Kindly note that this fax shows your company's current Registration & Prequalification status with TAKREER and it supersedes any and all previous faxes which may have been issued to you on this subject.

You are advised to quote your Principal's Registration No. 906293 in all future correspondence.

Regards,

 Hashim Al Hashemi


If you do not receive all the pages, please call Telephone : (9712) 6027479

No. of pages to follow:

Confidentiality Notice: This fax is Confidential. If you are not the intended recipient, please notify us immediately. You should not copy the Fax or use it for any purpose or disclose its contents to any other person. Thank you. FA.000283

TAKREER

28-OCT-2009 12:13 FROM ADGAS TO 96455033 P.01



FACSIMILE MESSAGE

ABU DHABI GAS LIQUEFACTION COMPANY LTD
 P.O. BOX 3580, ABU DHABI, U.A.E. FAX No. (9712) 6061201
 In case of transmission error, please call (9712) 6065412

To : From : Pages: 3

| | |
|------------------------------------|---|
| FAX NUMBER : 02 6455033 | FAX NUMBER : 02-6061201 |
| NAME : MR. ORLANDO RODRIGUES | NAME : MR. HASSAN A. THABET |
| TITLE : SALES EXECUTIVE | TITLE : PROCUREMENT DIVISION MANAGER |
| COMPANY : PETROMAR ENERGY SERVICES | COMPANY : ADGAS |
| | REF / DATE : AD.128/456 28 October 2009 |

SUBJECT: Registration No: 105934

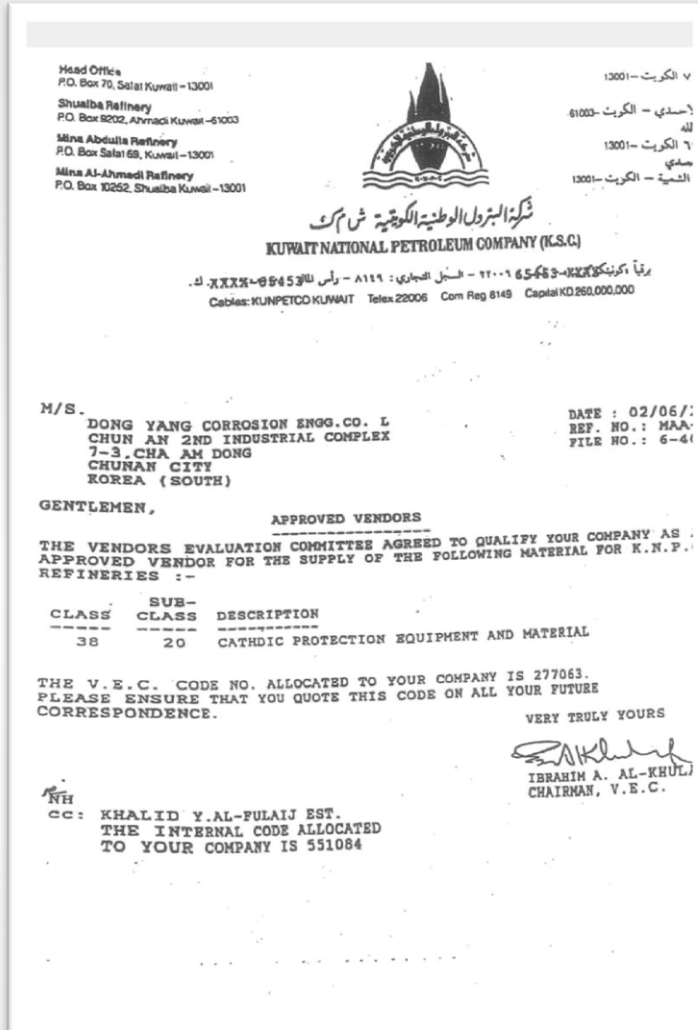
With reference to your submission of Manufacturers Pre-Qualification Questionnaire dated October 09, we would like to inform you that, the following Manufacturers/Products have been approved for inclusion in our data base system as possible source for service as shown below:

| | | |
|--|--------|-------------------------------------|
| | 280525 | CATHODIC PROTECTION SYSTEMS |
| | 280530 | CATHODIC PROTECTION MATERIALS |
| | 186005 | CORROSION COUPONS |
| | 186525 | CORROSION MONITORING SYSTEM |
| | 214505 | TRANSFORMERS / RECTIFIERS - GENERAL |
| | 280515 | JUNCTION BOXES FOR HAZARDOUS ARBA |
| | 280520 | JUNCTION BOXES FOR SAFE AREA |

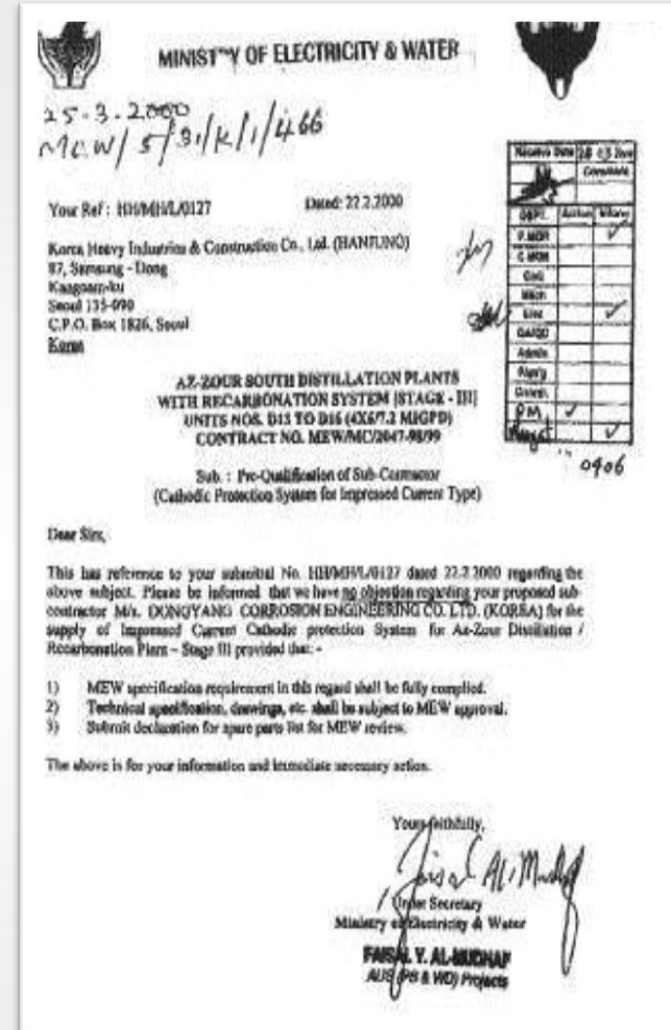
DONG YANG CORROSION ENGINEERING-KOREA
 Reg. No. 702-891

ADGAS-UAE

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Kuwait-Kuwait National Petroleum Company

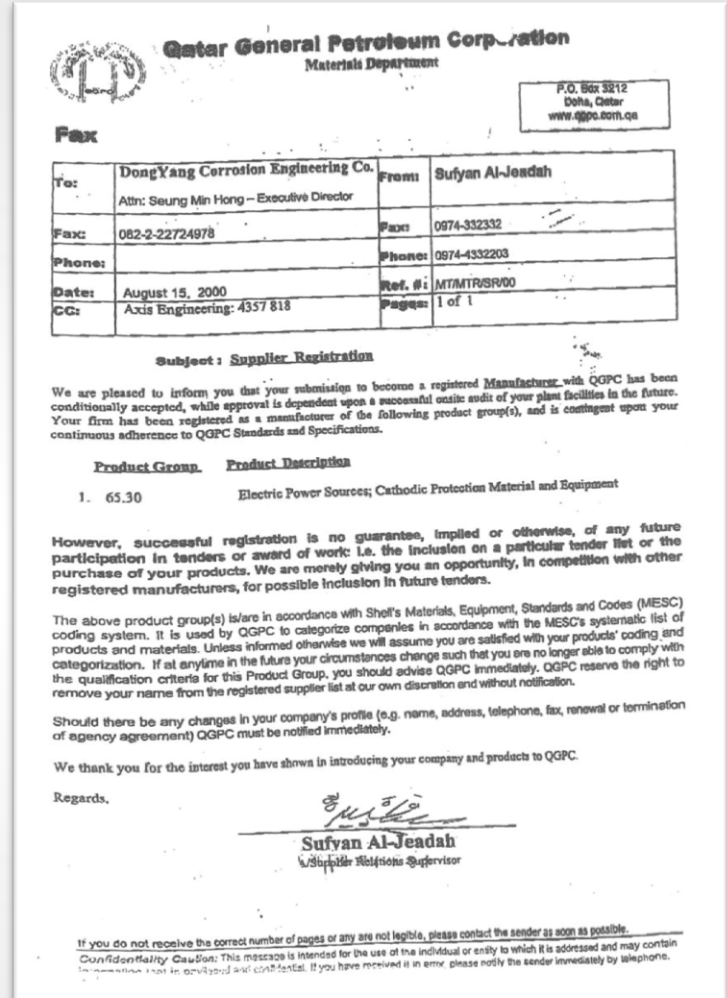


Kuwait-Ministry of Electricity & Water

8.0 Client Approval



Libya-Great Man Made River Authority



Qatar-Qatar Petroleum

8.0 Client Approval

شركة نفط الكويت (ك.س.ج.)

F-2447 (A)

MAIN OFFICE:
P.O. Box 9758
11008 AHMADI
KUWAIT
J.N. 21836
FAX : 965991
TELEX : 44211

المكتب الرئيسي
ص.ب : 9758
11008
الاحمدي
الكويت
الهاتف : 965991
التلغراف : 44211

شركة نفط الكويت (ك.س.ج.)
KUWAIT OIL COMPANY (K.S.C.)

TO: M/s. Khalid Y. Al-Fulaj Est.
Kuwait
Fax No.: 2421532

DATE: 21st June 2003
MSG. NO.: PQ/1106/2003
Total No. of Pages: 1

FROM: Team Leader Commercial Services
Commercial Affairs Group
P.O. Box - 9758
61008 Ahmadi, Kuwait
Fax No.: (965) 3984998

SUBJECT: **NOTIFICATION OF VENDOR APPROVAL**

OUR REF.: VEC/TR/CP/002/2003

Dear Sirs,

We are pleased to inform you that the application for pre-qualification submitted by you on behalf of the under mentioned manufacturer has been approved for inclusion in KOC's Approved List of Manufacturers for the product category and manufacturing facility mentioned below:

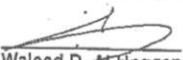
PRODUCT CATEGORY: TRANSFORMER RECTIFIER UNITS FOR CATHODIC PROTECTION

MANUFACTURER : M/S. DONG YANG CORROSION CO. LTD.

FACILITY ADDRESS : 7-3 CHAAM-DONG
CHEONAM-CITY, CHUNG NAM
KOREA

You may advise the manufacturer accordingly.

Sincerely,
for Kuwait Oil Company


Waleed D. Al-Haggan

RECEIVED
DATE 21.6.03
REF

Kuwait-Kuwait Oil Company

Aramco Overseas Company B.V.
Ark Mori Bldg. P.O. Box 529
No. 12-32, Akasaka 1-Chome,
Minato-ku, Tokyo 107-6016, Japan

Tel: 81-3-5563-0552
Fax: 81-3-5563-0544

February 26, 2003
(Control no. STJ-0206)

To: Dong Yang Corrosion Engineering Co., Ltd.
(Fax: 82-2-2272-4978)
(Tel: 82-2-2272-4975)

Attn: Mr. Jiwon Jung/Manager

From: Mohana A. Al Dossary - Representative, AOC Tokyo
Akiko Inoue, Vendor Liaison

Subject: **Registration Request**
Reference: **Vendor ID 10027470**


Dear Mr. Jung,

Further to your request for registration with ARAMCO Overseas Company B.V - Tokyo (AOC-T), we are pleased to advise you that your company has been accepted as an AOC-T supplier and 9COMs (Commodity Classification Code) shown in the attached sheet has been linked to your registration.

Thank you for introducing your products. The rest of 9 COM materials that you have introduced to us are inspectable materials. They are required to have a plant inspection. We will contact you if any additional information is required

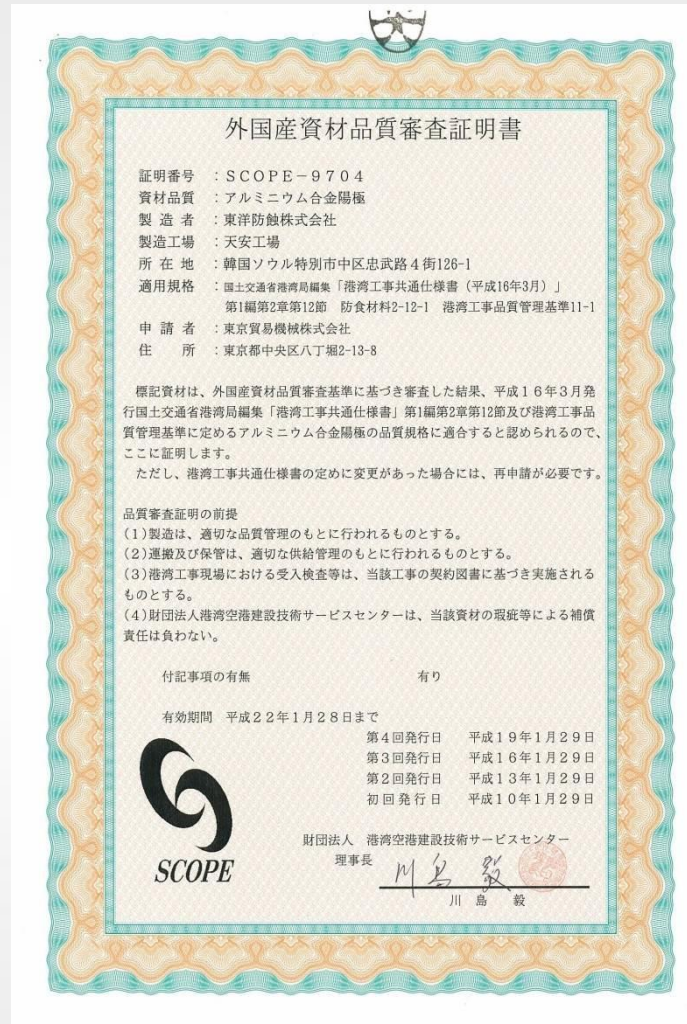
Please use the above Vendor ID on all written correspondence. However, if you have questions, please contact Akiko Inoue.

Yours faithfully,


Mohana A. Al-Dossary, Representative

Saudi Arabia-ARAMCO

8.0 Client Approval



Japan Government-SCOPE

9.0 References

9.0 References for Saudi Arabia

| Year | Project | Customer | Country |
|------|--|---------------------------|--------------|
| 2007 | - Marafiq CCP Project | GE Power | Saudi Arabia |
| | - PDH/PP Aljuball(SA) EPC Sahara-C/P Project | Sahara Basell | Saudi Arabia |
| | - Al Waha Basell PDH-PP | Sahara Basell | Saudi Arabia |
| 2008 | - Saudi Kayan Project | SABIC | Saudi Arabia |
| | - Saudi Kayan HDPE Project | Saudi Kayan Petrochemical | Saudi Arabia |
| 2009 | - CA/EDC Project | Arabian Chlor | Saudi Arabia |
| | - Riyad PP Project | Dhuruma Co | Saudi Arabia |
| | - SAUDI KAYAN LDPE PROJECT | SAUDI KAYAN | Saudi Arabia |
| | - Gas Phase 8 Project | National Ind. Gases | Saudi Arabia |
| 2010 | - Rabigh Power Plant II Project | SEC | Saudi Arabia |
| | - SUPPLY OF CP TR/TECTIFIER | SABIC | Saudi Arabia |
| 2011 | - Rabigh Power Plant II Project | SEC | Saudi Arabia |
| | - SUPPLY OF CP TR/TECTIFIER | SABIC | Saudi Arabia |

9.0 References for Saudi Arabia

| Year | Project | Customer | Country |
|------|---------------------------------------|--------------------------------|--------------|
| 2012 | - Tihama stage II | Tihama Power Generation Co | Saudi Arabia |
| | - Qurayyah Independent Power Project | HAJR | Saudi Arabia |
| | - Rectifier Control board | Gabas Gulf Trading Contracting | Saudi Arabia |
| | - Shoaiba 2 Power Plant Project | SEC | Saudi Arabia |
| 2013 | - LPG Train4 Project | KNPC | Saudi Arabia |
| | - Butanol and Syngas Plant | Saudi Butanol Company | Saudi Arabia |
| | - Jeddah South Power Plant | SEC | Saudi Arabia |
| 2014 | - Saudi Elastomers Project | SABIC | Saudi Arabia |
| | - Petrol Chemical Quay2 | Sabic | Saudi Arabia |
| | - Umm Wu'al EPC Ammonia Plant Project | Saudi Arabian Mining Company | Saudi Arabia |
| 2015 | - SAMAC MMA-PMMA PROJECT | Sabic | Saudi Arabia |

9.0 References for U.A.E.

| Year | Project | Customer | Country |
|------|--|----------------------------------|----------------|
| 2008 | - Green Diesel Project | Takreer | U.A.E |
| | - Bab Gas Compression Project - SALALAH METHANOL PROJECT-DRAIN CABL | ADCO Salalah Methanol company | U.A.E U.A.E |
| 2009 | - Ruwais Refinery Project (PKG1) | Takreer | U.A.E |
| | - Inter Refineries Pipeline Project(Tank Farm PKG) | Takreer | U.A.E |
| | - Ruwais Refinery Project (PKG3) | Takreer | U.A.E |
| | - Ruwais Refinery Project (PKG4) | Takreer | U.A.E |
| | - IGD Habshan-5 (U&O) Project | GASCO | U.A.E |
| 2010 | - Borouge #4 XLPE PJT | ADNOC | U.A.E |
| | - Borouge3 U & O Project | ADNOC | U.A.E |
| | - Inter Refinery Pipeline-II Project(Pipeline PKG) | Takreer | U.A.E |
| | - Ruwais Refinery Project (PKG7) | Takreer | U.A.E |
| | - LBO Project | Takreer | U.A.E |
| | - Ruwais Refinery Project (PKG2) | Takreer | U.A.E |
| | - CBDC | Takreer | U.A.E |
| 2011 | | | |
| 2013 | | | |

9.0 References for Middle East Area

| Year | Project | Customer | Country |
|------|--|----------|---------|
| 2007 | - FMP Torr Vessel Project | KOC | Kuwait |
| | - Replacement of 9 Crude Oil Filling Lines Project | KOC | Kuwait |
| | - New GC-24 at Sabriyah Field | KOC | Kuwait |
| | - KOC Crude Oil Export Facilities Project | KOC | Kuwait |
| 2008 | - Shuaiba North Cogeneration Plant Project | MEW | Kuwait |
| | - Great Man Made River Project | GMRA | Libya |
| 2009 | - G05021/KOC Crude Oil Export Facilities PJT | KOC | Kuwait |
| | - CABLE & INTERNAL EQUIPMENT FOR BSTP | KOC | Kuwait |
| | - ZN RIBBON ANODE (480,000m) | GMRA | Libya |
| 2010 | - LSFO Pipeline Project | KOC | Kuwait |
| | - Sabiya Combined Cycle Gas Turbine Project | MEW | Kuwait |
| | - AL SARIR GAS POWER PLANT PROJECT | GMRA | Libya |
| | - Great Man Made River Project | GMRA | Libya |

9.0 References for Middle East Area

| Year | Project | Customer | Country |
|------|---|----------|---------|
| 2010 | - LSFO Pipeline Project | KOC | Kuwait |
| | - Specialized Cathodic Protection Services Four (4) years CP maintenance /repair | KOC | Kuwait |
| | - New BS-132 & Enhancements | KOC | Kuwait |
| 2011 | - KOC wara Pressure Maintenance | KOC | Kuwait |
| | - KNPC North LPG Tank Farm(NLTF) Project | KNPC | Kuwait |
| 2012 | - Installation of Telemetry | KOC | Kuwait |
| 2013 | | | |

9.0 References for Other Area

| Year | Project | Customer | Country |
|------|--|-------------------------------------|--------------|
| 2007 | - EGP-3 Project | Shevron | Nigirea |
| | - Salalah Methanol Project | Salalah Methanol | Oman |
| | - Sohar Aromatic Project | Aromatic Oman | Oman |
| 2008 | - PTT LNG Terminal | PTT | Thailand |
| | - HMC PP Line-3 Project | HMC Polymer | Thailand |
| 2009 | - Al-Dur IWPP Project | Al-Dur Power and Water | Bahrain |
| | - GHECO One Project | GHECO One | Thailand |
| | - JETTY DEVELOPMENT AND LNG RECEIVING TERMINAL | PTT | Thailand |
| | - SIPCO 160 MW CAPP | Siam Power | Thailand |
| 2010 | - Skikda Project | Sonatrach | Algeria |
| | - SLNG Project | SLNG Corp. | Singapore |
| | - DINH VU Polyester Project | PVTEX | Vietnam |
| 2011 | - Singapore LNG Terminal | Singapore LNG Corporation | Singapore |
| 2012 | - Dumai LBO Plant Pertamina RY2 | Parta SK | Indonesia |
| | - Norte 2 CCGT | InterGen | Mexico |
| | - Qatar Laffan Refinery DHT Project | Ras Laffan Refinery Co.,LTD | Qatar |
| | - Jurong Aromatic Complex Project | Jurong Aromatic Complex | Singapore |
| | - PTT LNG Traning | PTT LNG Co., Ltd | Thailand |
| | - Tufan beyli thermal power plant | Enerji SA | Turkey |
| 2013 | - SM200 Phase 1 Project | SARANGANI Energy Co. | Philippines |
| | - Laffan Refinery Phase 2 Project | Laffan Refinery Co. Limited | Qatar |
| | - Turkmenbashi Oil Refinery Reconstruction Project | Turkmenbashi Oil Processing Complex | Turkmenistan |
| | - UGCC Project | Uz-Kor Gas Chemical | Uzbek |
| | - O MON | EVN | Vietnam |

10.0 Products

10.1 Products

1. General

There are a variety of impressed current anodes including lead-silver, platinum-titanium, platinum-niobium, and mixed metal oxide titanium anodes. These anodes usually are capable of providing very high current output while experiencing very low consumption.



| Anode Material | Consumption Rate(kg/A · yr) | Current Density (A/m ²) | Maximum Voltage(Volt) |
|----------------|-----------------------------|-------------------------------------|-----------------------|
| Pb-Ag | 0.014 ~ 0.027 | 300 | 60 |
| Pt-Ti | 1 x 10 ⁻⁵ Max | 1000 | 8 |
| Pt-Nb | 1 x 10 ⁻⁵ Max | 1000 | 60 |
| MMO-Ti | 1 x 10 ⁻⁶ Max | 200 ~ 400 | 60 |

2. Application

Typical applications include large condensers and heat exchangers in power plants, offshore structures, above ground and underground storage tanks, and pipelines.

High Silicon Cast Iron (HSCI) anodes have been successfully used for many decades. HSCI anodes that contain chromium are widely used and meet ASTM A518 Grade 3 specifications. These anodes are typically installed in ground beds made from coke breeze.

| Nominal Dimension(Inches) | | Nominal Weight | Nominal Area | |
|---------------------------|--------|----------------|--------------|----------------|
| Diameter | Length | (lbs) | Sq.ft | m ² |
| 1 1/2 | 60 | 26 | 2.0 | 0.19 |
| 2 | 60 | 44 | 2.6 | 0.24 |
| 3 | 60 | 110 | 4.0 | 0.37 |
| 1.1 | 9 | 1.1 | 0.22 | 0.02 |
| 1 1/2 | 24 | 11 | 0.79 | 0.073 |

Solid Types

| Nominal Dimension(Inches) | | Nominal Weight | Nominal Area | |
|---------------------------|----------|----------------|--------------|----------------|
| Diameter | Length | (lbs) | Sq.ft | m ² |
| 2.2(56) | 60(1520) | 36(16kg) | 3.0 | 0.28 |
| 2.2(56) | 84(2130) | 50(23kg) | 4.2 | 0.39 |
| 2.6(66) | 60(1520) | 50(23kg) | 3.5 | 0.33 |
| 3.8(97) | 84(2130) | 95(43kg) | 7.0 | 0.65 |
| 4.8(122) | 84(2130) | 122(57kg) | 8.8 | 0.82 |

Tubular Types

| | |
|--------------------------------|-----------|
| Consumption rate (lbs/ A · yr) | 0.3 ~ 1.1 |
|--------------------------------|-----------|

| Chemical Composition (%) | |
|--------------------------------|-----------------------------|
| HSCI ANODE (ASTM A518 Grade 3) | COKE BREEZE (Loresco, SC-2) |
| Si : 14.20 ~ 14.75 | Carbon : 99.54 Min |
| Cr : 3.25 ~ 5.00 | Ash : 0.41 Max |
| C : 0.70 ~ 1.10 | Moisture : 0.05 |
| Mn : 1.50 Max | Volatiles : 0(950°C) |
| Cu : 0.50 Max | |
| Mo : 0.20 Max | |

10.1 Products

Aluminium Anode

Aluminium Anode

3. Application

Platforms, Docks, Berges, Steel pile, Pier, Tank and Vessels containing oil field brine, Condenser, Heat Exchangers, Ship Ballast Tank, Offshore Pipeline Etc.

| Chemical Composition (%) | |
|--------------------------|------------------|
| Zn : 1.0 ~ 5.0 | Sn : 0.01 ~ 0.15 |
| In : 0.006 ~ 0.03 | Mg : 1.0 ~ 3.0 |
| Fe : 0.1 Max | Al : Balance |

4. Nominal Dimension And Weight

| Type | Dimension(mm) B X H X L | Weight(kg) | |
|--------------|----------------------------|------------|--------------|
| | | Net Weight | Gross Weight |
| SDPA - 5 - 1 | 145 X 125 X 400 | 9.8 | 12.8 |
| SDPA - 5 - 2 | 135 X 115 X 700 | 14.7 | 18.4 |
| SDPA - 5 - 3 | 130 X 105 X 1,050 | 19.3 | 23.8 |
| SDPA - 5 - 4 | 125 X 100 X 1,400 | 23.6 | 31.6 |
| SDPA - 5 - 5 | 120 X 100 X 1,800 | 29.2 | 38.6 |
| SDPA - W - 1 | 30 X 100 X 200 | | 1.8 |
| SDPA - W - 2 | 30 X 150 X 300 | | 3.8 |
| SDPA - W - 3 | 35 X 200 X 300 | | 5.7 |
| SDPA - W - 4 | 40 X 200 X 300 | | 6.3 |
| SDPA - W - 5 | 35 X 200 X 400 | | 7.4 |
| SDPA - B - 1 | 30 X 100 X 200 | | 1.5 |
| SDPA - B - 2 | 30 X 150 X 300 | | 3.3 |
| SDPA - B - 3 | 35 X 200 X 300 | | 5.3 |
| SDPA - B - 4 | 40 X 200 X 300 | | 5.8 |
| SDPA - B - 5 | 35 X 250 X 400 | | 11.5 |

| Type | Dimension(mm) (B+Be) X H X L | Weight(kg) | |
|---------------|---------------------------------|------------|--------------|
| | | Net Weight | Gross Weight |
| SDPA - 20 - 1 | (215+190) X 210 X 300 | 34.4 | 38.5 |
| SDPA - 20 - 2 | (205+170) X 190 X 550 | 52.9 | 57.9 |
| SDPA - 20 - 3 | (190+170) X 180 X 800 | 70.0 | 75.9 |
| SDPA - 20 - 4 | (185+180) X 170 X 1,100 | 87.1 | 94.0 |
| SDPA - 20 - 5 | (180+150) X 165 X 1,400 | 102.9 | 110.9 |
| SDPA - 25 - 1 | (215+190) X 210 X 760 | 87.3 | 93.0 |
| SDPA - 25 - 2 | (215+180) X 195 X 1,050 | 109.2 | 116.0 |
| SDPA - 25 - 3 | (200+170) X 195 X 1,350 | 131.5 | 139.3 |
| SDPA - 25 - 4 | (190+170) X 190 X 1,650 | 152.4 | 161.3 |
| SDPA - 30 - 1 | (245+205) X 235 X 720 | 102.8 | 108.4 |
| SDPA - 30 - 2 | (225+195) X 230 X 1,000 | 130.4 | 137.0 |
| SDPA - 30 - 3 | (220+185) X 220 X 1,300 | 156.4 | 164.0 |
| SDPA - 30 - 4 | (220+180) X 210 X 1,600 | 181.4 | 190.1 |
| SDPA - 40 - 1 | (280+245) X 280 X 950 | 175.1 | 181.5 |
| SDPA - 40 - 2 | (270+230) X 255 X 1,200 | 206.6 | 213.9 |
| SDPA - 10 - 1 | (145+120) X 140 X 380 | 19.0 | 21.9 |
| SDPA - 10 - 2 | (135+115) X 130 X 650 | 28.5 | 32.1 |
| SDPA - 10 - 3 | (130+105) X 120 X 960 | 36.5 | 42.9 |
| SDPA - 10 - 4 | (130+105) X 115 X 1,250 | 45.6 | 53.1 |
| SDPA - 10 - 5 | (125+100) X 110 X 1,650 | 55.1 | 64.0 |
| SDPA - 15 - 1 | (180+155) X 175 X 350 | 27.7 | 32.0 |
| SDPA - 15 - 2 | (170+145) X 160 X 600 | 40.8 | 46.0 |
| SDPA - 15 - 3 | (160+140) X 150 X 850 | 51.6 | 57.7 |
| SDPA - 15 - 4 | (160+135) X 140 X 1,150 | 64.1 | 71.2 |
| SDPA - 15 - 5 | (150+125) X 140 X 1,500 | 78.0 | 86.4 |
| SDPA - T - 1 | (50+80) X 55 X 1,000 | 7.5 | 8.5 |
| SDPA - T - 2 | (44+58) X 51 X 1,220 | 8.2 | 9.2 |
| SDPA - T - 3 | (45+50) X 50 X 1,500 | 9.5 | 10.5 |
| SDPA - T - 4 | (51+72) X 72 X 1,000 | 11.5 | 12.5 |
| SDPA - T - 5 | (77+84) X 80 X 1,000 | 17.5 | 18.1 |

10.1 Products

Magnesium Anode

Magnesium Anode

1. General



Magnesium anodes are one of the most widely used sacrificial anodes for underground structures and certain aqueous environments. Magnesium anodes have the highest driving potential for sacrificial anodes and can be used in high resistivity soils and waters. Magnesium anodes are available in a wide variety of shapes and sizes for different applications.

2. Product Properties

| Open Circuit Potential Cu/CuSO ₄ (-mv) | Theoretical Current Capacity (A·hr/kg) | Effective Current Capacity (A·hr/kg) | Current Efficiency(%) | Consumption Rate(kg/A·yr) | Specific Gravity |
|---|--|--------------------------------------|-----------------------|---------------------------|------------------|
| 1,650 | 2,200 | 1,100 | 50 | 8 | 1.80 |

3. Chemical Composition

| Element | Backfill material |
|-------------------|---------------------|
| Al : 0.01% Max | Gypsum : 75% |
| Mn : 0.5 ~ 1.3% | |
| Cu : 0.02% Max | Bentonite : 20% |
| Ni : 0.001% Max | |
| Fe : 0.03% Max | Sodium Sulfate : 5% |
| Others : 0.3% Max | |
| Mg : Balance | |

4. Application

Underground piping systems, Tank bottoms, Temporary cathodic protection.

5. Caution for Installation

1. When installing Mg anodes underground, the area surrounding the anode should be filled with fine soil minimizing stones and gravel.
2. If possible, anode installation should be at least 30 cm away from the structure that will be protected.

6. Nominal Dimension And Weight

| Type | Weight(lbs/kg) | | Weight(lbs/kg) | | | | |
|------|----------------|------------|----------------|------------|--------------|------------|-------------|
| | Bare | PKGD | A | B | C | D | E |
| 3D3 | 3(1.36) | 12(5.44) | 3 1/2(88) | 3 3/4(95) | 5(127) | 6(152) | 10(254) |
| 5D3 | 5(2.26) | 17(7.71) | 3 1/2(88) | 3 3/4(95) | 8 1/2(215) | 6(152) | 12(304) |
| 9D2 | 9(4.08) | 35(15.87) | 2 3/4(70) | 3(76) | 21 1/4(540) | 6(152) | 25(635) |
| 9D3 | 9(4.08) | 27(12.24) | 3 1/2(88) | 3 3/4(95) | 13 1/4(337) | 6(152) | 17(431) |
| 14D2 | 14(6.35) | 50(22.68) | 2 3/4(70) | 3(76) | 32 3/4(832) | 6(152) | 37(939) |
| 17D2 | 17(7.71) | 60(27.21) | 2 3/4(69) | 3(76) | 39 5/8(1006) | 6(152) | 44(1117) |
| 17D3 | 17(7.71) | 45(20.41) | 3 1/2(88) | 3 3/4(95) | 25 5/8(625) | 6 1/2(165) | 39(736) |
| 32D3 | 32(14.51) | 91(41.27) | 3 1/2(88) | 3 3/4(95) | 45 1/4(1149) | 6 1/2(165) | 53(1346) |
| 32D5 | 32(14.51) | 74(33.56) | 5 1/2(139) | 5(127) | 20 9/16(522) | 8(203) | 25 3/4(654) |
| 40D3 | 40(18.14) | 105(47.62) | 3 1/2(88) | 3 3/4(95) | 59 3/4(1517) | 6 1/2(165) | 66(1676) |
| 48D5 | 48(21.77) | 100(45.36) | 5 1/2(139) | 5 3/4(146) | 31 1/16(788) | 8(203) | 38(965) |

10.1 Products

1. General

Zinc has the longest history for use as a sacrificial anode in cathodic protection. It has been widely used for many decades in marine and soil applications. Zinc anodes are typically used in low resistivity soils ($< 1000 \Omega\text{-cm}$) and in seawater and produced brines. Zinc anodes can also be used as a long-lasting electrical ground and in the 99.99% pure special form can be used as permanent reference electrodes under tank bottoms and inside vessels.

Chemical Composition(%)

Al : 0.1 ~ 0.5
Cd : 0.05 ~ 0.3
Zn : Balance

2. Product Properties

| Open Circuit Potential Cu/CuSO ₄ (-mv) | Theoretical Current Capacity (A·hr/kg) | Effective Current Capacity (A·hr/kg) | Current Efficiency(%) | Consumption Rate(kg/A·yr) | Specific Gravity |
|---|--|--------------------------------------|-----------------------|---------------------------|------------------|
| 1,100 | 820 | 780 | 95 | 11.23 | 7.1 |

4. Application

Condenser, Hull, Ballast tank, Pier, Pile, Off-shore pipeline, Heat exchanger, Grounding cell etc.

3. Chemical Composition

| Type | Dimension(mm) | Weight(kg) | |
|----------|-------------------|------------|--------------|
| | B X H X L | Net Weight | Gross Weight |
| SDPA-5-1 | 145 X 125 X 400 | 9.8 | 12.8 |
| SDPA-5-2 | 135 X 115 X 700 | 14.7 | 18.4 |
| SDPA-5-3 | 130 X 105 X 1,050 | 19.3 | 23.8 |
| SDPA-5-4 | 125 X 100 X 1,400 | 23.6 | 31.6 |
| SDPA-5-5 | 120 X 100 X 1,800 | 29.2 | 38.6 |
| SDPA-W-1 | 30 X 100 X 200 | | 1.8 |
| SDPA-W-2 | 30 X 150 X 300 | | 3.8 |
| SDPA-W-3 | 35 X 200 X 300 | | 5.7 |
| SDPA-W-4 | 40 X 200 X 300 | | 6.3 |
| SDPA-W-5 | 35 X 200 X 400 | | 7.4 |
| SDPA-B-1 | 30 X 100 X 200 | | 1.5 |
| SDPA-B-2 | 30 X 150 X 300 | | 3.3 |
| SDPA-B-3 | 35 X 200 X 300 | | 5.3 |
| SDPA-B-4 | 40 X 200 X 300 | | 5.8 |
| SDPA-B-5 | 35 X 250 X 400 | | 11.5 |

10.1 Products

1. Anode dimensions and weight



(Table 1) Dimension and weight

| Type | Dimensions | | | | Weight (kg/m) |
|----------|------------|-------|---------------------------------|------------------------|---------------|
| | A(mm) | B(mm) | C(m/coil) | Dia. of steel core(mm) | |
| Super | 25.4 | 31.75 | 30.5 | 4.70 | 3.57 |
| Plus | 15.88 | 22.23 | 61 | 3.43 | 1.78 |
| Standard | 12.7 | 14.29 | $\frac{152.4 \times 305}{1000}$ | 3.30 | 0.89 |
| Small | 8.73 | 11.91 | 305 | 2.92 | 0.37 |

2. Anode Properties

- (1) Close Circuit Potential : More negative than (-) 1.05V (VS Cu/CuSO₄ Ref. electrode)
- (2) Open Circuit Potential : More negative than (-) 1.10V (VS Cu/CuSO₄ Ref. electrode)
- (3) Current Capacity : Min, 780 A.Hrs/Kg

3. Anode Composition (ASTM B418 Type II)

| Type | (%) | Remarks |
|------|-------------|---------|
| Al | 0.005% Max | |
| Cd | 0.003% Max | |
| Fe | 0.0014% Max | |
| Pb | 0.003% Max | |
| Cu | 0.002% Max | |
| Zn | Remainder | |

(Table 2) Chemical Compositions

1.1 The shape of zinc anode shall be lozenge-like, which length, diameter and weight depend on the customers' requirements.

1.2 The surface of zinc anode shall be clear and without any cracks, nicks, corrosive spots and embedded impurities.

10.2 RMS System

Advanced Remote Monitoring & Control System / Switch Mode Controlled & Oil Cooled Transformer Rectifiers

DYCE has provided switch mode controlled transformer rectifier(SMCR). Our transformer rectifier including remote monitoring and control products are very specified to the corrosion prevention industry.

All product including SMCR and RMCS are designed through satisfied standard of international engineering standards as NACE, BS, IEC, and all products are produced through strict safety standards, quality standard and procedure.

Our SMCR has been developing to gratify various requires of client. As a result, our SMCR was approved and supplies from Oil & Gas companies as TAKREER, GASCO, ADCO, SABIC, KOC, and so on. For detail specification and function, please see SMCR data sheet.

Application

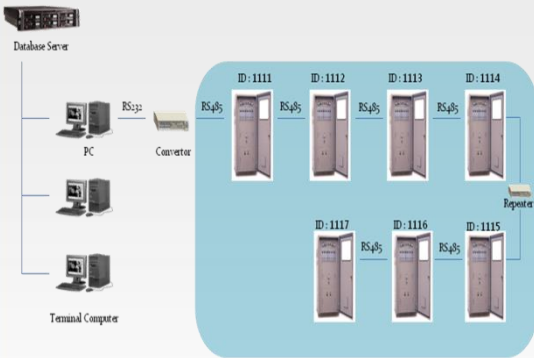
1. Industrial chemical complex.
2. Power plant
3. Long transportation pipeline.
4. Offshore structure.

Attachment

1. Data Sheet for switch mode controlled transformer rectifier(SMCR).
2. SMCR outline drawing.
3. SMCR schematic diagram.



10.2 RMS System



Advanced Remote Monitoring & Control System

With almost 40 years of experience of CP system design, installation, operation and maintenance, we provide following functions of Remote monitoring and Control system through user interface.

Through embodied functions, we can gather and provide exact operating information of every CP system from small to big areas in a timely manner. With this function, we can prevent environmental pollution and reinvestment in equipment caused by corrosion and create financial effect.

■ Basic Function of RMCS

- Measurement and adjustment of CP rectifier's input and output.
- Measurement and adjustment of impressed current anode output.
- Measurement of structure to electrolyte potentials.

In addition to the above tasks, the following reports are automatically generated at user selected frequency :

- Current status of rectifiers and anodes
- Structure to electrolyte potentials of all or selected items
- * This function is optimized to engineering standard of UAE ADNOC including Takreer.

■ Advantage of RMCS Software

- Possible to confirm live operation status and location of CP equipment through inter-working system with site plan.
- Adopted User interface for user's convenience.
- Continuous technical support by feedback with customers as well as site condition.



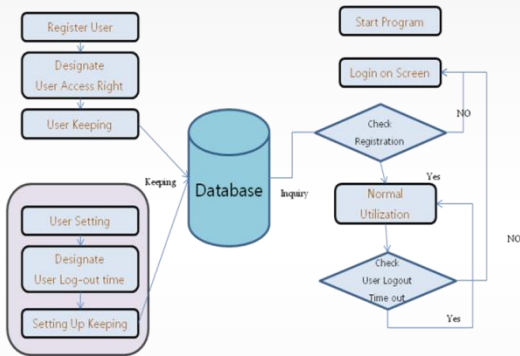
10.2 RMS System

Advanced Remote Monitoring & Control System

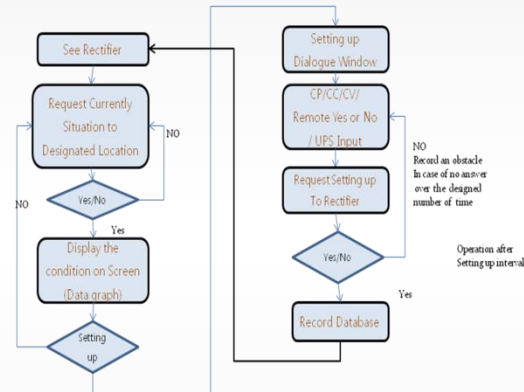
Our RMCS software were improved by continuous feedback with users. By our open feedback and engineering services, we provide effective corrosion control and CP system maintenance.

Basic logic diagram of RMCS software are as follows.

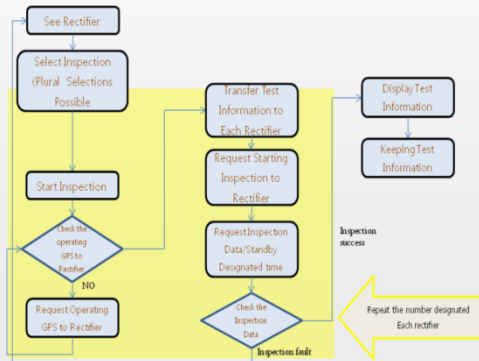
Logic Diagram



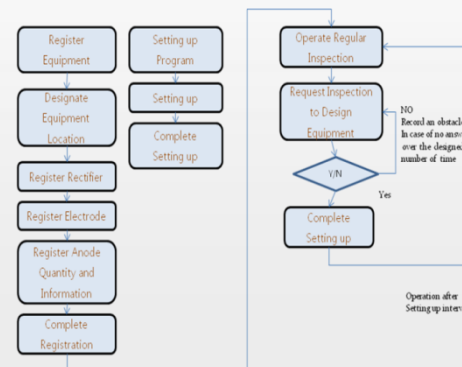
Status of equipment checking and setting up



Logic for equipment, installation resistor and regulation inspection



Status of equipment checking and setting up



THANK YOU

DYCE
G L O B A L