WAY AHEAD IN CORROSION CONTROL

OFFSHORE PIPELINE

Prequalification Package
Complete Corrosion Services and Solutions

DEEPWATER

CONTENTS

EXECUTIVE SUMMARY

Deepwater Corrosion Services, Inc. is the technology leader in external corrosion management of offshore pipelines. For 30 years, the company has been innovating improvements in offshore pipeline surveillance and life extension.

The attached experience list outlines almost 200 pipeline projects completed over 30 years on pipelines across the world. Headquartered in Houston, with six strategic international offices and a dozen international partners, we are optimally positioned to take care of your offshore pipeline.

Our unique product range includes patented solutions to ensure maximum integrity at minimal cost. The development of the RetroClamp™ in 2000 enabled an entire suite of anode retrofit systems and monitoring equipment for rapid installation on pipelines and subsea production infrastructure. Our offshore innovations coupled with 30 years of applied experience are why Deepwater should be your partner of choice.

Deepwater can handle all aspects of your project:

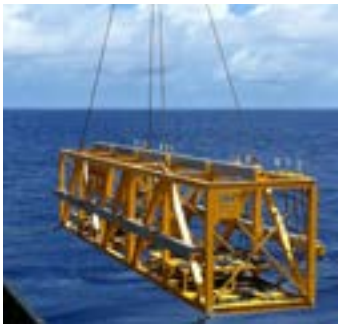
- Condition assessment using our Polatrak® survey systems and offshore inspection crews.
- Cathodic protection design using in-house engineering expertise and modeling software.
- Retrofit life extension using our wide range of clamp-on anode technologies such as:
  - RetroClamp™
  - RetroMat™
  - RetroSled™
  - RetroLink™
- Ongoing verification using our Polatrak fixed monitoring systems.
- Patented underwater test stations.

The attached document describes the world-class people, services and manufacturing that is Deepwater Corrosion Services Inc. Our experience is unparalleled.

Sincerely,

Jim Britton
CEO

COMPANY OVERVIEW



As the energy industry grows more complex, so do the new challenges that continue to drive our corrosion engineers and designers. New depths, new life requirements and new materials create an ever-evolving mix of cathodic protection and corrosion mitigation issues.

Deepwater draws from decades of specialized corrosion engineering and manufacturing experience to solve real-world problems. We design and build cathodic protection systems and subsea monitoring devices for all offshore applications.

We Are Corrosion Experts

With worldwide reach from our six offices, Deepwater is well-versed in every type of asset, from platforms to wind turbines, FPSOs, and pipelines. We strive to maintain a superior understanding of the offshore corrosion process, enabling us to provide best-in-class solutions for:

Cathodic Protection

We develop more efficient and affordable alternatives to traditionally-installed anode systems. While conventional sacrificial anodes are still viable for some new projects, they are often difficult and expensive to replace when they become depleted. Our proprietary systems can quickly and efficiently add decades of life to any asset in any environment.

Subsea Inspection

Deepwater can mobilize and conduct subsea surveys anywhere in the world using our line of Polatrak® instruments and software. Finite and attenuation modeling for pipelines coupled with patented underwater CP test stations mean our advanced survey methods get most jobs done at half the time and 20% the cost of traditional survey methods.

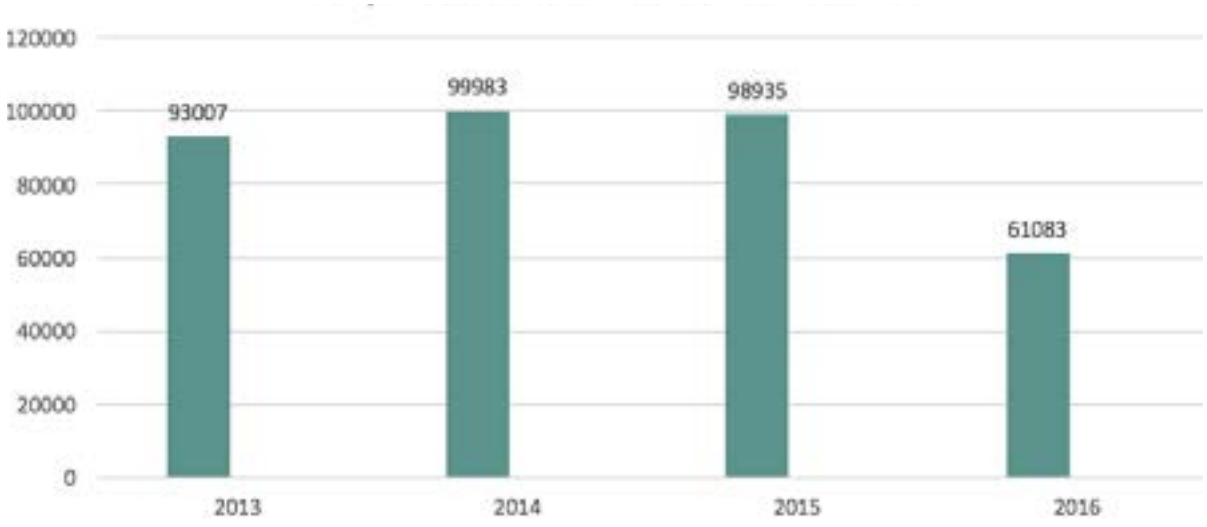
Corrosion Investigation

Our doctoral-level corrosion specialists are practiced masters at failure analysis, corrosion testing, third party verification and long term laboratory testing. We test, analyze, model, and solve corrosion issues on everything from simple subsea fasteners to entire production fields. Deepwater engineers find the answers needed to develop practical solutions.

SAFETY RECORD

Deepwater Corrosion Services, Inc. ensures safety is the top concern for any and all projects. Health, Safety and Environmental (HSE) responsibilities are integral to the way we do business. Successfully managing HSE issues is an essential component of our business strategy. Through observance and encouragement of our HSE Policy, Environmental Policy, and Quality Policy, we assist in protecting the overall well-being of our employees, clients, subcontractors, and environment.

Deepwater Corrosion Services 4-Year TRIR



Year	Exposure Hours	TRIR
2013	93,007	0
2014	99,983	0
2015	98,935	0
2016	61,083	0

QUALITY CERTIFICATES

ISO 9001:2007

Certificate Number:	778
Date Issued:	29 January 2015
Registered Activities:	Design, engineering, and manufacture of pipe support and corrosion prevention systems

ISO 14001:2004

Certificate Number:	EN 1314
Date Issued:	8 August 2016
Registered Activities:	Design, engineering, and manufacture of pipe support and corrosion prevention systems

OHSAS 18001

Certificate Number:	OH 1362
Date Issued:	8 August 2016
Registered Activities:	Design, engineering, and manufacture of pipe support and corrosion prevention systems

INSURANCE COVERAGE

Coverage		Amount
General Liability		
	Each Occurrence	$1,000,000 USD
	General Aggregate	$2,000,000 USD
	Professional Liability (Each Wrongful Act)	$1,000,000 USD
Workers Compensation		**Statutory**
Bodily Injury by Accident (Each Accident)		$1,000,000 USD
Bodily Injury by Disease (Each Employee)		$1,000,000 USD
Bodily Injury by Disease (Policy Limit)		$1,000,000 USD
Excess Liability		
Each Occurrence; Each Claim; Each Pollution Condition		$10,000,000 USD
General Aggregate		$10,000,000 USD
Excess Charterers Legal Liability & Maritime Employers Liability		
Any One Accident		$10,000,000 USD

MANUFACTURING CAPABILITIES

We manufacture our proprietary anode systems, monitoring systems, inspection tools, and pipe support solutions in-house. The products Deepwater sells in America are made by Americans. Some manufacturing for other global markets is done at our various worldwide locations, but the bulk of production is carried out within our Houston headquarters' 37,775 sq. ft. of dedicated manufacturing space containing:

Heavy Fabrication and Welding
Manufacturing robust, long-lasting subsea hardware demands quality, heavy-duty materials. Our metal fabrication and welding teams have honed their craft over decades of careful and methodical construction of highly-technical, ultra-durable offshore systems to extend the lives of assets.

Cutting-Edge CNC
Bespoke retrofits often require bespoke components. Three state-of-the-art CNC machines bring rapid precision machining capabilities fit to craft any component required to get the job done. If we can think it, we can create it quickly and efficiently. An ability to rapidly machine custom parts also bolsters our research and development endeavors.

Water Jet, Sandblasting, Paint, and Coatings
Our precision water jets are able to cut the hardest materials with unparalleled speed and accuracy. Deepwater boasts jumbo sandblasting and paint bays for finishing of especially large assets or speciality coating application.

Facility Information and Utilization

Building and Land:

Land Area	10.66 Acres
Building total sq/ft	67,855 sq/ft
Warehouse	7,600 sq/ft
CNC/Machining	2,200 sq/ft
Pipe Supports	3,000 sq/ft
Administrative & Office	11,500 sq/ft
General & Heavy Fabrication	22,000 sq/ft
Coating	2,975 sq/ft

GLOBAL LOCATIONS

HOUSTON
Deepwater Corrosion Services, Inc.
13813 FM 529 RD
Houston, TX 77041
USA

Tel: +1 713 983 7117
Fax: +1 713 983 8858
Email: sales@stoprust.com

ABERDEEN
Deepwater EU Ltd.
The Westhill Business Centre
Arnhall Business Park
Westhill, Aberdeen
AB32 6UF
Scotland

Tel: +44 (0)1224 443523
Fax: +44 (0)1224 626227
Email: sales@stoprust.com

BRAZIL
Deepwater Do Brasil Engenharia Ltda
Avenida Presidente Vargas,
633, Sala 2021, Centro
Rio de Janeiro
CEP: 20.071-905 RJ
Brasil

Tel: +55 021 2252-2172

LONDON
Deepwater EU Ltd.
4.8 Frimley Business Park
Frimley, Camberley
Surrey, GU16 7SG
United Kingdom

Tel: +44 (0) 1483 600482
Fax: +44 (0) 1483 901447

NORWAY
Deepwater Norway AS
Neptunveien 6-7652
Verdal
Norway

Tel: +47 902 45 119
Email: swigen@stoprust.com

PERTH
Deepwater Australasia Pty Ltd
FLUX, Level 1, 191 St Georges Terrace
Perth, WA, 6000

Tel: +61 8 6298 7396
Email: sales@stoprust.com

PRINCIPAL PERSONNEL

James N. Britton
CEO

Summary:
Jim Britton has worked around the world in the corrosion and cathodic protection industry since 1972 and founded Deepwater Corrosion Services in 1986. He holds several patents and has published dozens of papers as an authority on offshore corrosion control. Jim is an active member of NACE and the Marine Technology Society.

Areas of Expertise:
- Cathodic Protection
- Coatings
- Materials Selection
- Inspection, ROV Technology
- Product Development
- Offshore Cathodic Protection
- Offshore Inspection
- Ships & MODUs
- Docks, Jetties & Harbors
- Tanks & Vessels
- Application Process

Qualifications:
BS Corrosion Technology
[Equivalency determined by INS for visa]

Dick Baxter
Offshore Project Advisor

Summary:
Cathodic Protection field services, design and engineering with over 40 years of experience. The last 22 years have been spent at Deepwater. Has worked on numerous product developments and consulting projects. Baxter has an in-depth understanding of crevice corrosion, shielding and cathodic protection only exprience provides.

Areas of Expertise:
- Cathodic Protection System Design
- Pipeline Attenuation
- Internal Pipe Joint Corrosion
- Hydrogen Evolution
- Metallurgy
- Platforms
- Pipelines

Qualifications:
- B.S. in Extractive Metallurgy
- NACE Corrosion Specialist

Brian Gibbs
Projects and Engineering Manager

Summary:
Formerly director of a consulting division covering business development, bidding, contract negotiation and project execution, Gibbs excels in development and implementation of highly effective asset integrity management (AIM) solutions for a wide range of offshore and onshore oil and gas, and other industries' assets.

Areas of Expertise:
- Corrosion Management
- Risk-Based Verification (ivb / Cva)
- Risk-Based Inspection
- Incident Investigation
- Life-extension Assessments / Implementation
- Managing Aging Infrastructure
- Risk Assessment

Qualifications:
- BSc Civil Engineering, Polytechnic of Wales (UK)
- NACE Corrosion Specialist

Matthew L. Taylor, Ph.D, E.I.T
Head of Science & Technology

Summary:
Dr. Taylor is both a Ph.D in Materials Science and Engineering, and a Professional Engineer recognized by the Texas Board of Professional Engineers. Dr. Taylor reviews and audits engineering department deliverables while providing critical Research and Development, Product Design, and Failure Analysis expertise.

Areas of Expertise
- Material Science & Metallurgy
- Platform Cathodic Protection
- Laboratory Management
- Failure Analysis
- Corrosion Chemistry
- Corrosion Survey
- Subsea Data Logging
- Inspection Tools
- ROV Technology
- Pipeline Cathodic Protection

Qualifications:
- Ph.D. Materials Science & Engineering, The Pennsylvania State University (PSU)
- M.S. Metallurgical Engineering, University of Nevada, Reno (UNR)
- B.S. Materials Science & Engineering, Georgia Institute of Technology (GT)
- National Association of Corrosion Engineers (NACE) since 2005 (#118933)
- Member of The Electrochemical Society since 2008

Adam Earle, P.E., PMP
Field Operations Manager

Summary:
A Civil Engineer and Professional Engineer, Mr. Earle brings practica experiencel and technical knowledge to the Deepwater Team. With 20 years in the business, leading Field Operations where he ensures the safe, swift and successful design and delivery of offshore corrosion prevention and cathodic protection systems all over the world.

Areas of Expertise:
- Offshore CP Design
- CP Retrofit Project Management
- Offshore CP System Installation
- Materials Consulting
- Transformers / Rectifiers
- Pipeline CP Surveys
- Continuity Testing
- Special Surveys of Subsea Systems
- Fixed Jacket Production Platforms
- Drilling and Foundation Templates
- Single Leg Caissons
- Tension Leg Platforms
- Production Barges
- Storage Barges

Qualifications:
- B.S. Civil Engineering, University of Houston
- Professional Engineer (License No. 101058)
- Project Management Professional (License No. 1674229)
- NACE CP 2 – Cathodic Protection Technician

OFFSHORE PIPELINE EXPERIENCE

Year	Customer	Location	Description
1987	Arco Oil & Gas Company	Southern LA Wetlands	Pipeline CP Survey
1988	Phillips Petroleum	GOM - Corpus Christi	Pipeline CP Survey
1988	Shell Offshore Inc.	Onshore Study	Direct Cast Bracelet Study
1988	Exxon Company USA	GOM - Mississippi Canyon - lena	Pipeline CP Survey
1988	Shell Offshore Inc.	GOM - East Bay	Retrofit Design – Infield Flowlines
1989	Shell Offshore Inc.	GOM - Pompano & Cobia Pipelines	Pipeline CP Survey
1989	Zapata Oil & Gas	GOM - High Island	Pipeline CP Survey
1989	Shell Pipeline Company	GOM - Eugene Island Area	Pipeline CP Survey
1990	Marathon Oil Company	GOM - West Delta	Pipeline CP Survey
1990	Shell Offshore Inc.	GOM - Vermillion Area	Pipeline CP Survey
1990	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Pipeline CP Survey
1990	Shell Offshore Inc.	GOM - Yellowhammer	Design & Supply Pipeline Monitoring System
1990	Shell Offshore Inc.	GOM - Tarpon Pipeline	Pipeline CP Survey
1990	Shell Offshore Inc.	GOM - South Pass 27	Pipeline Database & Risk Assessment
1991	Samedan Oil Company	GOM - Bastian Bay	Pipeline CP Survey
1991	Arco Oil & Gas Company	GOM - South Timbalier	Pipeline CP Survey
1991	Shell Pipeline Company	GOM - Various Pipelines	Pipeline CP Survey
1991	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Pipeline CP Survey
1992	Shell Offshore Inc.	GOM - Bud Pipeline	Pipeline Lay Monitoring
1992	British Cas	Caribbean Sea - Trinidad	Pipeline CP Survey
1992	Marathon Oil Company	Gulf of Guinea - Alba	Pipeline CP Design
1992	Petroleos Mexicanos (PEMEX)	Campeche Area	Pipeline CP Survey
1993	Shell Oil Company	GOM - Various Pipelines	Pipeline Lay Monitoring
1993	Exxon Pipeline Company	GOM - South Pass Area	Pipeline CP Survey
1993	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Pipeline CP Survey
1994	Marathon Oil Company	GOM	Pipeline CP Survey
1994	Samedan Oil Company	GOM - Main Pass 305	Pipeline CP Survey
1996	Amoco Pipeline	GOM - High Island (HIPS)	Design CP Retrofit System
1996	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Pipeline CP Survey
1996	Oryx Energy / Amoco Pileline	GOM - High Island 379	Pipeline CP Design
1996	Exxon Canada	North Atlantic - Hibernia	Pipeline CP Survey
1997	Shell Offshore Inc.	GOM - Auger	Pipeline CP Survey
1998	Equilon Pipeline	GOM - High Island	Pipeline CP Survey
1998	Marathon Oil Company	Gulf Of Guinea - Alba	Pipeline CP Design
1998	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Pipeline CP Survey
1998	British Cas	Caribbean Sea - Trinidad	Pipeline CP Survey
1998	Mobil	GOM - Chinook Pipeline	Design & Supply Pipeline Monitoring System
1998	Huber Petroleum	GOM - Grand Isle	Pipeline CP Survey
1999	BP	GOM - Green Canyon	Pipeline CP Survey
1999	Equistar	Southern LA Wetlands	Pipeline CP Survey
1999	Black Marlin Pipeline	GOM - High Island	Pipeline CP Design
1999	BP	Arctic Ocean - Northstar	Design & Supply Pipeline Monitoring System
1999	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Pipeline CP Survey
1999	Shell Deepwater Services	GOM - Angus, Macaroni, Europa	Pipeline CP Design - Attenuation Model
1999	Arco Pipeline	GOM - South Pass Area	Pipeline CP Survey
2000	Equilon Pipeline	GOM - Pompano & Cobia Pipelines	Design & Supply CP retrofit Systems
2000	Samedan Oil Company	GOM - Venice - South Pass	Design & Supply CP retrofit Systems

2000	Devon Energy	GOM -Bonita / Sleeping Turtle	Pipeline CP Survey
2000	BP	GOM - Amberjack	Pipeline CP Survey
2000	Phillips Alaska	Cook Inlet - Pipeline	Pipeline CP Survey
2000	BP Amoco	Caribbean Sea - Trinidad	Pipeline CP Survey
2000	William G Helis Co	GOM - Black Bay	Pipeline CP Design
2000	Equistar	Southern LA Wetlands	Pipeline CP Survey
2001	Equilon Pipeline	GOM - Eugene Island Area	Design & Supply CP retrofit Systems
2001	Phillips	Cook Inlet - Pipeline	Design & Supply CP retrofit Systems
2001	Samedan Oil Company	GOM - Main Pass Area	Retrofit
2001	PetroCanada	North Atlantic - Terra Nova	Pipeline CP Survey
2001	NGC Trinidad	Caribbean Sea - Trinidad	Pipeline CP Survey
2001	Century Offshore	GOM - Breton Sound	Pipeline CP Survey
2001	BP Indonesia	Java Sea	Pipeline CP Survey
2001	Kerr McGee	GOM - Boomvang, Nansen	Pipeline CP Design
2001	Project Consulting	GOM Gulfstream Pipeline	Pipeline CP Design
2001	ExxonMobil	GOM - Mobile Bay	Pipeline CP Design
2001	Hong Kong Power	Hong Kong Bay	Pipeline CP Survey
2002	Blue Dolphin Pipeline Company	GOM - Buccaneer Pipeline	Design & Supply CP retrofit Systems
2002	Shell Pipeline Company	GOM - Odyssey Pipeline	Design & Supply CP retrofit Systems
2002	Shell Pipeline Company	GOM - West Delta Area	Design & Supply CP retrofit Systems
2002	Phillips Alaska	Cook Inlet - Tyonek Pipeline	Pipeline CP Survey
2003	Marathon Ashland Pipeline Company	GOM - Various Pipelines	Design & Supply CP retrofit Systems
2003	Shell Pipeline Company	Southern LA Wetlands	Supply Retrofit Monitoring
2003	Amerada Hess	GOM - Conger	Pipeline CP Design
2003	Marathon Pipeline	GOM - East Cameron	Pipeline CP Survey
2003	Marathon Oil Company	GOM - Canyon Express	Pipeline CP Survey
2003	Marathon Oil Company	Gulf of Guinea - Alba	Pipeline CP Survey
2003	Phillips Alaska	Cook Inlet - Tyonek Pipeline	Pipeline CP Survey
2003	PetroTrin	Caribbean Sea - Trinidad	Pipeline CP Survey
2004	BP	GOM - Cameron Highway	Supply Clamps
2004	Cairn Energy	Inidan Ocean - Rawa	Supply Repair to Install Damage
2004	Gulf South Pipeline Company	Southern LA Wetlands	Supply Retrofit Monitoring
2004	Kerr McGee	GOM -Boomvang Flowline	Supply Repair to Install Damage
2004	Marathon Oil Company	Gulf of Guinea - Alba	Supply Repair to Install Damage
2004	Shell Pipeline Company	GOM - Eugene Island Area	Supply Repair to Hurricane Damage
2004	Shell Pipeline Company	GOM - Pompano Pipeline	Design & Supply CP retrofit Systems
2004	Tesoro Oil Company	Cook Inlet - Pipeline	Design & Supply CP retrofit Systems
2004	Tesoro	Cook Inlet - Pipeline	Pipeline CP Survey
2004	PetroCanada	North Atlantic - Terra Nova	Pipeline CP Survey
2004	Iroquois Pipeline	Long Island Sound	Pipeline CP Survey
2004	Kerr McGee	GOM - Red Hawk	Pipeline CP Design
2005	Marathon Ashland Pipeline Company	GOM - Various Pipelines	Design & Supply CP retrofit Systems
2005	Noble Energy Inc.	Southern LA Wetlands	Design & Supply CP retrofit Systems
2005	Premier Oil Company	Java Sea	Supply Repair to Install Damage
2005	Williams Midstream	GOM - Devils Tower	Supply Retrofit Monitoring
2005	Conoco	Coral Sea - PNG Line	Pipeline CP Survey

2006	Bahamas Oil Refining Co.	Caribbean Sea - Bahamas	Design & Supply CP retrofit Systems
2006	BP	Gulf of Guinea - Plutonia Flowlines	Supply Continuity Jumpers
2006	Brunei Shell Petroleum	South China Sea - PID 15	Design & Supply CP retrofit Systems
2006	Duke Energy	GOM - Houma Area	Supply Clamps, RetroMats
2006	Duke Energy	Southern LA Wetlands	Supply Retrofit Monitoring
2006	Century Offshore	GOM - Vermillion Area	Supply Clamps, RetroSleds
2006	Sarawak Shell	South China Sea	Supply Repair to Install Damage
2006	Shell Pipeline Company	GOM - Cobia Pipeline	Design & Supply CP retrofit Systems
2006	Shell Pipeline Company	GOM - SMI - Vermillion Area	Design & Supply CP retrofit Systems
2006	Spectra Pipeline	Southern LA Wetlands	Supply Retrofit Monitoring
2006	Williams Midstream	GOM - Blind Faith	Supply Retrofit Monitoring
2006	Williams Midstream	GOM - Gunnison	Supply Retrofit Monitoring
2006	Williams Pipeline	GOM - Boomvang	Supply Repair to Install Damage
2007	Apache North Sea	North Sea -Forties Area Infield Lines	Design & Supply CP retrofit Systems
2007	BP	Mad Dog - Risers	Supply Clamps
2007	Gulf South Pipeline Company	Southern LA Wetlands	Supply Retrofit Monitoring
2007	Marathon Oil Company	GOM - Arnold, Oyster Flowlines	Design & Supply CP retrofit Systems
2007	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Supply Clamps
2007	Petronas Carigali	South China Sea	Supply Clamps
2007	Shell Pipeline Company	GOM - Vermillion Area	Design & Supply CP retrofit Systems
2007	Spectra Energy	North Altlantic - Hub Line	Supply Retrofit Monitoring
2007	Stone Energy Company	GOM - Main Pass Area	Design & Supply CP retrofit Systems
2007	Taylor Energy	GOM - South Marsh Island	Design & Supply CP retrofit Systems
2008	ATP Oil & Gas	GOM - Independence Hub Risers	Design & Supply CP retrofit Systems
2008	China National Oil Co. (CNOOC)	South China Sea	Supply Clamps
2008	Enbridge Energy Partners	GOM - Manta Ray Pipeline	Design & Supply CP retrofit Systems
2008	Enstar	Cook Inlet - Pipeline	Supply Retrofit Monitoring
2008	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Supply Clamps
2008	Shell Pipeline Company	GOM - Central Gulf Gathering	Design & Supply CP retrofit Systems
2008	Shell Pipeline Company	GOM - Central Gulf Gathering	Supply RetroSled
2008	Shell Pipeline Company	GOM - Eugene Island Area	Design & Supply CP retrofit Systems
2008	Talisman	North Sea -Tartan	Supply Clamps
2009	BP Angola	Gulf of Guinea - Angola Flowlines	Supply Clamps
2009	BP Indonesia	Java Sea	Supply Clamps
2009	Exxon Malaysia	South China Sea	Design & Supply CP retrofit Systems
2009	Gulf South Pipeline Company	Southern LA Wetlands	Supply Retrofit Monitoring
2009	JGC Energy	Southern LA Wetlands	Design & Supply CP retrofit Systems
2009	Petronas Carigali	South China Sea	Supply Clamps, RetroSleds
2010	BP	North Sea	Supply Clamps
2010	Hilcorp Energy Co.	GOM - Varuious Pipelines (Infield)	Design & Supply CP retrofit Systems
2010	Total Congo	Gulf Of Guinea - Pipelines	Supply Clamps
2010	Chevron USA	GOM - Various Pipelines	Design & Supply CP retrofit Systems
2011	Marathon Ashland Pipeline Company	GOM - Various Pipelines	Supply Retrofit Monitoring
2011	Shell Pipeline Company	GOM - Eugene Island Area	Design & Supply CP retrofit Systems
2011	Petroleos Mexicanos (PEMEX)	GOM - Campeche Area	Supply Clamps
2011	CACT Operator Group	South China Sea	Supply Clamps
2011	Boardwalk Pipeline	GOM	Supply Clamps, RetroLinks

2011	Chevron USA	GOM - Bay Marchand	Design & Supply CP retrofit Systems
2011	CACT Operator Group	South China Sea	Design & Supply CP retrofit Systems
2011	Apache North Sea	North Sea - Forties	Design & Supply CP retrofit Systems
2011	TAQA	North Sea - Cormorant Area	Design & Supply CP retrofit Systems
2011	Exxon Malaysia	South China Sea	Supply Clamps
2012	Black Elk Energy	Southern LA Wetlands	Design & Supply CP retrofit Systems
2012	MC Offshore Petroleum	GOM	Design & Supply CP retrofit Systems
2012	DCOR LLC	US West Coast - Santa Barbara	Supply Retrofit Monitoring
2012	Total North Sea	North Sea - Alwyn	Design & Supply CP retrofit Systems
2012	Anadarko Petroleum	GOM - Nansen	Design & Supply CP retrofit Systems
2013	TAQA	North Sea - Brent Pipeline	Design & Supply CP retrofit Systems
2013	China National Oil Co. (CNOOC)	South China Sea - Liwan	Supply Clamps
2013	Williams Pipeline	GOM	Supply Clamps
2013	Petrobras	Campos Basin	Supply Clamps
2013	Marathon Pipeline	GOM	Supply Clamps, RetroMats
2013	Petronas Carigali	South China Sea	Supply Clamps, RetroSleds
2013	Premier Oil Company	Java Sea	Supply Clamps
2013	Spectra Energy	GOM	Supply Clamps, RetroSleds
2013	Shell Oil Company	GOM - Perdido	Supply Clamps, RetroSleds
2013	Shell Pipeline Company	GOM - Eugene Island Area	Design & Supply CP retrofit Systems
2013	Hess	GOM - Tubular Bells	Supply Clamps
2014	Saudi Aramco	Arabian Gulf	Supply Clamps
2014	Bunduq	Arabian Gulf	Design & Supply CP retrofit Systems
2014	Allseas Australia	Indian Ocean	Supply Clamps
2014	DCOR LLC	US West Coast - Santa Barbara	Supply Retrofit Monitoring
2014	Boardwalk Pipeline	Inshore Louisiana	Supply Retrofit Monitoring
2014	Chevron USA	GOM - Bay Marchand	Design & Supply CP retrofit Systems
2014	Spectra Pipeline	Southern LA Wetlands	Supply Retrofit Monitoring
2014	DCOR LLC	US West Coast - Santa Barbara	Supply Retrofit Monitoring
2014	Shell Pipeline Company	GOM	Supply Clamps, RetroSleds
2014	Petrobras	Campos Basin	Supply Clamps
2014	Hess	GOM - Tubular Bells	Supply Clamps
2014	Statoil	North Sea - Norway	Supply Clamps
2015	Petroleos Mexicanos (PEMEX)	Campos Basin	Supply Clamps
2015	C&C Technologies	Mexico	Beach Approach Inspection
2015	Spectra Energy	GOM	Design and Supply RetroSled
2015	Shell Pipeline Company	GOM	Pipeline CP Survey
2015	Crimson Gulf LLC.	GOM	Supply Clamps
2015	Shell Pipeline Company	GOM	Supply Clamps
2015	Helis Oil & Gas	GOM	Supply Bracelet Anodes
2015	Stone Energy Company	GOM	Supply Clamps, RetroSleds for 3 Pipline Segments
2016	Shell Oil Company	GOM - Amberjack	Supply Retrofit Monitoring
2016	Shell Pipeline Company	GOM	Supply Clamps
2016	Williams Pipeline	Houston Ship Channel	CP Consulting
2016	ExxonMobil	Malaysia Malaysia	F12 Pipeline CP Retrofit
2016	Shell Pipeline Company	GOM ICCP	Pipeline Survey

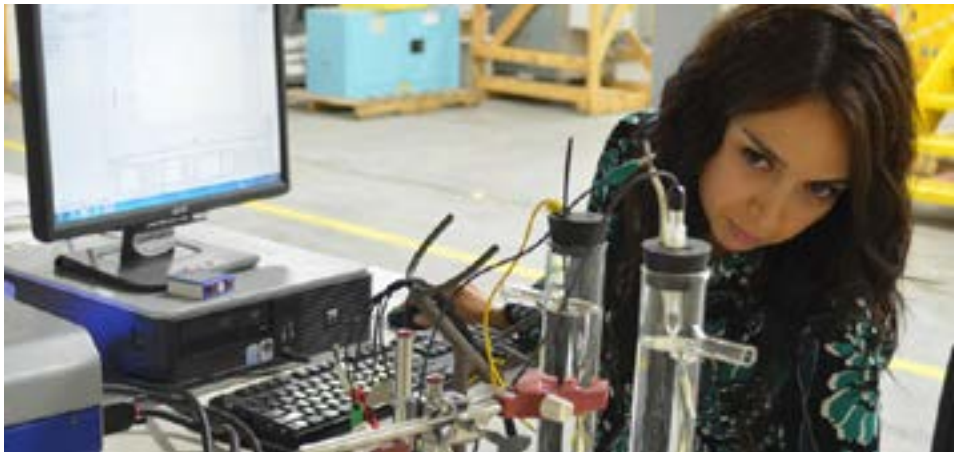
2016	Renaissance Offshore	GOM	SS-219 Segment 12 Pipeline Anode Retrofit
2016	Noble Energy	Tamar Field	CP Design Review, Subsea Expansion
2016	Renaissance Offshore	GOM	Main Pass Supply RetroSled
2016	PTT Public Company, Ltd.	Gulf of Thailand	ERP Platform - KNM Shore Crossing CP Retrofit Design
2016	Shell Pipeline Company	GOM Supply Clamps	
2016	Corrpro Companies	GOM Supply Clamps	
2016	Statoil	North Sea - GullFaks	Design & Supply CP Retrofit Systems
2016	Total	North Sea - Edradour pipeline	Design & Supply CP Monitoring
2016	ExxonMobil Malaysia	South China Sea	3 Pipelines Design, Supply Install CP Retrofit System

OFFSHORE
PRODUCTS AND SERVICES

Comprehensive corrosion control

ENGINEERING AND FIELD SERVICES

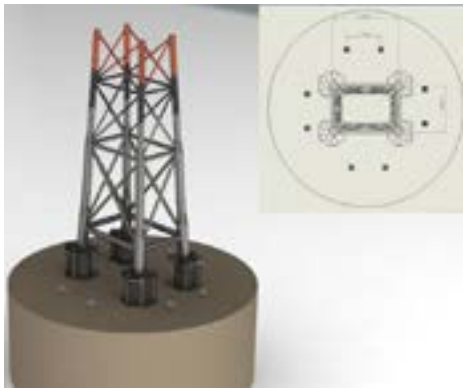
Our seasoned staff of NACE-certified corrosion engineers are experienced in all aspects of corrosion and materials science. We offer anode system design, third-party review services, anode testing, failure analysis, corrosion consulting and predictive modeling of future Cathodic Protection (CP) performance.



In addition to new CP designs according to NACE, ISO and DNV standards for traditional assets our Anode system designs for new pipelines are strictly governed by industry-accepted design codes; DNV RP-F103, ISO 15589-2 and NACE SP0169-2007.

Though we specialize in retrofitting aging cathodic protection on most types of offshore assets, we also provide a full range of corrosion consulting services for unique cathodic-protection problems. We have an extensive résumé of failure analysis and diagnostic consulting services, as well as traditional cathodic- protection design and evaluation. Over the years, we have seen and corrected almost every type of cathodic protection design error or corrosion mishap. If your corrosion problem is more specific or complex, we can find the solution.

CATHODIC PROTECTION DESIGN



New Build and Initial Design

Properly designing a bespoke CP system for a new pipeline can save untold costs and man hours on future inspections, surveys, and anode replacement. Do it right the first time and see decades of savings. Traditional bracelet anodes deplete quickly, creating difficulties in evaluating their performance and demanding expensive replacement.

Deepwater designs custom, clamp-on, semi-remote andoe systems that can be combined with optional fixed or permanent monitoring. Our proprietary RetroClamp™ electrically connects the anode to the pipeline, even through a concrete weight coat. The RetroClamp can be used to connect anodes, light-powered CP monitors, and CP test station stab plates to create a comprehensive corrosion control system.

Our andoe systems are easily installed by a diver or ROV in minutes instead of hours or days. The same goes for survey and inspection, traditionally some of the costliest CP services for pipelines.

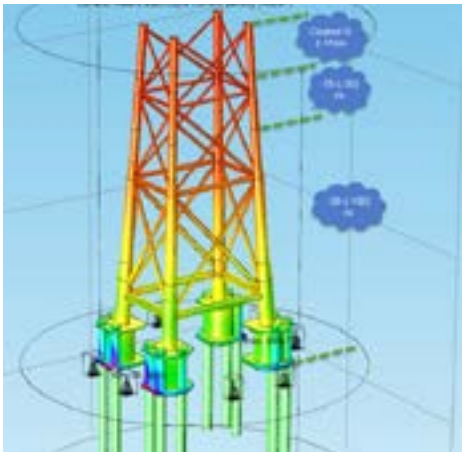
Deepwater will engineer the optimum CP system for maximum efficiency and long-lasting corrosion control. Our advanced computer modeling techniques and materials science methodologies paired with our proprietary anodes us to clamp on the perfect level of protection.

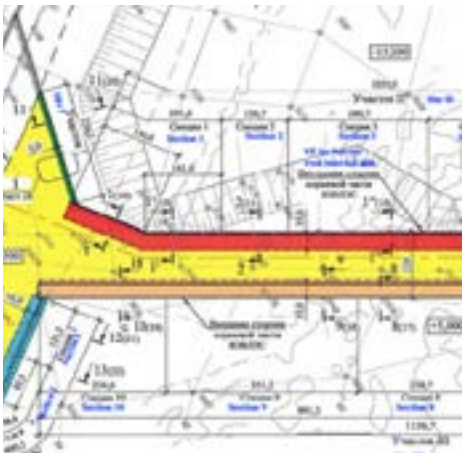
Retrofit for Asset Life Extension

To retrofit an existing pipeline or related asset for additional years of safe productivity, Deepwater will first evaluate the condition of the asset and and identify the appropriate cathodic protection retrofit solution depending on the severity of the corrosion and unique asset operating environment. We will determine a solution for maximum efficacy and compliance with all applicable regulations.

We then rapidly design the system, manufacturing it in-house to the required specifications, and mobilize for installation. Our retrofit anode systems consist of RetroSled™ anode sleds and and RetroLink anode links for unburied pipelines and RetroMat™ anode concrete stabilization mattresses for buried pipelines or pipelines exposed to severe weather conditions.

Cathodic Protection presents unique opportunities to save on future survey and inspection costs. The RetroClamps used to attach the anode systems to the pipeline or other asset can be outfitted with fixed CP monitoring points or CP Test Stations to make future CP diagnostic data acquisition fast, easy, and affordable.





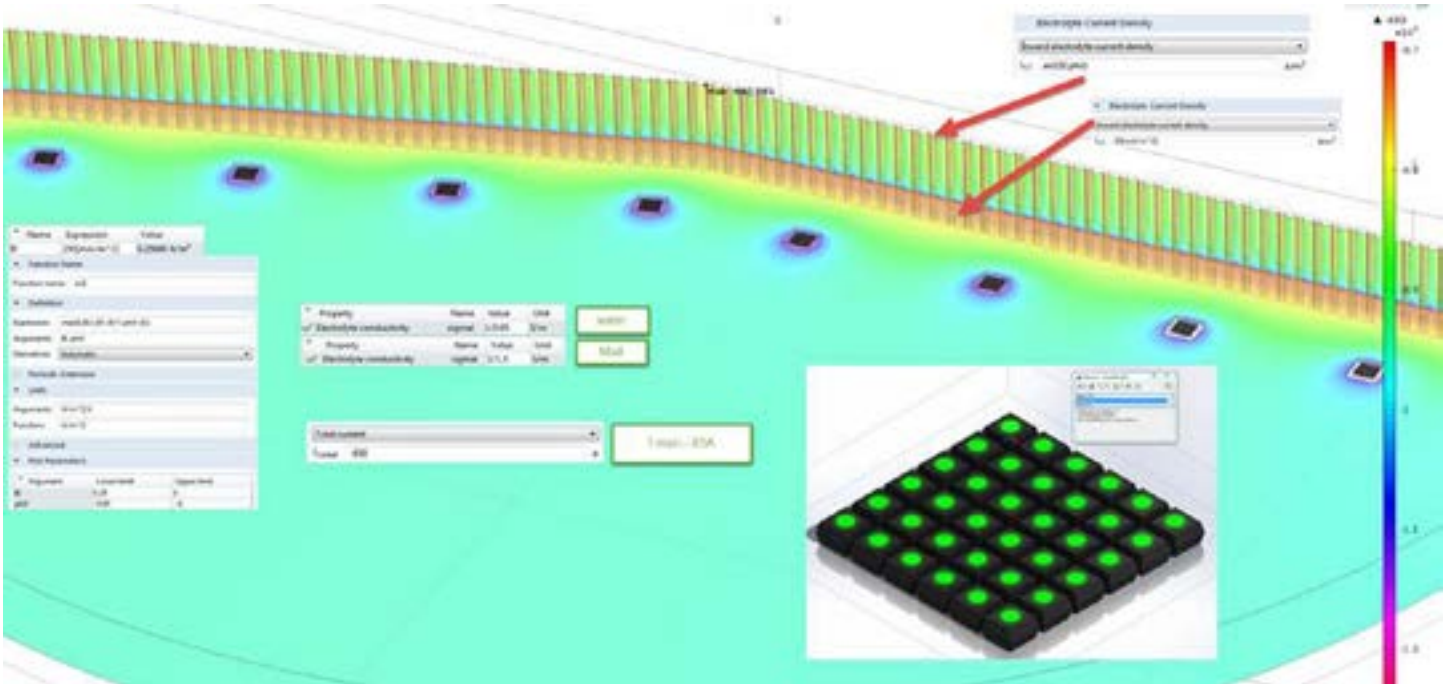
Finite Element Modeling

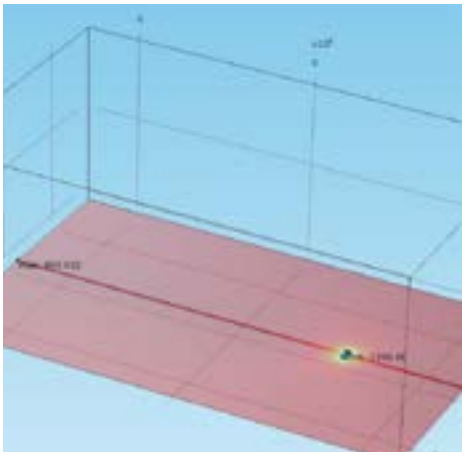
Deepwater offers FEM/BEM computer modeling of cathodic protection design to verify a system's potential distribution and lifetime, evaluate special-case scenarios, determine a structure's remaining CP capacity before retrofitting, optimize a retrofit solution and inspection planning.

By offering computer modeling along with cathodic protection system design, review and verification, Deepwater provides a quicker, more accurate and less costly alternative to using outsourced vendors. Our team of advanced modeling specialists in Deepwater Norway A.S. supports all our offices worldwide supported by Ph.D-level electrochemists, and CP specialists with unmatched experience on hundreds of structures.

Utilizing 3-D structural software with a user-friendly interface makes modeling the most efficient approach. With our live link to CP software, we can easily import or generate structural geometry for our models. For even greater efficiency, we've established a library of in-house retrofit and CP options.

Predictive modeling enables our engineers to analyze "what-if" scenarios concerning coating breakdown, loss of anodes and other structure-threatening possibilities. We can also make more exact predictions on anode consumption and end-of-life scenarios. Modeling allows optimization of CP retrofit anode distributions, GACP and ICCP hybrid systems and sled designs that minimize anode current interferences. Advanced modeling means superior CP performance.





Attenuation Modeling

Recently updated pipeline design codes (ISO, DnV, NACE) stress the importance of attenuation modeling as a design aid for subsea pipeline cathodic protection (CP). Attenuation models predict the potential distribution along a pipeline at various distances from known CP current sources attached to the pipeline. Knowing potential distribution is crucial not just during pipeline design, but also during the life-cycle maintenance of the pipeline.

Deepwater predicts the worst-case potential at the midpoint between two known current source drain points. This prediction is used when a pipeline is retrofitted with intermittent anode sleds, mattresses, or links. Once we have measured the potential at the drain point (point of connection of the anode sled to the pipeline) and the mid-point pipeline potential between sleds and the current output (EFG) associated with each sled, we have a good baseline from which to develop a life-cycle maintenance and survey program. Interval surveys need only consist of drain point measurements and rapid potential attenuation modeling can do the rest–with reports usually completed within a single day.

The application of attenuation models in offshore pipeline retrofit design is critical to keep the costs of this type of work under control. The price of an offshore pipeline retrofit is directly proportional to the number of dives required so the optimization of anode sled spacing offers a substantial opportunity to minimize future costs. It's expensive enough out there.

CATHODIC PROTECTION SURVEY

Deepwater began as an offshore inspection and engineering firm in 1986, and in 1988 we developed the Polatrak® line of subsea survey equipment. The integrity of survey data is only as good as the instruments and the offshore inspection crews using them, and Deepwater is the best in the business. We have always been a pioneer in improving both the equipment and the methodologies used for subsea corrosion survey. Deepwater invented the probes and developed software necessary to conduct the most comprehensive surveys in the industry.

Data Recording

Accurate inspection data are critical to provide expert consultancy on the health and performance of cathodic protection systems, including if and when to retrofit failing anodes. Our multipoint, risk-based inspection procedures and reporting software ensure that you utilize your inspection spend wisely while protecting your staff and offshore asset.

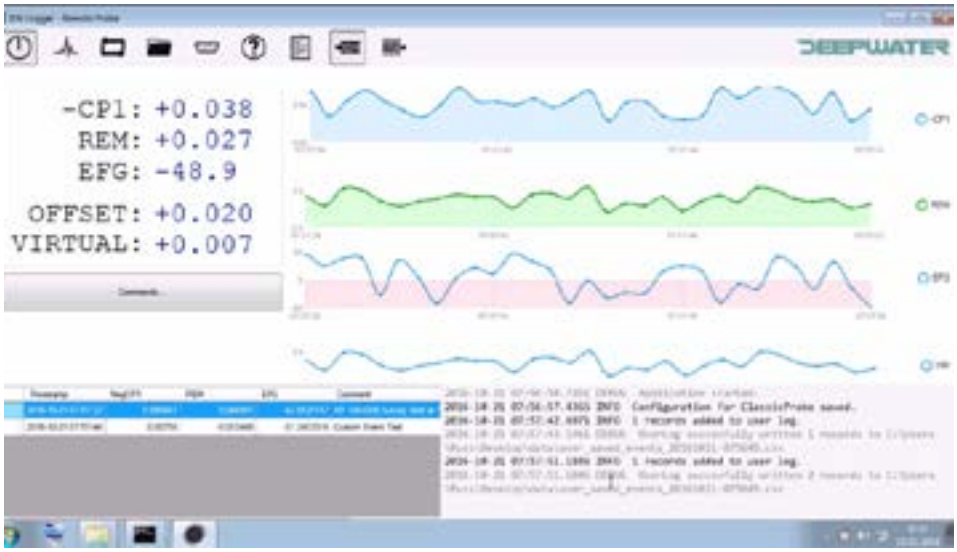
For special situations and complex equipment, it has been proven to be very useful to collect rich time-resolved CP data to help characterize the kinetics of a complicated CP system. The ReCap™ Subsea Data Logger can be installed and retrieved in a variety of configurations, either topside (such as on a drilling stack or riser section), or subsea by ROV or diver.

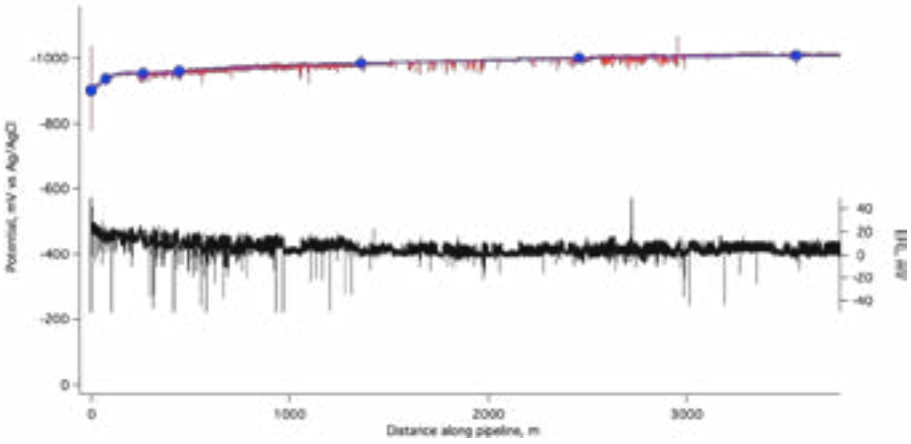
We have developed a number of survey techiques to give representation of existing conditions, and can accurately estimate the remaining life of cathodic protection systems for platforms, pipelines and subsea equipment.

Reporting & Analysis

Deepwater has streamlined the reporting process between field and office using standard software to record all data from the survey. Once a survey is completed, Deepwater engineers and survey specialists review the data and quickly output reports in any format required. In more complicated scenarios, our failure analysis program utilizes top corrosion scientists to identify and remedy the problem variables with an efficient and easy-to-install solution.

Deepwater has developed an online offshore inspection asset and reporting data management system (ARMS) for complete access to survey data online, including some diagnostic tools and searchable database features. Analysis of the reports will inform recommendations for future cathodic protection measures.





Recommendations

Deepwater uses survey data to design and deploy the most robust and reliable cathodic protection system possible. We may also advise on materials, methodologies, and future survey or monitoring plans. Our objective is always to minimize costs and maximize the protection and productive life of your asset.

CATHODIC PROTECTION ANODE SYSTEMS

Corrosion Control Systems for Pipelines and Subsea Equipment

RetroClamp™

Electromechanical Clamp for Rapid Connection of Anodes and Assets

First deployed in 2000, RetroClamp is an electromechanical clamp installed by divers or ROV. Thousands of RetroClamps have been successfully installed worldwide for a wide variety of applications, including attachment of cathodic protection anode r monitoring systems to pipelines, wellheads, vessels, and large-diameter tubular members. This adaptability has made the use of RetroClamps widespread among Deepwater's cathodic protection and monitoring systems.

The simple push-and-twist installation means that the clamp is usually installed in minutes; the unique design of the spring-tensioned floating plate ensures that the low-resistance electrical contact is maintained under constant tension. RetroClamp can be configured with a range of contact tips that allow it to be attached without cleaning or coatings removal in most cases. Even concrete weight coatings can be penetrated, saving a significant amount of time and effort during installation.

Large anode retrofit projects connecting sacrificial anode arrays (RetroPod™ RetroSled™ RetroLink™) to offshore pipelines, platforms and subsea systems is quick and cost-effective with the RetroClamp. The clamp can be fitted to a partially-buried pipeline by exposing only 120 degrees of the pipe. This allows rapid and cost effective deployment of additional cathodic protection to subsea structures. It's most effective as supplemental CP during routine ROV pipeline work.

Notable Projects

Brent Pipeline
Cathodic protection retrofit using anodes built into stabilization mattresses. Deepwater supplied Retromats and Retroclamps to protect 12 km of pipeline with 7mm asphalt coating and a 2.25" thick concrete weight for 15 years.

Olympus Field
Cathodic protection system for wellheads and permanent guide bases (PGBs). The RetroPod XL was installed on the seabed in approximately 3,000 feet of water and is designed to provide protection for 45 years.

Technical Data
Download the RetroClamp Technical Datasheet for full product specifications.

More RetroClamp Downloads.

RetroMat™

Concrete Stabilization Anode Mattress for Challenging Conditions

A Cathodic protection system for pipelines & special applications, RetroMat is a stabilization mattress comprised of anodes that are cast directly into modular concrete segments. The wire rope core of the mat provides a low resistance anode array. The system is designed to provide cathodic protection for pipelines at crossings, for buried pipelines, or assets in unstable seabed conditions.

The mattress utilizes plastic FLXMAT shells, which have revolutionized the deployment of offshore concrete mattresses. Rather than shipping prepared concrete, we deliver a complete mat's worth of FLXMAT shells and anodes that conveniently clip together and allow local crews to assemble the mat and pour the concrete on-site, saving costs.

A cathodic-protection retrofit project using RetroMat will provide the required stabilization and an added benefit of up to 30 years of cathodic protection for up to 3 miles of pipeline per mattress. The system can be installed quickly by diver or ROV to electrically connect to the pipeline via Deepwater's RetroClamp and can house either small cylindrical sacrificial anodes or ICCP anode discs.

The modular nature of a Retromat means that cathodic protection designers can ensure exactly the right amount of anode current is delivered to an asset in order to protect it for the desired length of time. In addition to pipeline crossings and general bracelet anode replacement, RetroMat has also been used to anchor CP Test Stations and other devices such as pipeline markers and location equipment.

Notable Projects

Atlantic Methanol Pipeline
Deepwater successfully designed and installed 20-year Cathodic Protection (CP) retrofit systems for Atlantic Methanol Pipeline Company (AMPCO), Equatorial Guinea subsea facilities in the Gulf of Guinea on the Western African coast.

Brent Pipeline
Cathodic protection retrofit using anodes built into stabilization matresses. Deepwater supplied Retromats and Retroclamps to protect 12 km of pipeline with 7mm asphalt coating and a 2.25" thick concrete weight for 15 years.

View more projects.

Technical Data

Download the RetroMat Technical Datasheet for full product specifications.

RetroSled™
Anode Sled for Pipeline Cp Retrofit

The RetroSled allows operators to quickly and easily replace cathodic protection anodes on aging pipelines adding 15 to 30 years of productive life. It is an aluminum-anode sled designed for offshore pipeline life extension projects. The RetroSled is lowered onto the seafloor via crane and connected electrically to the pipeline with one or two RetroClamps. Anode sled retrofit sites along the pipeline are determined by our cathodic protection designers using recent survey data and our cathodic-protection modeling systems.

Notable Projects

Tabu, Guntong, Semangkok Pipelines
Deepwater designed and supplied a semiÐremote sledÐbased retrofit for the three subsea pipelines for a life extension of 25 years (to 2041)

The RetroSleds installed via RetroClamps at 6 locations on 3 pipelines in 4 days and 60 meters of water.

Alba Field Pipeline
Deepwater designed and deployed 4 RetroSleds connected to the pipeline via 8 RetroClamps in 200 feet of water to successfully complete an anode retrofit of an offshore process pipeline in Equatorial Guinea

View more projects.

Technical Data
Download the RetroSled Technical Datasheet for full product specifications.

More RetroSled Downloads.

RetroLink™
Cathodic Protection Anode String for Shallow Water

Retrolink™ is a durable and easily replaceable 5-year system that installs in 1.5 hours. From 2009-2014, RetroLinks were used to retrofit the cathodic protection systems on over 500 fixed structures. It is a highly cost-effective cathodic-protection retrofit system consisting of 3 to 15 aluminum anodes cast directly onto a heavy-duty wire rope. RetroLink can be installed on anyasset or structure in less than 85 feet of water.

In addition to being easy to install, the RetroLink system is incredibly robust. RetroLink is consistently able to resist category 2 hurricanes and often remains in service after category 4 storms. Two operators doing post-hurricane inspections in 2009 found that 95% of their RetroLinks were still working perfectly after record-breaking hurricanes Gustav, Ike, Humberto, Rita, and Katrina.

The RetroLink can be hung from any horizontal or vertical member and can be attached subsea for pipeline protection. Adjustable in the field, the wire-rope core provides electrical conductivity through the anode system as well as sound mechanical support. If additional anode material is laid in the mud, the system life can be extended to almost 10 years. Once the crew is on site, installation takes an average of 68 minutes per link; the average time dock-to-dock is two hours and 12 minutes.

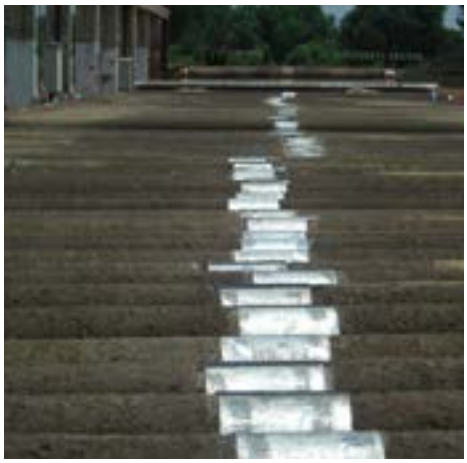
Notable Projects

Gulf of Mexico Pipeline
Deepwater Corrosion Services was contracted by Chevron to provide cathodic protection (CP) retrofit materials for their 8" wet oil pipeline running from their fixed-jacket platorm to shore. The pipeline was retrofitted with RetroLink anode strings and attached via RetroClamp. Total offshore time: 30 hours.

Bay Marchand Structures
Over 60 RetroLinks were used to economically extend the lives of six shallow-water structures in the Bay Marchand area of the Gulf of Mexico. The assets are cathodically protected for at least another five years with minimalcost and maximum safety.

View more projects.

Technical Data
Download the RetroLink Technical Datasheet for full product specifications.
More RetroLink Downloads.



Bracelet Anodes

Sacrificial Anodes Designed for Pipelines

Deepwater's aluminum and zinc anode bracelets are designed specifically for offshore pipelines. We supply bracelet anodes for new pipelines. and recommend supplementing these anodes with one of our systems or having a plan to update your system as these anodes inevitably deplete and become cost-prohibitive to replace.

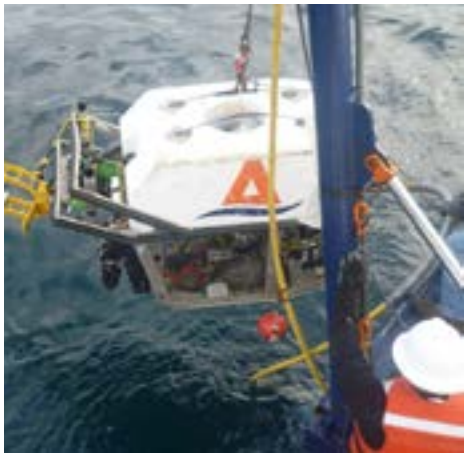
Our aluminum and zinc bracelet anodes are cast in low-iron, high-purity alloys and can be manufactured in diameters from 3 inches to 48 inches using our extensive inventory of water-cooled molds. Pipeline anodes are available in the following basic configurations: welded, tapered and bolted.

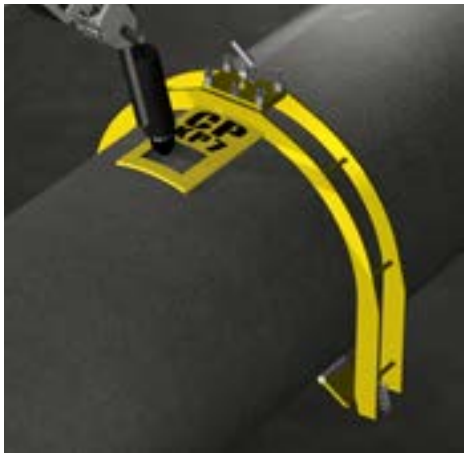
Anode Chemistry

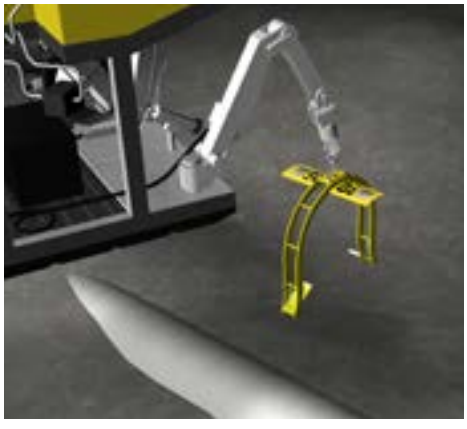
DEEP7		DEEP10	
Iron (Fe)	0.07 max	Iron (Fe)	0.10 max
Silicon (Si)	0.10 max	Silicon (Si)	0.10 max
Copper (Cu)	0.003 max	Copper (Cu)	0.006 max
Zinc (Zn)	4.75 - 5.25	Zinc (Zn)	4.75 - 5.75
Indium (In)	0.015 - 0.025	Indium (In)	0.010 - 0.020
Titanium (Ti)	0.025 max	Titanium (Ti)	0.025 max
Others (each)	0.02 max	Others (each)	0.02 max
Aluminum (Al)	remainder	Aluminum (Al)	remainder

PERMANENT CP MONITORING

Long-Lasting Cathodic Protection Data Acquisition







CP Test Stations for Pipelines

Permanent and Reusable Cathodic Protection Test Points

Deepwater's CP test stations are the most cost-effective method for gathering accurate pipeline readings and can be fitted to both buried and unburied subsea pipelines. The most common method of evaluating the cathodic protection of subsea pipelines is the three-electrode survey method, which has not proved very reliable in practice. Deepwater developed CP test stations to save survey time and ensure accurate readings.

On unburied pipelines, RetroClamps fitted with special stab plates are attached around every 10 Km, allowing an ROV to take a stab reading of the pipeline's real potential and not that of the anode. The clamp is electrically connected to the pipeline, and a freely-corroding "coupon" on it draws protection from the CP system. Stabbing the coupon yields an accurate potential reading without damaging the pipeline's coating.

For buried pipelines, Deepwater's RetroMat is used as a test station. The RetroMat, fitted with stab plates and coupons, is laid on the seabed and is electrically attached to the buried pipeline using a RetroClamp. CP readings can be easily taken from the mat's stab surface by the ROV's probe, resulting in far more accurate readings than the three-electrode method can provide.

Costly inspection time is significantly reduced because survey speeds can be increased. If an ROV only has to take a reading every 10 Km, there's no need for it to travel in close proximity to the pipeline. These test stations result in dramatically better data quality and repeatability with precise attenuation modeling. A Test Station system provides accurate, repeatable data for the design life of the pipeline and costs the same as just one three-electrode survey, so the system practically pays for itself the very first year.

Notable Projects

Edradour & Glenlivet Pipelines

Cathodic Protection Test Station spans Norway installed via RetroClamps on two 12" pipelines in total of 8 hours for 20 years of fixed cathodic protection monitoring.

DCOR LLC Pipeline in California

Cathodic Protection Test Station spans installed via RetroClamps at key locations. Subsequent surveys carried out with Polatrak contact survey equipment yeilded cathodic protection readings with constant location data, which when trended, allows the operator to predict the remaining life of the anodes.

View the Whitepaper.
Watch the demonstration.

Sunstation™

Light-powered Subsea CP Monitoring Readout for Deep Water

The SunStation can operate in deep water for up to 25 years and never requires batteries. A light-powered LED readout system uses solar panels for power allowing for operation in depths of up to 3,000 meters. It displays numerical data whenever activated by a powerful light source. Deepwater uses the system in conjunction with its line of CP monitoring instruments to create a unique subsea solution that can be fitted to structures, pipelines and underwater equipment.

When installed in critical areas, the SunStation system can greatly reduce inspection costs by redefining the requirements of the ROV class-and-equipment scope required to conduct a full cathodic protection survey. The most common instruments used with the SunStation are reference electrodes and current-density monitors that allow asset owners to track the performance of cathodic-protection anodes.

Since SunStation requires only visual inspection, a specially-qualified inspector is no longer necessary offshore. With the SunStation placed strategically where ROV intervention is consistently required, this system can save the operator significant sums in reduced inspection time every season. The system cost can typically be made up in two inspection cycles or less.

Notable Projects

Shenzi Subsea Tree

First-ever deployment of a SunStation CP critical monitoring system pre-installed onto a subsea tree. The unit displays the from permanent reference electrodes installed at two critical locacations on a wet tree deployed in 4,300 FSW (1,300 m).

View more projects.

Technical Data

Download the Sunstatoin Technical Datasheet for full product specifications.
More Sunstation Downloads.

POLATRAK®

Corrosion Survey Instruments

ROV II™ CP Probe

Contact Cathodic Protection Probe for Diver and ROV

For use with diver's umbilical or Deep C Meter self-contained ROV readout. The ROV II is the most dependable and widely used tip-contact probe on the market. It is the world's best-selling, general-purpose, tip-contact cathodic-protection probe. The first CP probe manufactured with twin elements, it allows on-line calibration that eliminates time-consuming on-site procedures and greatly reduces user error.

The ROV II serves as either a tip-contact or proximity-style probe. Like all Polatrak corrosion probes, the ROV II

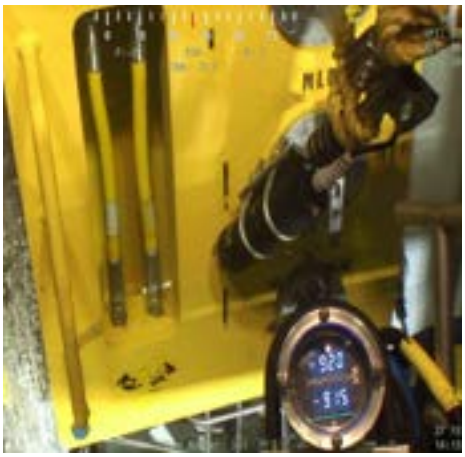
is fully field-serviceable, with plug-in electrode elements and interchangeable components. The dual silver / silver chloride (Ag/AgCl) electrodes eliminate common measurement errors. Internal redundancy and on-line calibration, allowing the probe to be reliably tested and serviced in the field.

Technical Data

Download the ROV II Technical Datasheet for full product specifications.

Operation Manual

Download the ROV II Operation Manual for instructions on setup and use



Deep C MeterTM 3000 AD CP Probe

Robust ROV Cathodic Protection Survey System for Use in Deepwater

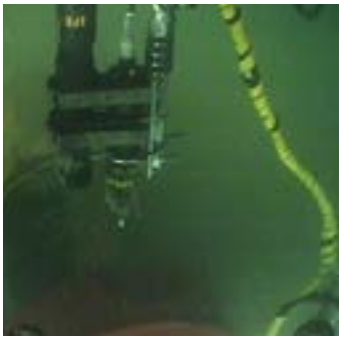
The Deep C Meter 3000 AD interfaces with ROV to provide real-time survey data stream and is designed for rugged service on a workclass ROVs. With a 316 SS pressure housing and a fully-articulating mount, this system can work on cathodic-protection survey projects down to 3,000 m (10,000 feet). Its RS232 (standard ASCII string) digital outputs real-time data points of events as they occur. The data can be exported with our Polatrak Survey SoftwareTM to a report format to eliminate lengthy post-processing of data after a survey.

The Deep C Meter 3000 AD kit includes the ROV II probe, an articulated mount and all standard replacement parts. Since it features triple voltmeters, the 3000 AD can also provide simultaneous readings from an electric field gradient (EFG) probe that is available as an option. The Deep C Meter 3000 AD provides output through three analog LED displays and a continuous RS232 ASCII feed and is 24V DC ROV powered, which eliminates the need to open the pressure housing to change batteries.

The meter installed quickly and easily on the ROV anywhere in view of the camera. Cabling can be interfaced with ROV either through a splice or oil-filled cables. All data are recorded in digital form and on the video display, which features programmable ultra-bright LED displays. And like all Polatrak-brand CP probes, the ROV II probe component has twin silver-chloride electrodes for online calibration and redundancy.

Technical Data
Download Deep C Meter 3000 AD Technical Datasheet for full product specifications.

Operation Manual
Deep C Meter 3000 ADOperation Manual for instructions on setup and use.



EFG Probe

Offshore Electric Field Gradient Measurement Device

The EFG is an electric field gradient (EFG) measurement device that uses two replaceable silver/silver chloride reference electrodes separated by a known distance (13 inches) to provide a contactless method of determining anode activity and of measuring electric fields in seawater.

When passing near a structure such as a pipeline, the current density reading can confirm that an anode is properly activated. The Polatrak EFG is intended for use with the Deep C Meter 3000 AD ROV survey system and is the ideal complement to the industry-leading ROV-II contact probe.

Technical Data
Download EFG Probe Technical Datasheet for full product specifications.

Operation Manual
Download EFG Probe Operation Manual for instructions on setup and use trode Kit Tech Datasheet for full product specifications.

Remote Electrode Kit

Three Electrode Survey Expansion Kit for Deep C Meter

The Polatrak Remote Electrode Kit upgrades the Deep C Meter with EFG and ROV-II to perform "remote electrode" pipeline surveys (also known as "three electrode", "remote variance" and "close interval" surveys). The Deep C Meter will retain all of it's standard stab and field gradient functionality. In addition, the remote kit and updated Polatrak Survey software records of remote electrode potentials.

TMS-Mounted Remote Survey

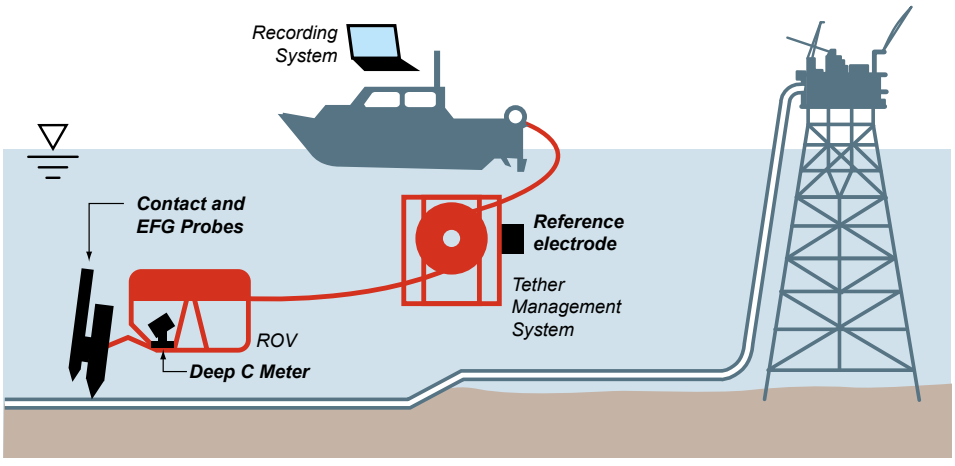
The Remote Kit includes a remote electrode that can be mounted on the tether management system (TMS) and wired into the MUX box on that unit. Remote readings travel down to the Deep C Meter unit on the ROV, where they are processed inside the pressure housing. Remote readings are sent up the umbilical in RS232 or RS485 to the Survey software with the stab and field gradient data.

Over-The-Side Remote Survey

The Remote Kit also includes an over-the-side weighted electrode that can be wired into the ROV shack directly and trailed over the side of the survey vessel. Remote readings travel down to the Deep C Meter unit on the ROV, where they are processed inside the pressure housing. Remote readings are sent up the umbilical in RS232 or RS485 to the Survey software with the stab and field gradient data.

Technical Data

Download Remote Electrode Kit Technical Datasheet for full product specifications.
Download Remote Electrode Kit Operation Manual.

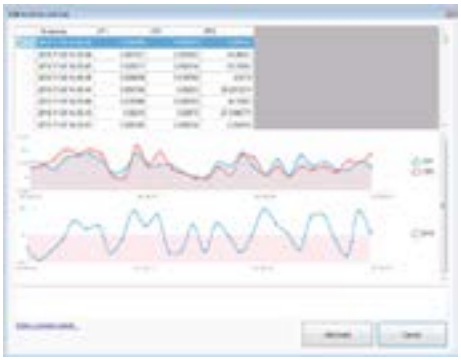


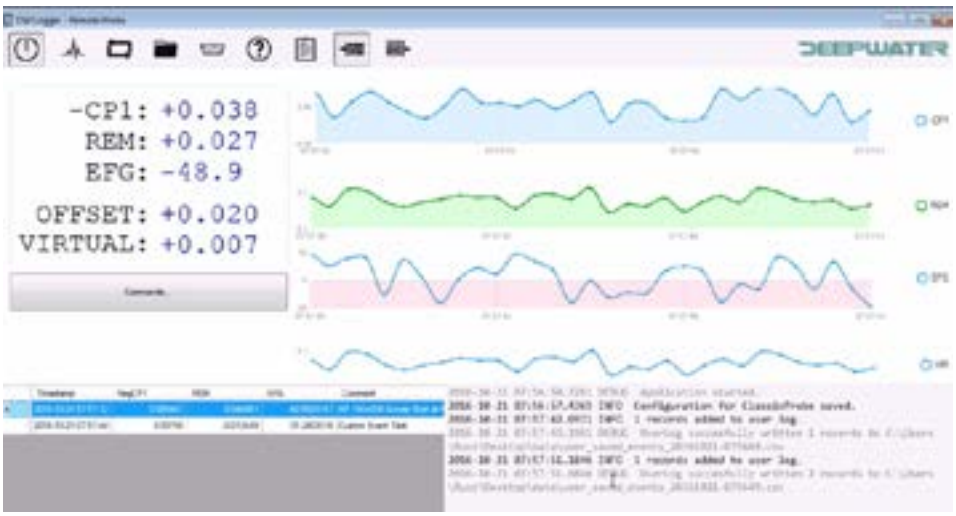
Polatrak Survey™ Software
Log Rich CP Data in Real-Time

Deepwater's Polatrak Survey™ subsea cathodic protection survey software creates a richer CP profile, allowing for real-time data logging from classic, swain, or remote probes and comes with all digital Deep C Meter™ 3000 AD probes.
Log custom events with use of the Deep C Meter 3000 AD, Swain Meter™, AquaMER™, Polatrak EFG and Remote Electrode Kit inspection tools. Instantaneous values can be recorded using the event button, and time stamped continuous data will be automatically logged to the continuous data log.

- Survey gives the ability to import data-stream (like kilometer posts) and gives virtual potential in real time (last calibration + remote variance)
- Utilize event module for stabs, creating a time-machine allowing for the selection of the preferred data point from the last 30 seconds of survey. This eliminates the need to push a button for every sta.
- The software logs when running so there is zero user error or failed data capture.
- The software exports reports of the survey and event log. Polatrak Survey is the perfect platform for conducting traditional stab, EFG, and remote electrode surveys.

Software Preview View the Software Quick Start Video





DEEPWATER

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