

ASSET INTEGRITY & SHUTDOWN MANAGEMENT

DANAMIN OIL & GAS SERVICES LLC





DANAMIN's commitment towards customer Satisfaction

Vision

 To become a leader and a company of choice for our customers in Oman and in the region on our technical expertise to provide talent development services and integrated end to end cost effective solutions for challenges related to Material/Corrosion/Risk based Inspection/RLA and FFS



Mission

- To put emphasis on knowledge & expertise transfer to the young omani Engineer community in the field of Material/Corosion and Inspection.
- Identify challenges that are giving pain to owners and operators within the Oil & Gas Industry and Introduce innovative solutions through our expertise and the use of technology to improve do ability, cost / time optimization and Safety enhancement.







, OPAL and all major Oil Omani SME Company registered with Riyada Oman such as PDO & Gas companies in Oxy, Daleel etc.. Expertise in Oil & Gas Industry with a cumulative hands on experience of over 80 years

Introduce appropriate solutions for asset integrity chronic challenges Asset Integrity Management by specialized Subject matter studies and end to end support experts ie RLA/RBI/FFS/MSR/CMF etc....



Oil and Gas Services LLC

Nasser

Al

Bahlani

Faisal

Al-

Abrawi

Hicham

Jarad

Saleh

Omairy

Al-

Nasif

Mahmoud

Hermant

Abhare

Our Expertise

- 80+ years of combined management and hands on experience by the team (on the left) on risk management, Asset integrity management, RBI, RCM,RLA etc... on facilities Pressure Systems, facilities, process piping, storage tanks, Pipelines, infra-Structures and Material selection of all FEED & EPCI both downstream, upstream, subsea and topsides and onshore. Experience in welding, inspection, maintenance of static equipment, Quality control/assurance, Corrosion mapping, corrosion control & mitigation in both onshore and offshore facilities, corrosion monitoring ie Coatings and linings, Cathodic protection design & installation, UT monitoring, ER probes, other areas like:-
- Build up asset integrity from Feed to RLA
- Identification of Safety critical element & establishing performance Standard
- Oversee Quality in projects (ie QA / QC, HSEQ and hazard mitigation etc...
- Conduct/ facilitate RBI, RLA HAZOP, RCA, FFS studies,
- Turn Around Planning and inspections and all types of Maintenance
- Materials selection for sweet & Sour services NACE-175/Iso15156.
- Carry out Intrusive & non-intrusive NDT and conduct FFS
- Expertise on all the activities related to codes (ie ASME Sec VIII Div.1 /2, ASTM, AWS, TEMA, API 571, 577, 580, 934 NACE, Shell DEP, API- 510, 570,571, 653, 579, BS7910, ASME B31G, ASME, etc.) for compliance to assurance or with Government regulations and companies' Technical ,HSE and Operating requirement.
- We conduct training , coaching and development in our area of expertise supporting young Omani engineers to obtain accredited and internationally recognized certification ie API-510, 570, 653, 577, 571, RBI 580/581,B31G, RCA, FFS API-579 / ASME FFS , NDT ASNT TCA level1 & 2, etc...





DANAMIN with the many years of experience in the field of Asset integrity management adds value to customers through;



Oil and Gas Services LLC

Integrity mgt / asset life Extension (RLA)

Knowledge transfer

Innovation/ Technology

Through our knowledge of Industry challenges in many parts of the world with respect to integrity management requirement and catastrophes that could occur ie, the tragic industrial disasters in North sea, gulf of mexico and other incidents in the region, we understand that process safety is key in Oil & Gas Business

Assess current condition of ageing facilities /pipelines and increasing operational complexities that require special and more delicate care, we provide recommendation for life extension, Risk Management, Inspection & Mitigation requirement

We put strong Support Omanization drive, fill gap and experience supporting and building capabilities in the customer and their contractors ie coaching, training & mentoring

We bring innovative solutions and technologies where customers do not have time to pursue and provide Resources to review and evaluate technologies

Danamin Services



Danamin Services Though the Plant life Cycle AWITN DA **Asset Life Cycle** Oil and Gas Services L.L.C. Abandonment **Manufacturing and Operation and** construction maintenance Design **Risk assessment** and and IM planning 1. Equipment failure **2. SHE**

3. Cost control

4. Quality control

5. Codes, standards and regulation

6. Design life

Risk assessment and IM planning	Inspection, monitoring and testing	Integrity assessment	Mitigation and repair	Risk assessment an IM planning
2. SHE 3. Cost control 4. Quality control 5. Codes, standards and regulation 6. Design life	 Corrosion monitoring Third party damage Third party audit QMS SOP's Codes, standards and regulations Cost control 	1. SME opinion 2. In house expertize 3. Codes, standards and regulations 4. SHE	1. SHE 2. Codes, standards and regulations 3. Cost implication 4. Audit observations 5. QC	 SHE Codes, standards and regulation Cost control



Asset Integrity and the project lifecycle

OPERATE & CONCEPT CONCEPT **EXECUTE EVALUATE SELECT** DEFINITION PRODUCE **Establish Asset Integrity** Safeguard Asset Integrity **Design Integrity Technical Integrity** Operating Integrity



Examples for the service's

Oil and Gas Services LLC

IDENTIFY / ASSESS	SELECT	DEFINE	EXECUTE	OPERATE
Development Options Risk Register Identify Issues/ needs OU basis of design (Specs/Standards & codes) Operations Strategy • Operability • Availability • Reliability	Concept selection Risk Register Development for each design option Concept selection report Operation Philosophy SCE list for select option BOD contains performance criteria derived from Design premises and HEMP studies Demonstration of systematic HEMP Application Demonstration of slection of an ALARP concept	HEMP Establish risk to ALARP Identify MAH's to determine Safety Critical Element (SCE) groups (Design Safety case) Define deliverables High Risk & Severity 5 from RAM Application of Performance standards (PS) to the identified SCE's Design review SCE Barrier performance Criteria and functionality SCE Function Assurance task and accept criteria Apply Design PS templates to SCE Define deliverable SCE group with Design PS template standard Asset Integrity studies (RAM) Maintenance Strategy identified	SCE PS completed with design specific Assurance tasks and performance Acceptance values Apply RRM for maintenance strategy HSE critical Ops tasks MOPO etc. Statement of Fitness SCE's & PS input to SAP Functional activity Assurance task Performance value Task Frequency Verify project deliverables inc. SCE PS met during commissioning Documentation & Handover Inspection & testing records Commissioning – Verification of design Handover to Ops	



Our specialized services

(Conduct Risk analysis / Assessment
l	Risk mitigations Studies
	Root cause Analysis (RCA)
(Quantitative risk Assessment
(Corrosion Control & Chemical supply { corrosion , scale, Biocide inhibitors etc.,}
	Technical Audit through IRCA lead auditor
l	Design Gate Review/ Facilitation/
(Conduct/ Facilitate/ Review Material selection studies
l	Identify and define safety critical element in line with shell
l	Plant intrusive and non-intrusive inspection
(Concept Engineering
	Pre bid engineering support
	FEED & detail design
	IM , SAP, commissioning and as building
	Digitalization and conversion of Drawings
	Training API-510, 570, 653, 577, 571, RBI 580/581,B31G, RCA, FFS API-579 / ASME FFS , NDT ASNT TCA level1 & 2, etc

Supply All the spare parts (tubing, pipeline, Equipment, Valves, Electric ,etc.



Innovation and Technology

We bring innovative solutions and technologies to our customer's doorstep. We Provide Resources to review and evaluate technologies Among our available technologies:-

- 1.Inspection techniques and Drones
- 2.Tank cleaning techniques (robotic and non-Robotics)
- 3. Corrosion Monitoring techniques
- 4. Steam Boiler Tubing decoking and Inspection
- 5. Sever corrosion well tubing prevention
- 6.Thermal well tubing for paraffinic wells
- 7.ILI-UT Inspection for non piggable pipelines



Asset Integrity Management & Asset life Extension (RLA)

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Corrosion Management Studies

- Corrosion management framework
- Corrosion Management Manual
- Integrity Operating Window (IOW)
- Indetification of thickness measurement locations (TML)

Risk-Based Inspection

- RBI is a process that uses a combined system of methods to identify and understand risk. Put simply, risk can be defined by two elements:
- The consequence of failure (CoF) and the probability of failure (PoF).
- The CoF considers and evaluates the consequences of various outcomes (e.g. health and safety, environmental damage, equipment damage, and economic loss).
- The PoF is the likelihood that a piece of equipment will fail at a given time. Furthermore, both the CoF and the PoF involve qualitative and quantitative assessments.
- RBI can be used to reduce uncertainty about the damage state of a piece of equipment by prioritizing inspection activities. This is usually done by means of NDT.

Fitness-for-Service & Remaining life assessment (RLA)

- There are three levels of FFS assessments, each increasing in level of detail, analysis, and complexity. Typically, conducted in accordance with API579 and also EEMUA for above ground storage tanks
- The outcome of an FFS assessment, Establishing inspection intervals improves the overall safety, reliability, and efficiency of aging equipment or rehabilitation scope after failure.



Danamin Software (IMS)



Risk based inspection & AIMS

DANAinkages between the graphics, integrity management logic and the detail technical data.

Oil and Gas Services LL.C





Asset Integrity Management & RBI - Software

ANA

Oil and Gas Se DANAMIN & PRIMALUX has implemented Inspection Management, Corrosion Management and Anomaly Management since 2001.

Inspection Management includes the creation of

- The inspection work pack (book, datalogger, tablet, pigging runs, underwater inspection and many more),
- Work assignment and tracking of the inspection execution, recording of results,
- Anomaly management;
- All this includes the related inspection drawings (isometrics, process engineering flow schemes, piping and instrument diagrams, equipment drawings, structural drawings).

Anomalies can come in from the inspection team and operations from their routine inspection, all this goes into Anomaly Management.

DANAMIN & PRIMALUX will also go to the remote sites to train the relevant team, when they are not our own team members.

The following schematic diagram explain CIMS tools and how its working dynamic

Integrity Operating Windows (IOW)

Oil and Gas Services LLC Integrity Operating Windows solution integrates with your Distributed Control System (DCS), data historian, or Supervisory Control and Data base (SAP) system integrated to CIMS s and limits to track changes to your equipment condition in real-time.



Chemical Supply & Infrastructure

DANAMIN

Oil and Gas Services LLC

Filtration Control Agents

- 1. Starch (Modified / with Biocide)
- 2. CMC LV / HV (Carboxy Methyl Cellulose)
- 3. High Temp. Starch
- 4. PAC LV / R (Polyanionic Cellulose)
- 5. Resinated Lignite

Infrastructure

- 1. Reactors SS316, Glass Line & HDPE Reactor,
- 2. Distillation Column
- 3. Spray Dryer & Flaker, Centrifuge,
- 4. Filter Press, Nutch Filter, Rotary
- 5. Vacuum Paddler Dryer, Spin Flash
- 6. Dryer, Scrubbing System. Our
- 7. Utilities cover Boilers, Thermic Fluid
- 8. Heaters, Hot Air generators, Brine
- 9. Chilling Plants, Cooling Towers,
- 10. Nitrogen plants, Air compressors, RO
- 11. Plants, and DG sets. In-house
- <u>12. Labo</u>ratory.

Corrosion & Scale Inhibitors

- 1. Corrosion Inhibitor Drilling
- 2. Choline Chloride
- 3. Corrosion Inhibitor All Purpose
- 4. Alkyl Pyridine Mixture
- 5. Amine Corrosion Inhibitor (20%-30%)
- 6. Biocide
- 7. pH adjustable
- 8. Oxygen scavenger.
- 9. others



Training target per Years

251			PROJECT	KEY POINTS		
~ -		Certificates Description	Duration /Day	No. Of attedance	Who Attend?	Comment
	1	API-653 Tank Inspection , welding , Repair	10.00	15.00	Designed for pressure equipment	
	2	API-510 High pressure vessel Inspection , welding , Repair	10.00	15.00	inspector and engineers working in refineries, chemical & industrial plants, gas	
	3	API-570 process piping Inspection ,welding , Repair	10.00	15.00	plants, power plant, pipeline terminals, and oil fields.	
	4	API-577 Welding Processes, Inspection, and Metallurgy	10.00	15.00	*Inspection / Mechanical Engineer * Asset Integrity Engineer	
	5	API- 580 Risk-based Inspection	5.00	15.00	*Material & Corrosion Engineer	
	6	Fitness-For-Service API-579	5.00	15.00	* DOSH Officer Occupational Safety and	
	7	Damage Mechanisms Affecting Fixed Equipment API-571	5.00	15.00	Health (Safety and Health Officer) DOSH Officer	
	8	Advanced NDT based on ASME, V, XIII, IX	5.00	15.00	* Welding Inspector	
Γ	9	Rout Cause analysis	5.00	15.00	*Project Engineer *QA /QC / NDT	
	10	Corrosion principle	5.00	15.00	Engineer *Quality / Safety	
	11	Static integrity and maintenance	5.00	15.00	Coordinator	
	12	Cathodic protection Certifecation	5.00	15.00	* Static Engineer, Technician	
	13	Coating Inspector Program (CIP1)	5.00	15.00	* Pipeline Engineers	
	14	Material Engineer(Types, selection, Applications)	5.00	15.00	*Cathodic protection Engineer	
	15	Asset integrity Management Systems (AIMS)	5.00	15.00	*Painting Engineer	
	16	Pipeline Integrity Management System (PIMS)	5.00	15.00		,



Specialized in providing solutions in the following areas

DAN.

OIL & Gas Asset Integrity Consultation

- Provide short- and long-term solutions to overcome corrosion, inspection and material selection.
- Provide risk analysis , Risk mitigations for the high critical anomalies to avoid asset failures.
- Provide Asset remaining life assessment , and required actions for save operation and asset life extension

Review corrosion and material selection project

- 30+ years of Oil and gas experience with major project performing Conceptual, FEED / operation facilities and Detail design of offshore & Onshore facilities. As follows
- Material selection & testing, welding , CP, Coating, RBI etc.

Crude Oil Tank Integrity Management

• Provide technological solutions and end to end activities' coordination to enhance Tank turn around by 30%

Non piggable Pipeline Inspection and Integrity Assessment

• Inspection of non piggable pipelines, integrity assessments and provide life extension recommendations

Boiler decoking and full integrity management

• HRSG / OSTG tube cleaning and Inspections. Data analysis and provision of next cleaning and remedial work requirements





Well Services





Drilling-bits

Types of Drill-Bits and Their Uses

- 1. Development of the roller cone bit
- 2. Multiple cone and jet arrangements in roller bits
- 3. Cone lubrication methods
- 4. Diamond bit drilling and coring procedures
- 5. Polycrystalline (PDC) drilling-bits



Elements of a rock bit (Courtesy of Hughes Christensen)



Fig.4 Mill Tooth drilling Bits Type used in oil and gas wells



Fig.5 Insert Bits





Polycrystalline diamond compact





Drilling-bit Details

Oil and Gas Services LLC

Item	Product Name	Details	Qty of nozzles	IADC	Unit
1	bit for oil well 12 1/4" metal sealed	6 5/8"REG	3	IADC : 517/537/617/637	pcs
2	bit for oil well 8 1/2" metal sealed	4 1/2"REG	3	IADC: 517/537/617/637	pcs
3	bit for oil well 6 1/8" metal sealed	3 1/2"REG	3	IADC : 537/617/637	pcs
4	bit for mining well 12 1/4"	6 5/8"REG	3	IADC : 532	pcs
5	Matrix body PDC bit 8 1/2", 5 Bladges	4 1/2"REG	5	IADC:M323	pcs
6	Matrix body PDC bit 8 1/2", 6 Bladges	4 1/2"REG	9	IADC:M332	pcs
7	steel body PDC bit 8 1/2", 5 Bladges	4 1/2"REG	7	IADC:S223	pcs
8	steel body PDC bit 8 1/2", 6 Bladges	4 1/2"REG	7	IADC:S223	pcs
9	Matrix body PDC bit 6 1/8", 5 Bladges	3 1/2"REG	5	IADC:M323	pcs
10	Matrix body PDC bit 6 1/8", 6 Bladges	3 1/2"REG	5	IADC:M323	pcs



Heat Insulation & Anti-wear Tubing for Oil wells



Heat insulation and anti-wear tubing for oil wells

This types of tubing services have three purposes

- Thermal insulated well tube due to its ability to preserve the temperature at well head
- 2. It service the same purpose of same ordinary carbon steal
- 3. Corrosion resistance (Longer lifetime due to corrosion resistance)
- 4. Heat insulation and wear resistant tubing for oil well is composed of ordinary tubing, tubing coupling,
- 5. 40Mn2 inner tube, thermal insulation layer, Teflon ring and 2Cr13 sealing sleeve





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Result of the Typical Cases

Typical well examples for field applications

Oil and														
								At the	time of	test	After us	e Therm	al Tube	
		Well number	Wellhead temperature	Designed depth	Daily liquid ion(t)	Daily oil producti	water content(Wellhead temperat	Inlet tempe	Wellhead back	Wellhead rature	Inlet temper	Wellhead back	Inlet pipeline
	1	Gao- 101	25	1600	16.1	1.5	88.8	30	34	1.8	55	40	1.0	
	2	Gao30 -24	26	1500	16	0.88	94.5	32	35	1.5	58	39	0.53	
	3	Gao35 -55	19	1800	1.52	0.77	92.68	32	36	2.2	51	42	0.9	1500
	4	Gao11 5	27	1000	28.13	2	92.89	37	42	2.6	64	47	1.7	1500



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Case study (Shengli Oilfield)

Well No.G61-33 Usage Comparison

Dil	Daily fluid output (M³)	Daily oil output (Ton)	Wellhead Temp (°C)	Monthly well washing	Daily power comsumption (KWH)
Before use 2018	15.9	2.25	40.5	3	170
After use 2023	18.4	2.61	55	0	100

Well No.G61-33 Monthly Costs and Benefits Comparison

	Depreciatio n of heat tracing equipment (¥)	Depreciatio n of pumping and oil pipes, etc. (¥)	Well washin g costs (¥)	Power costs (¥)	Chemical s adding costs (¥)	Labor costs and other fixed costs (¥)	Total costs (¥)	Cost reduction rate (%)	Yield increase (Ton)	Yield increase rate (%)	
Before use 2018	5000	15000	3000 0	5100	1500	100000	156600	07 0/	10.0	100/	
After use 2023	0	22000	0	3000	0	90000	115000	21%0	10.8	10%0	7
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- Supply the Horizontal Well Anti-wearing tubing with the following;
 - 1. Cobalt internal lined tubing to overcome the main challenge faced in PCP horizontal wells application, where the rod is rotating at high speed, with a direct metal to metal contact with the tubing, especially at the inclination section .
 - 2. Full set Progressive cavity pumps (PCM) anti-wearing material, anti-corrosion. .





DANAMIN Oil and Gas Services LL.C

Polymer wear /friction Performance

Disc Material	PV (lb ft/in2min)	SG	Test Length (hrs)	Pressure (psi)	Speed (ft/min)	Wear Factor (in3min/ft-lb-hr)	Dynamic COF
Impact Modified PPA / Unfilled (AU)	20000	1.11	75	250	80	249	0.27
ARPMAX [®] 44X	20000	1.23	100	250	80	68	0.23
40% Long Glass Fiber Reinforced PPS-X	20000	1.68	0.2	250	80	318	0.42
30% Glass Fiber Reinforced PPS	20000	1.66	3.5	250	80	33814	WL
30% Glass Fiber Reinforced and Impact Modified PPA (AF)	20000	1.45	24	250	80	WL	WL

Per ASTM D3702 Thrust Washer Wear Test against C1018 steel.

Tests in bold red italics reached wear limit (WL) prior to 100 hours.

			Recommended Applications									
Material	Base Polymer	Contii Oper Tempe Limit	nuous ation erature ation	Hot Oiling	Sweet Crude	Sour Crude	Sand	Water	Brine			
NFF	Nylon	275°F	135°C	0	0		0	0				
AU	PPA	280°F	138°C	0	0	0		0				
AF	PPA	400°F	204°C	0	0	0	0	0	0			
PPS	PPS	400°F	204°C	0	0	0	0	0	0			
PPS-X	PPS	500°F	260°C	0	0	0	0	0	0			
LG15		350°F	204°C	0	0	0		0				
UHMWPE	60	180°F	82°C	a secondaria da	0	0	0	0	0.6 85			
ARPMAX [®] 44X		397°F	203°C	0	0	0	0	0	0			



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NFF	Nylon	275°F	135°C	0	0		0	0				
AU	PPA	280°F	138°C	0	0	0		0				
AF	PPA	400°F	204°C	0	0	0	0	0	0			
PPS	PPS	400°F	204°C	0	0	0	0	0	0			
PPS-X	PPS	500°F	260°C	0	0	0	0	0	0			
LG15		350°F	204°C	0	0	0		0				
UHMWPE	82	180°F	82°C		0	0	0	0	1.0 83			
ARPMAX [®] 44X		397°F	203°C	0	0	0	0	0	0			



Cobalt Alloy 87S Tubing Descriptions

CobaltAlloy greatly improves resistance to wear, abrasion, and corrosion in production tubing, resulting in fewer tubing failures and related expenses.



The internal protective layer has a high mechanical strength, very low co-efficient of friction and will operate continuously in well temperatures ≤150 C (≤300 F).



This production tubing package (CobaltAlloy Tubing and Cobalt Rod Guides) ensures that your well completion string is optimized for

- **1.** Abrasive wear,
- 2. Corrosion protection,
- **3.** Reduced torque,
- **4.** Lowest co-efficient of friction and
- **5.** Increased well production.

Cobalt Alloy 87S Tubing Descriptions

Tubing Treatment (Internal)	Proprietary Thermo-Mechanical Process
Surface Treatment Thickness	450um
Abrasion Resistance	Very High
Corrosion Resistance	Very High
Chemical Resistance	Very High
Compatible with ARPMAX [®] Polymer	Yes
Tubing Grades	Any API Grade
Tubing Sizes	Full Range of Tubing Sizes
Threaded Connections	All Thread Types
Tubing Coupling Treatment	Proprietary Thermo-Mechanical Process
Tubing Centralizer Option	CobaltLOK [®] Mid-Joint Centralizer
RFID Inventory Tracking	Yes
Co-Efficient of Friction	Very Low
Tubing Surface Preparation (Internal)	Sand Blasted, Acid Etched
Tubing Pup Joints (Treated Internally)	Yes
Sucker Rods	Available Tubing/Sucker Rod Package
Cobalt Premium Sucker Rod Guides	ARPMAX [®] Polymer (Compatible with
	CobaltAlloy™ Tubing)



Running Project

SER- No.	Date	Client Name	Area	RFC-Number	Tender-Number	Clint referance
1	2023	OQ	MUSANDM	21392	6000045041	DANAMINOM/006-23
2	2023	OQ- MUSANDM	MUSANDM	20885	9900030956	DANAMINOM/007-23
4	2023	OXY	MUKTHNA	49341692	WS4049341682	DANAMINOM/008-23
5	2023	PDO	FAHUD-NEMER	PDO-452159	PDO-910 - 1692 1785	DANAMINOM/008-23
6	2023	OQ	Block-8	25795	9892 1800	DANAMINOM/009-23
7	2023	OXY	MUKTHNA	6000011112	10855980	DANAMINOM/009-23
9	2023	MEDCO	Block-57	451235	235 - 7355 1030	DANAMINOM/010-23
10	2023	MEDCO	Block-76	516534	245 - 8945 2312	DANAMINOM/012-23



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OUR PARTNERS







Gab Analysis Study



Detailed Engineering

Oil and Gas Services LLC

Front-end Engineering & Design	Detailed Engineering	Construction & Procurement	Commission, Start-up & Turnover	
 Activities Equipment, instrument lists finalized; drawings finalized Equipment and contracts specifications assembled Long lead orders placed 				
Common Gaps				
 Operability and maintainability treated as inspection instead of process control 				
 Alternatives chosen based on capital cost and intuition rather than optimal total ownership value 				
 Format of deliverables does not consider start-up and ongoing O&M needs 				
 Capital, operation applying O&M b throughput, reliant 	ons, and maintenar est practices to op ability, etc.	nce costs unnecess timize capability, ca	arily high; not pacity,	

Detailed Engineering Up Front Deliverable Examples





Procurement & Construction

Front-end Commission, **Detailed** Construction **Engineering &** Start-up & Engineering & Procurement Design Turnover **Activities** • Site prep Request for quotes Initial equipment acceptance **Bid evaluations Facilities erection** Vendor, contractor selection Utilities construction Equipment installation, connection **Common Gaps** Timing, quantity, format, media, and content of vendor documentation Vendors not encouraged to provide optimal total ownership value Successful bidders primarily the lowest cost rather than best value • Long-term strategic sourcing/global procurement rarely considered Involving O&M personnel to minimize O&M learning curves Redundancy of acceptance testing, quality control, preventive maintenance program development, and training development



Procurement & Construction Up Front Deliverable Examples

ervices LLC	Execute and Maintain Readiness Master Plan	Begin Employee Training and Certification Program
	Logistics, Material Handling, Quality, Prod. Control & Standard Operating Procedures, Tools, Instruments, & Facilities	Establish Systems Contracts, MRO Facilities, And Supply Chain Management Procs Initialize Supply Chain
OI Pr Re	Install, Initialize Management Systems	Management Systems Initial Supply Orders
Rey	Populate CMMS, Repair Plans,	Develop Plant Engineering,
	PM/PdM/NDE/Calibration Procs, Tools, Plans, BOMs	Admin. Procedures
	PM/PdM/NDE/Calibration Procs, Tools, Plans, BOMs Training Program Development, Employee Hiring & Selection, HR System Initialization	Admin. Procedures Initialize Plant Engineering, Facilities, Accounting, & Other Admin. Procedures



Commission, Start-up, Ramp-up & Turnover

Front-end Engineering & Design	Detailed Engineering	Construction & Procurement	Commission, Startup & Turnover		
 Activities Containment testing, validation Process start-up Process ramp-up and debugging Operations acceptance 					
Common Gaps					
 Poor quality version 	endor training				
 Inadequate O8 	Inadequate O&M personnel involvement				
 Limited accountability of designers, equipment suppliers Project documentation deliverables rarely meet most O&M requirements 					
 Validation of O&M data, procedures and training ineffectively integrated and scheduled 					



Commission, Start-up, Production Ramp-up & Turnover Up Front Deliverable Examples





Other Services

supply Services :-

- > Oil Field Supply ie Valves, flanges etc...
- Catalyst and chemical supply
- Safety Equipment supply (PPE's) Tools
- Security Services and eqpt CCTV, consultancy and Project Management etc..
- > Electrical Supplies ie Cables, Insulator, truncking junction boxes etc..









Thanks

