

GRAHAM SHEEDY GS MANAGEMENT CONSULTANTS

OIL AND GAS PROCESSING FACILITIES

SPE 21ST NOVEMBER 2017



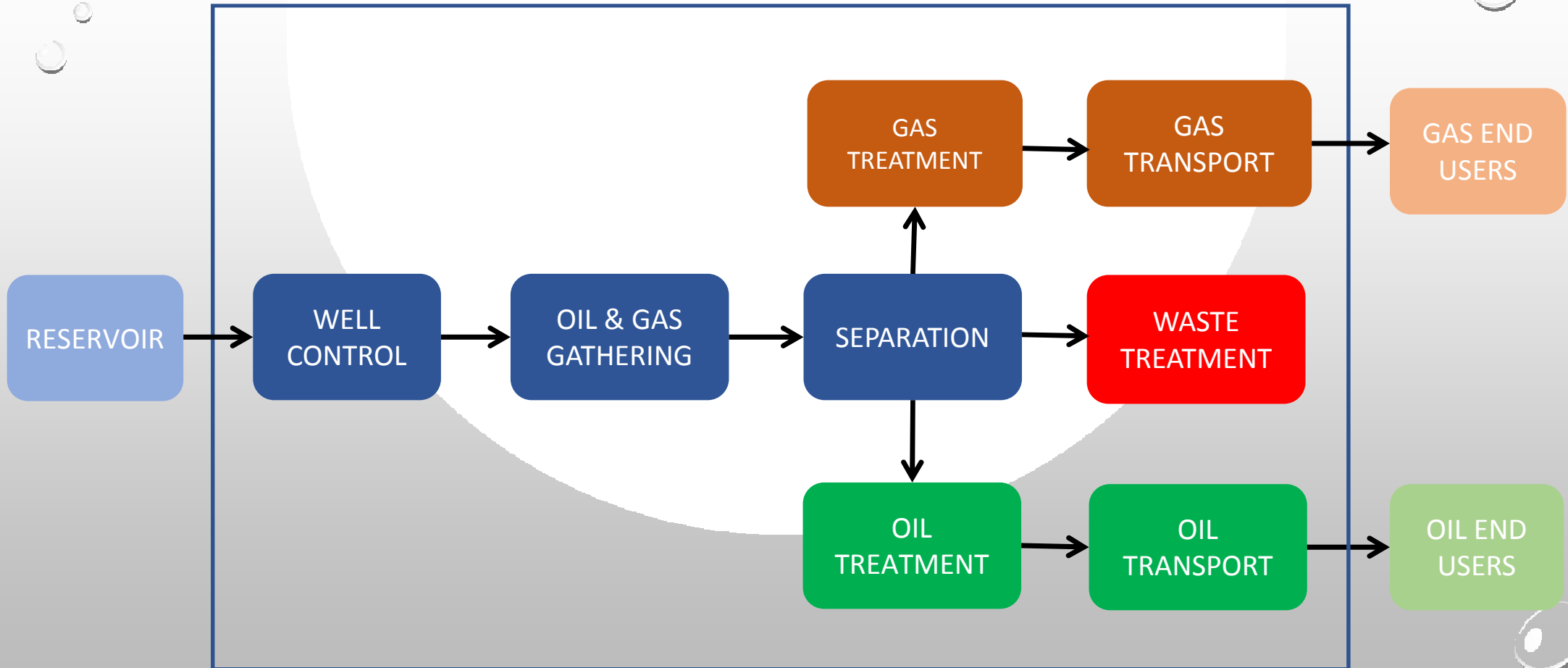
Management Consultants Ltd.

OIL AND GAS PROCESSING FACILITIES

- OVERALL FLOW SCHEME
- PURPOSE OF EACH COMPONENT
 - HOW THEY WORK
 - CHALLENGES
 - OPTIONS
- OIL AND GAS FACILITIES OPERATING MODELS
- KEY PERFORMANCE METRICS CONSIDERATIONS



OIL AND GAS PRODUCTION



WELL CONTROL

PURPOSE

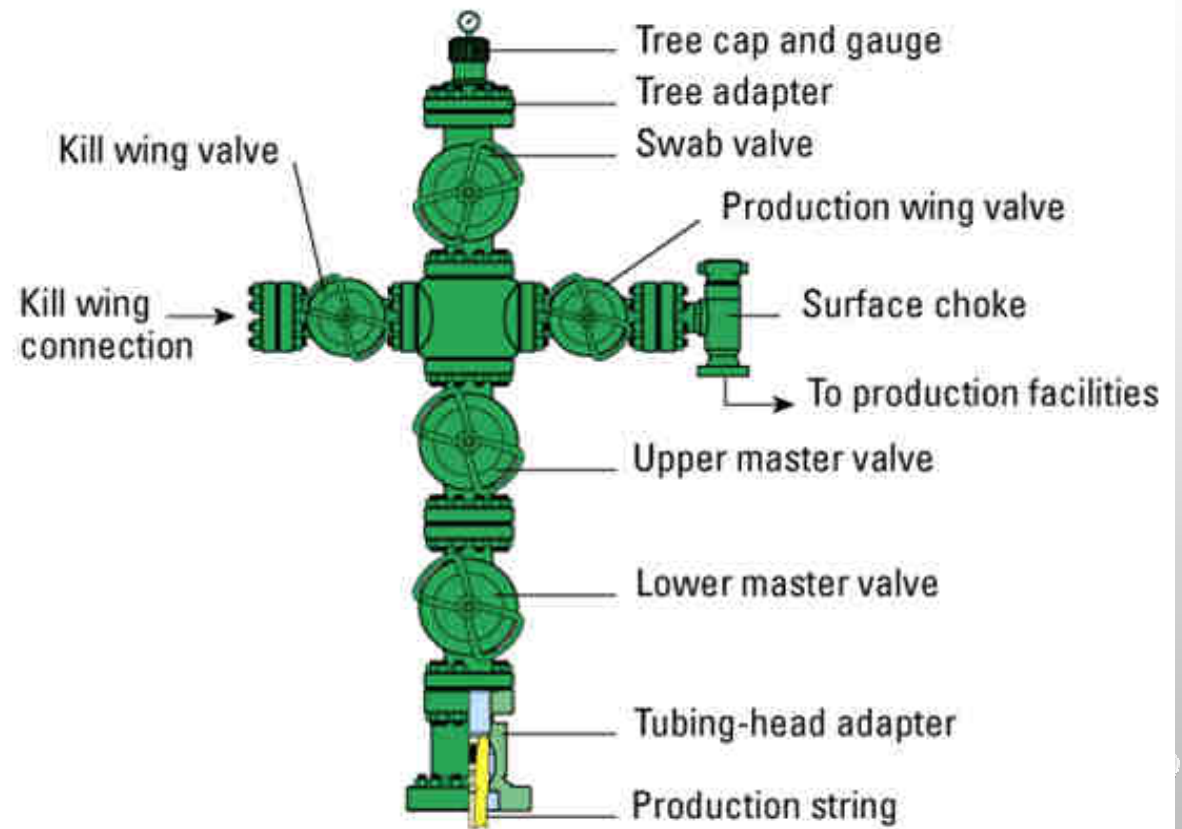
- CONTROL PRODUCTION RATES
- MAXIMISE PRODUCTION
- PROTECT FROM UNCONTROLLED RELEASE OF WELL FLUIDS

CHALLENGES

- CHANGING WELL CONDITIONS
- CHANGING FLUID PROPERTIES
- SAND EROSION

OPTIONS

- SUBSEA
- TOPSIDE



WELL CONTROL

PURPOSE

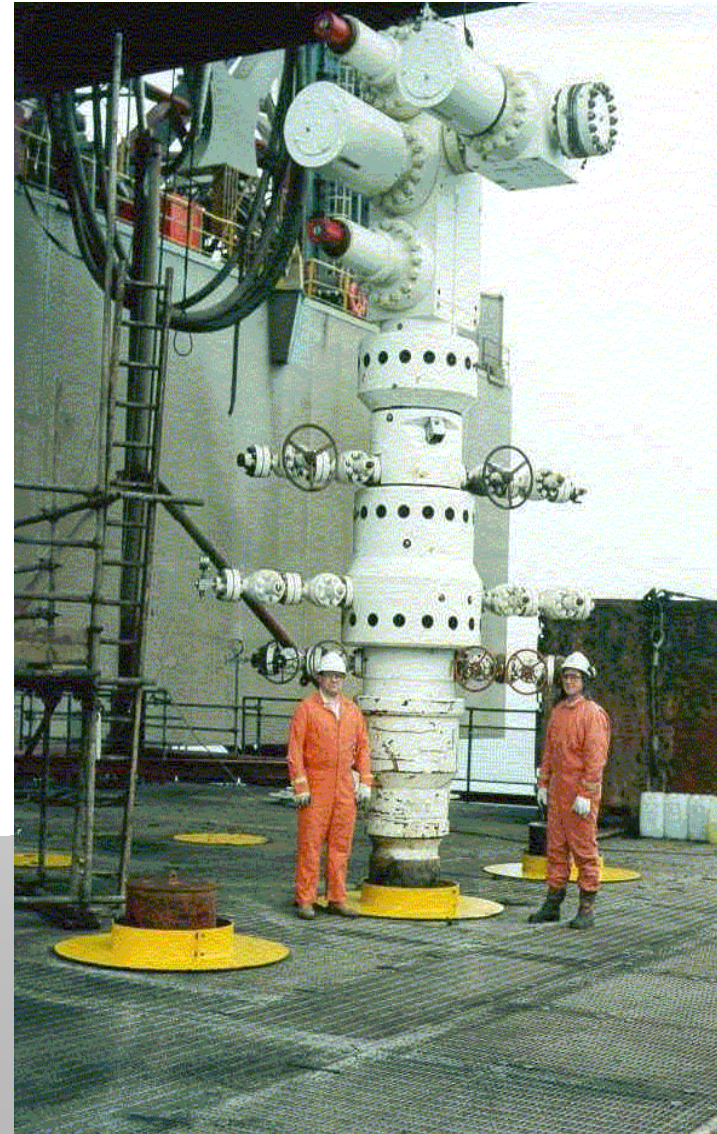
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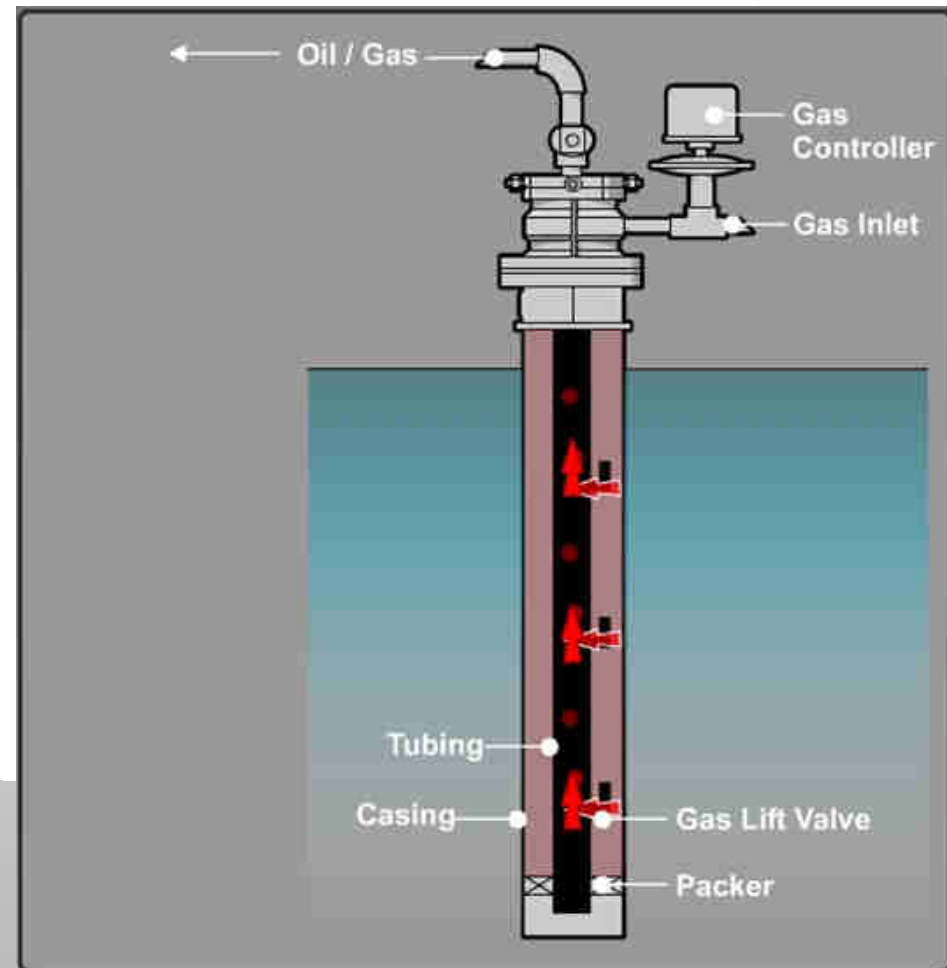
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OIL AND GAS GATHERING

PURPOSE

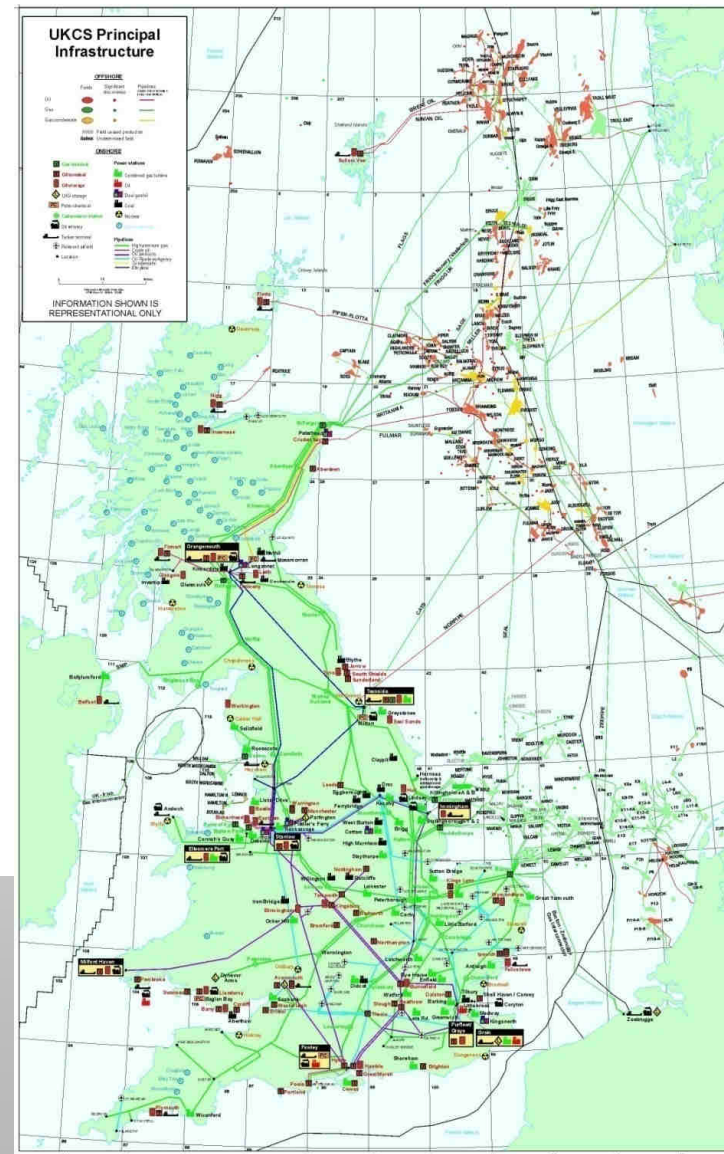
- MOVE FLUIDS TO CENTRAL PROCESSING
- MINIMISE COST
- PRODUCTION METERING

CHALLENGES

- CHANGING WELL CONDITIONS
- CHANGING FLUID PROPERTIES
- COMINGLING FLUIDS
- CORROSION/EROSION

OPTIONS

- SUBSEA/TOPSIDE
- REMOTE/CENTRALISED
- MANNED/UNMANNED



OIL AND GAS GATHERING

PURPOSE

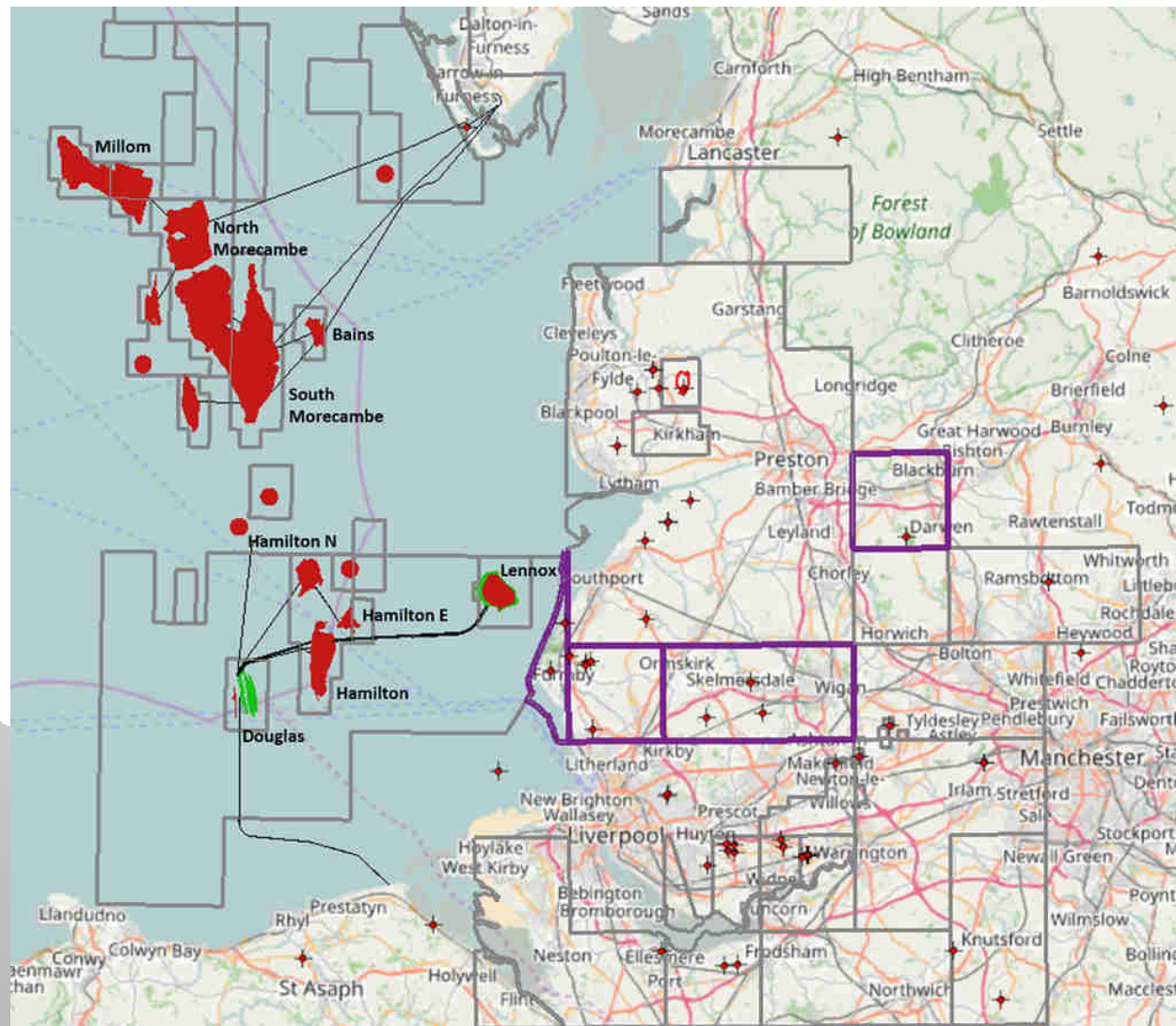
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Conoco Phillips Assets
Operated by Centrica

Rivers
Terminal



Millom
West



Millom
East



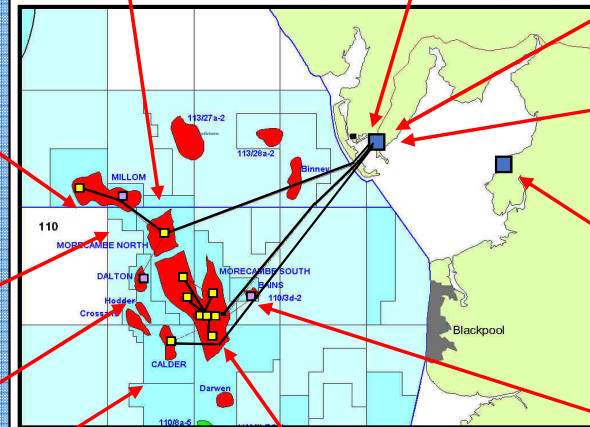
Dalton



Calder



DPPA



South
Morecambe



Heysham
Logistics
Base



Bains



South Morecambe Central & Remote Installations

OIL AND GAS GATHERING

PURPOSE

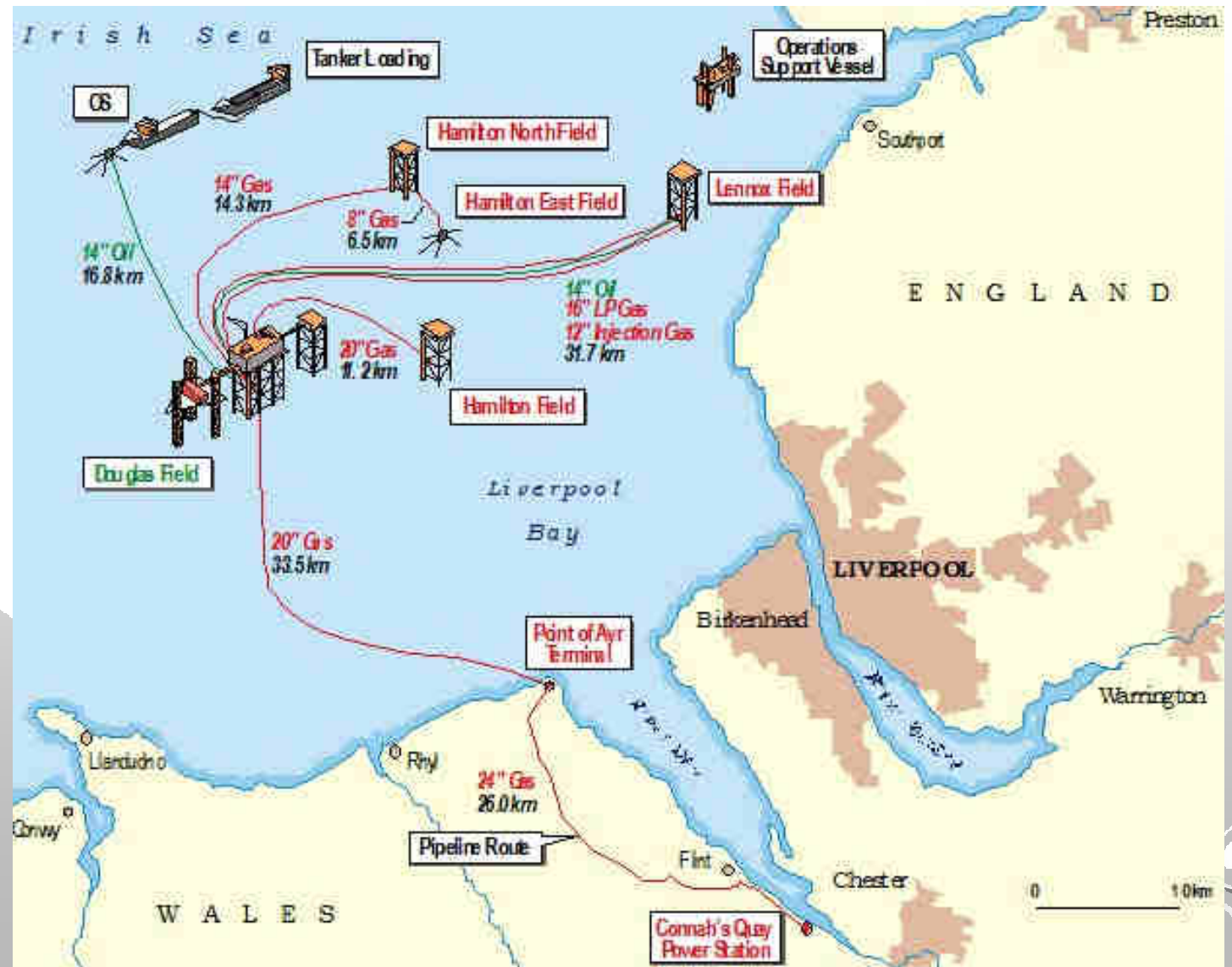
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METERING CONSIDERATIONS



SEPARATION

PURPOSE

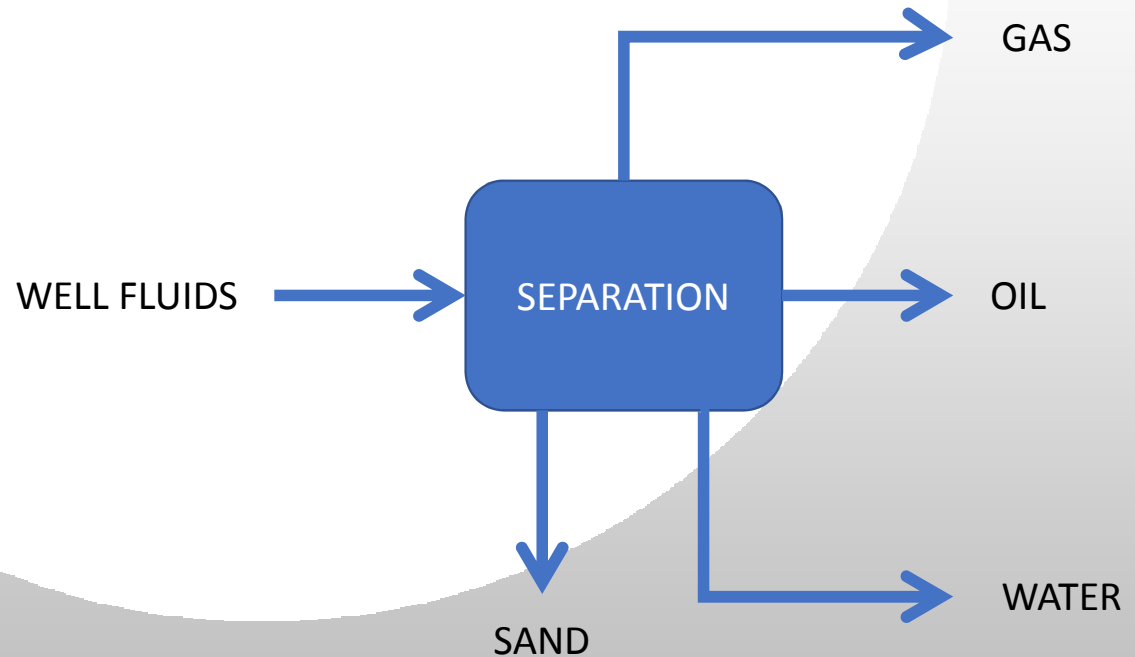
- SEPARATE THE WELL FLUIDS, I.E. OIL, GAS, WATER AND SAND
- STABILISE THE OIL

CHALLENGES

- UNCERTAINTY OF DESIGN BASIS
- OPTIMISATION OF SEPARATION AND COMPRESSION
- WEIGHT AND SPACE LIMITATIONS

OPTIONS

- DEGREE OF SEPARATION
- NUMBER OF SEPARATION STAGES
- REDUNDANCY
- HORIZONTAL OR VERTICAL SEPARATORS



SEPARATION

PURPOSE

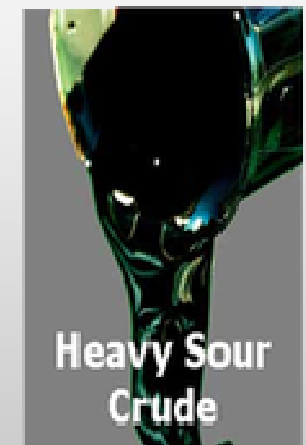
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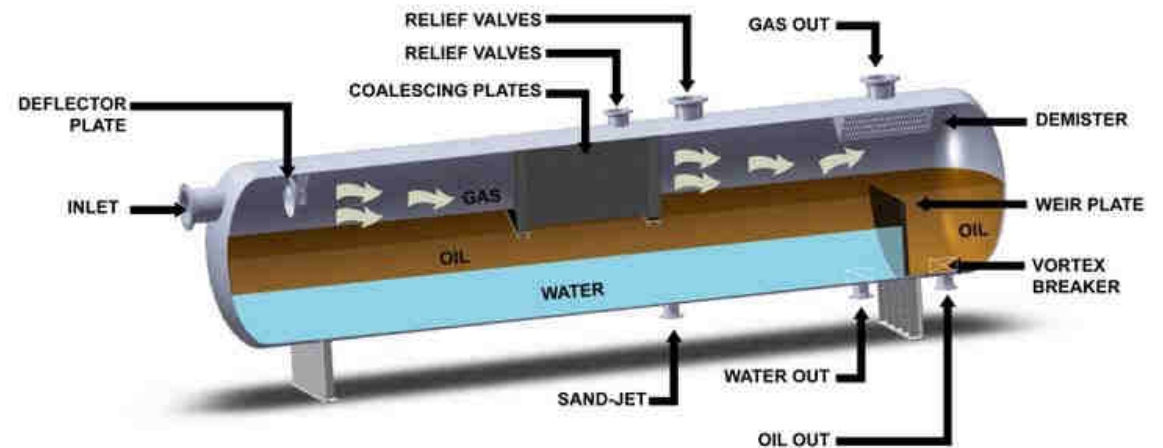
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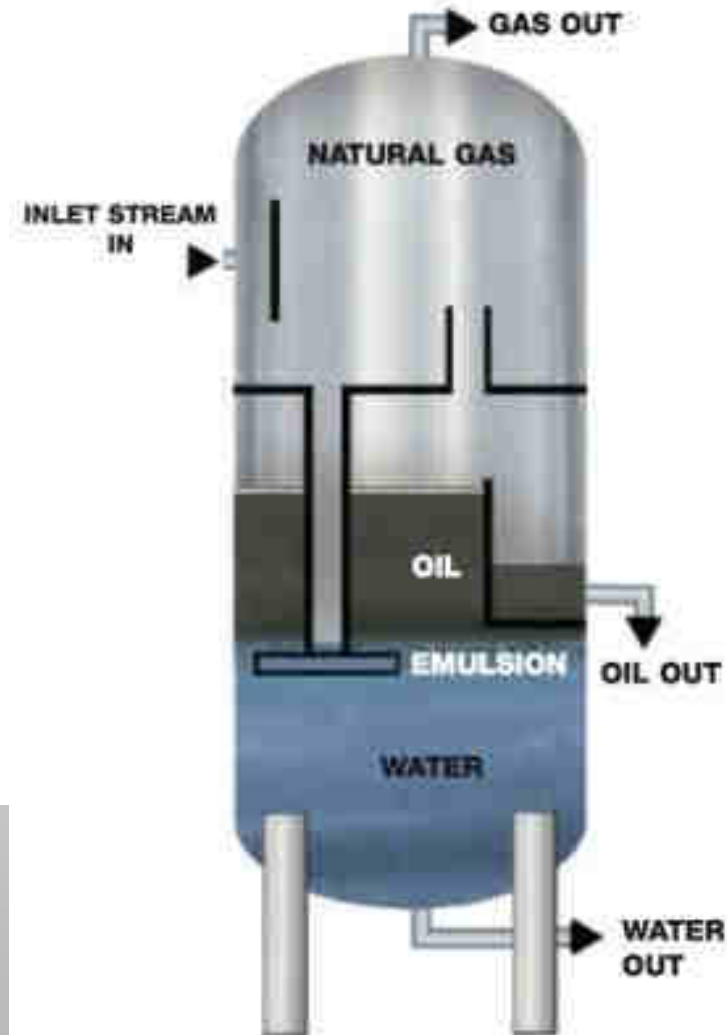
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GAS TREATMENT

PURPOSE

- REMOVE WATER, ACID GASES AND MERCURY
- CONDITION GAS
- MEET GAS SALES QUALITY SPECIFICATION

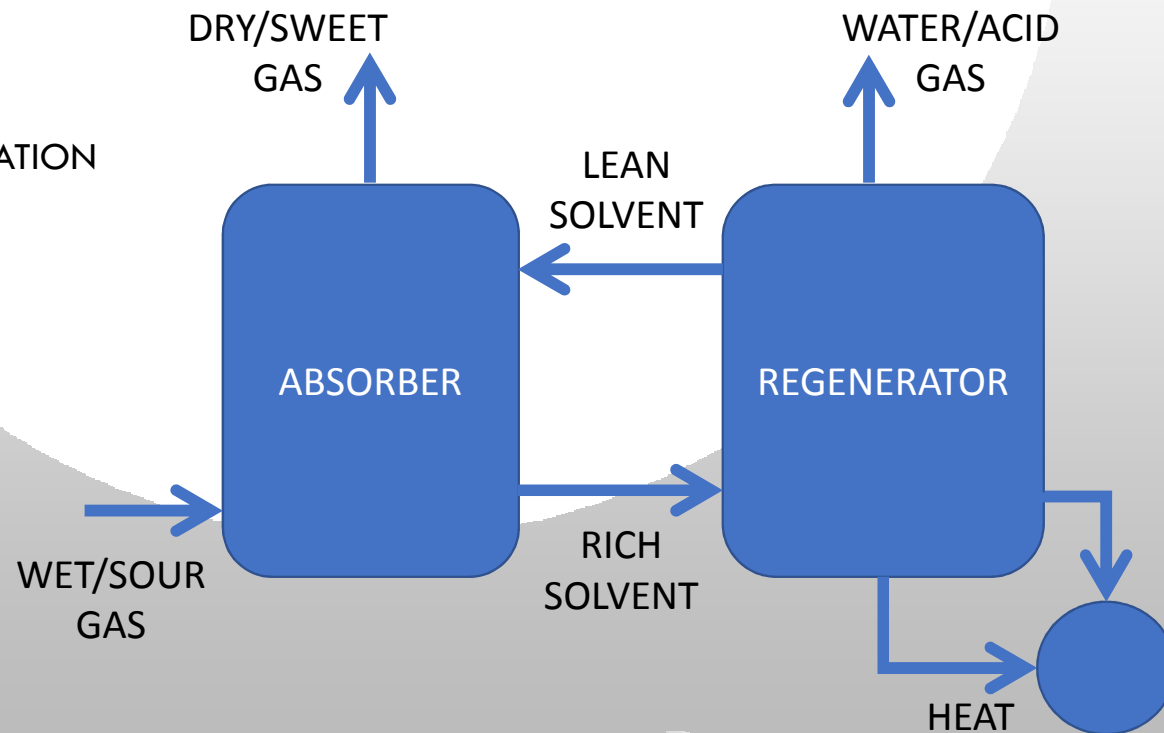
CHALLENGES

- CHANGING FLUID COMPOSITION
- DISCHARGE GAS QUALITY
- WASTE DISPOSAL

OPTIONS

- EXTENT OF TREATMENT
- COMBINATION TREATMENTS

WATER AND ACID GASES TYPICALLY REMOVED USING LIQUID SOLVENTS THAT ARE REGENERATED AND REUSED



GAS TREATMENT

PURPOSE

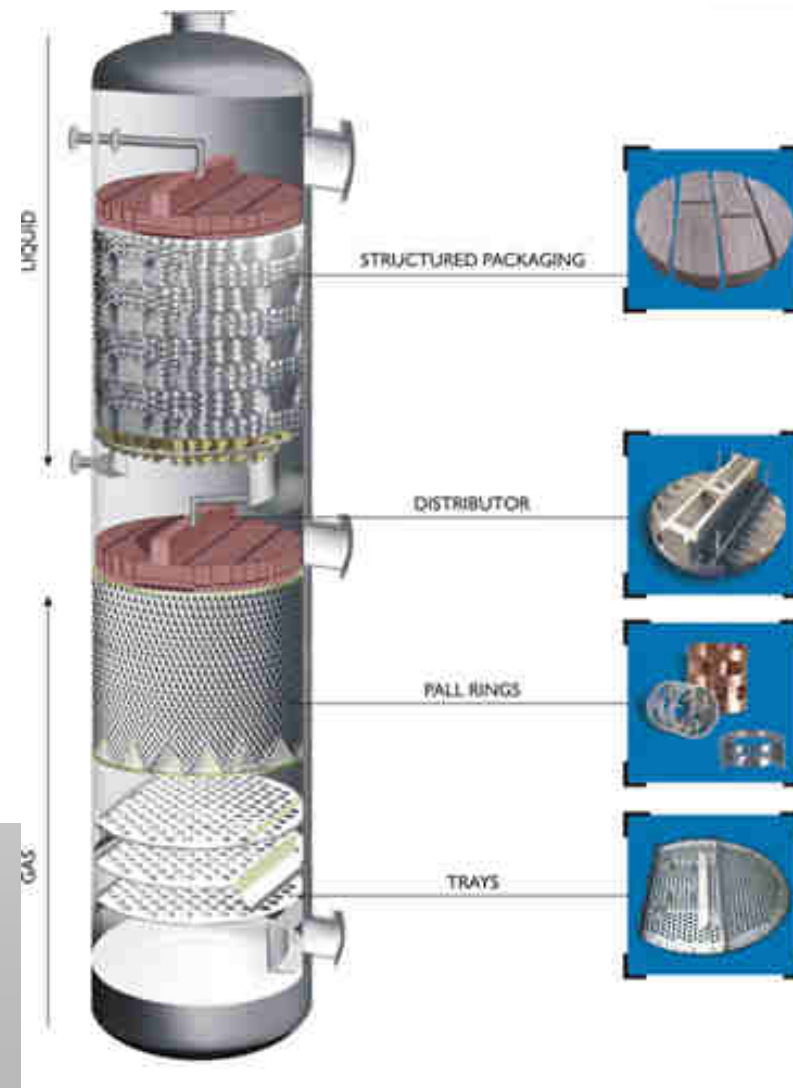
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OPTIONS

- EXTENT OF TREATMENT
- COMBINATION TREATMENTS



GAS TRANSPORT

PURPOSE

- TRANSPORT GAS TO END USER

CHALLENGES

- ENERGY USAGE
- CHANGING FLUID PROPERTIES
- TECHNICAL COMPLEXITY
- ACCESS TO INFRASTRUCTURE
- PROCESS SAFETY RISK

OPTIONS

- PIPELINE
- LNG/LPG SHIP
- COMPRESSION STAGES
- DRIVE TYPE



THE BOTTLE CONTAINS 0.026 CUBIC METRES OF LIQUID
AT ATMOSPHERIC PRESSURE THE GAS WOULD HAVE A VOLUME
OF 6.9 CUBIC METRES

GAS TRANSPORT

PURPOSE

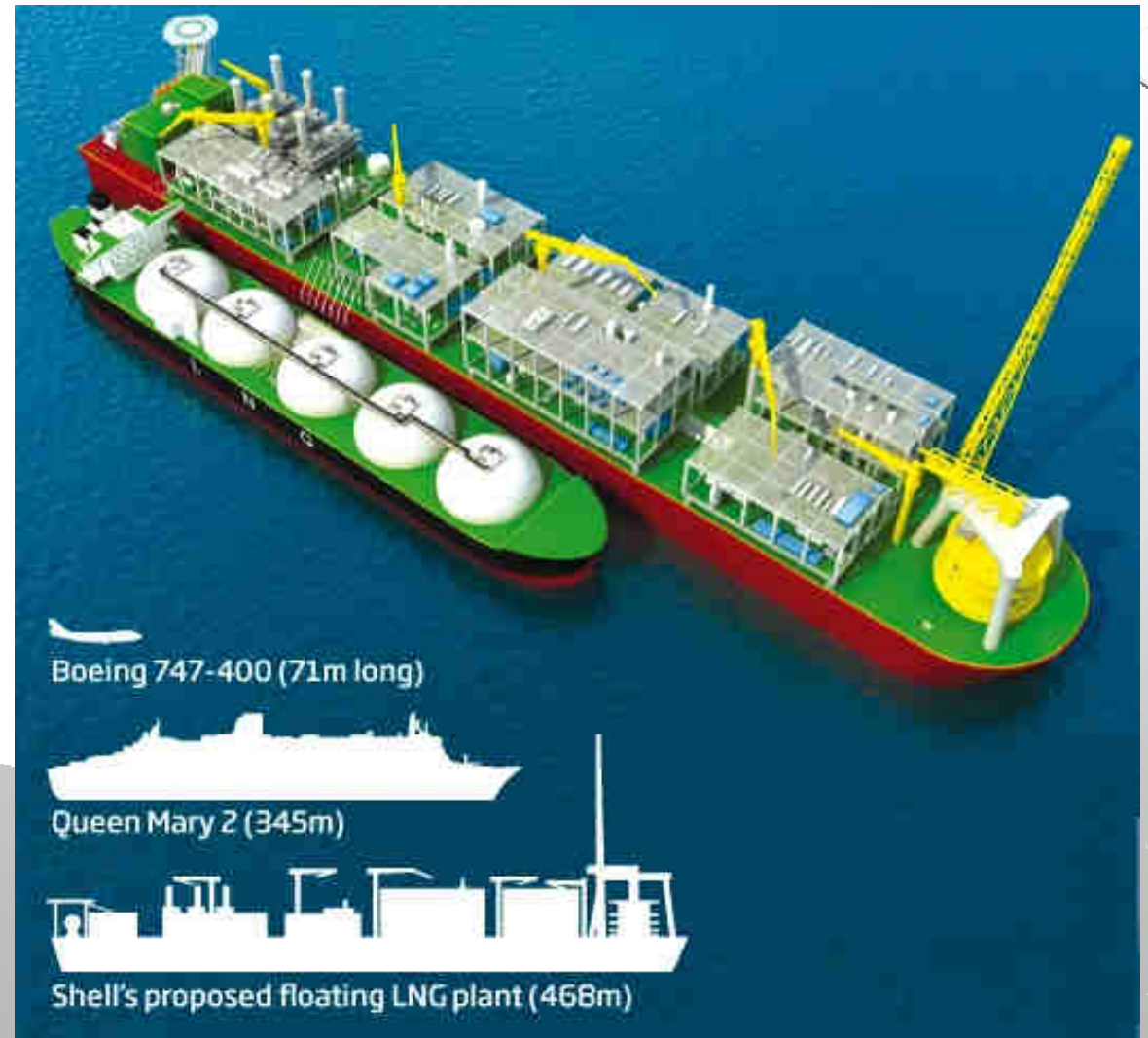
- TRANSPORT GAS TO END USER

CHALLENGES

- ENERGY USAGE
- CHANGING FLUID PROPERTIES
- TECHNICAL COMPLEXITY
- ACCESS TO INFRASTRUCTURE
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OPTIONS

- PIPELINE
- LNG/LPG SHIP
- COMPRESSION STAGES
- DRIVE TYPE



GAS TRANSPORT

PURPOSE

- TRANSPORT GAS TO END USER

CHALLENGES

- ENERGY USAGE
- CHANGING FLUID PROPERTIES
- TECHNICAL COMPLEXITY
- ACCESS TO INFRASTRUCTURE
- PROCESS SAFETY RISK

OPTIONS

- PIPELINE
- LNG/LPG SHIP
- COMPRESSION STAGES
- DRIVE TYPE



GAS TRANSPORT

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OPTIONS

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- LNG/LPG SHIP
- COMPRESSION STAGES
- DRIVE TYPE



OIL TREATMENT

PURPOSE

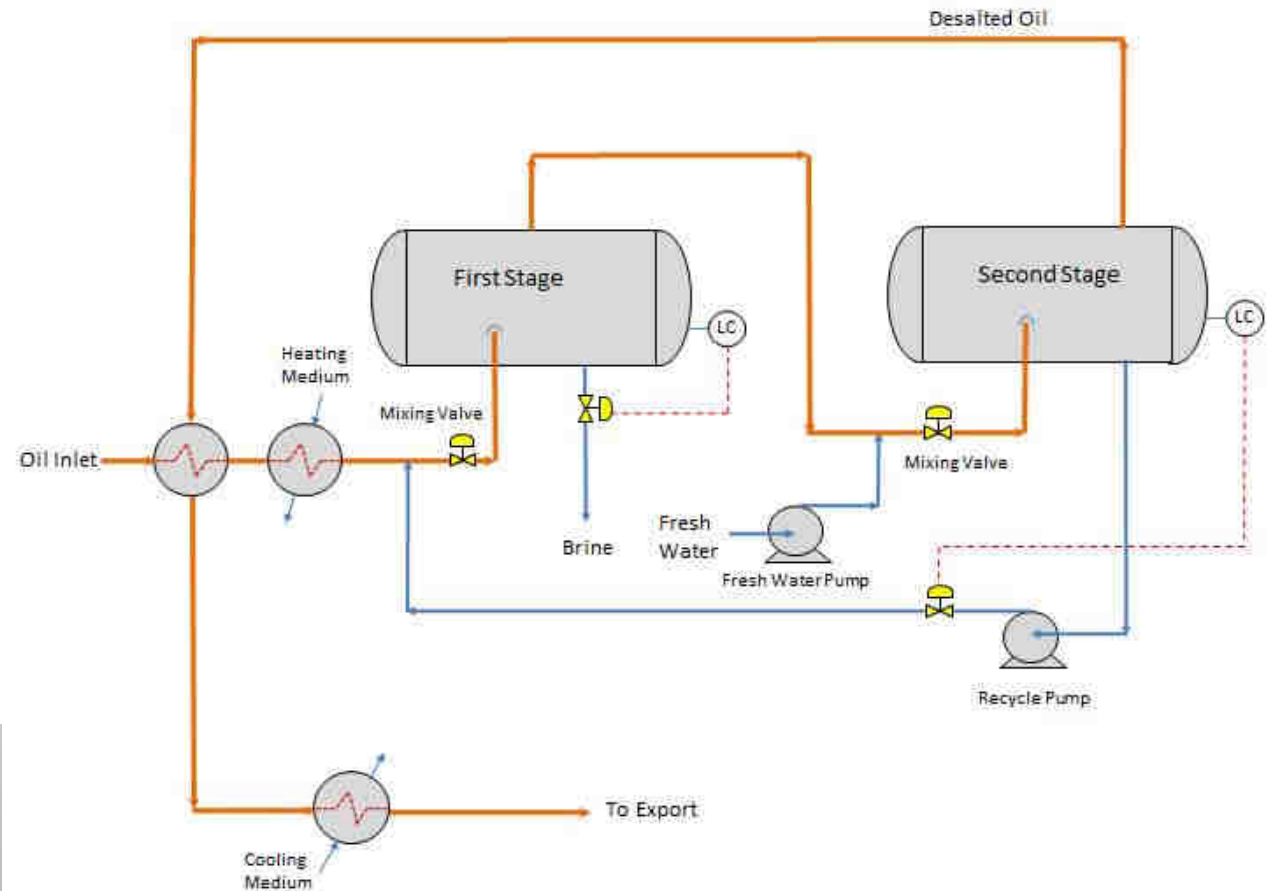
- REMOVE WATER/SAND/SALT
- MEET OIL SALES QUALITY SPECIFICATION

CHALLENGES

- CHANGING FLUID PROPERTIES
- ENERGY USAGE
- WEIGHT CONTROL
- DISCHARGE OIL QUALITY CONTROL
- LOGISTICS

OPTIONS

- DEGREE OF OFFSHORE TREATMENT
- TREATMENT METHODS



OIL TREATMENT

PURPOSE

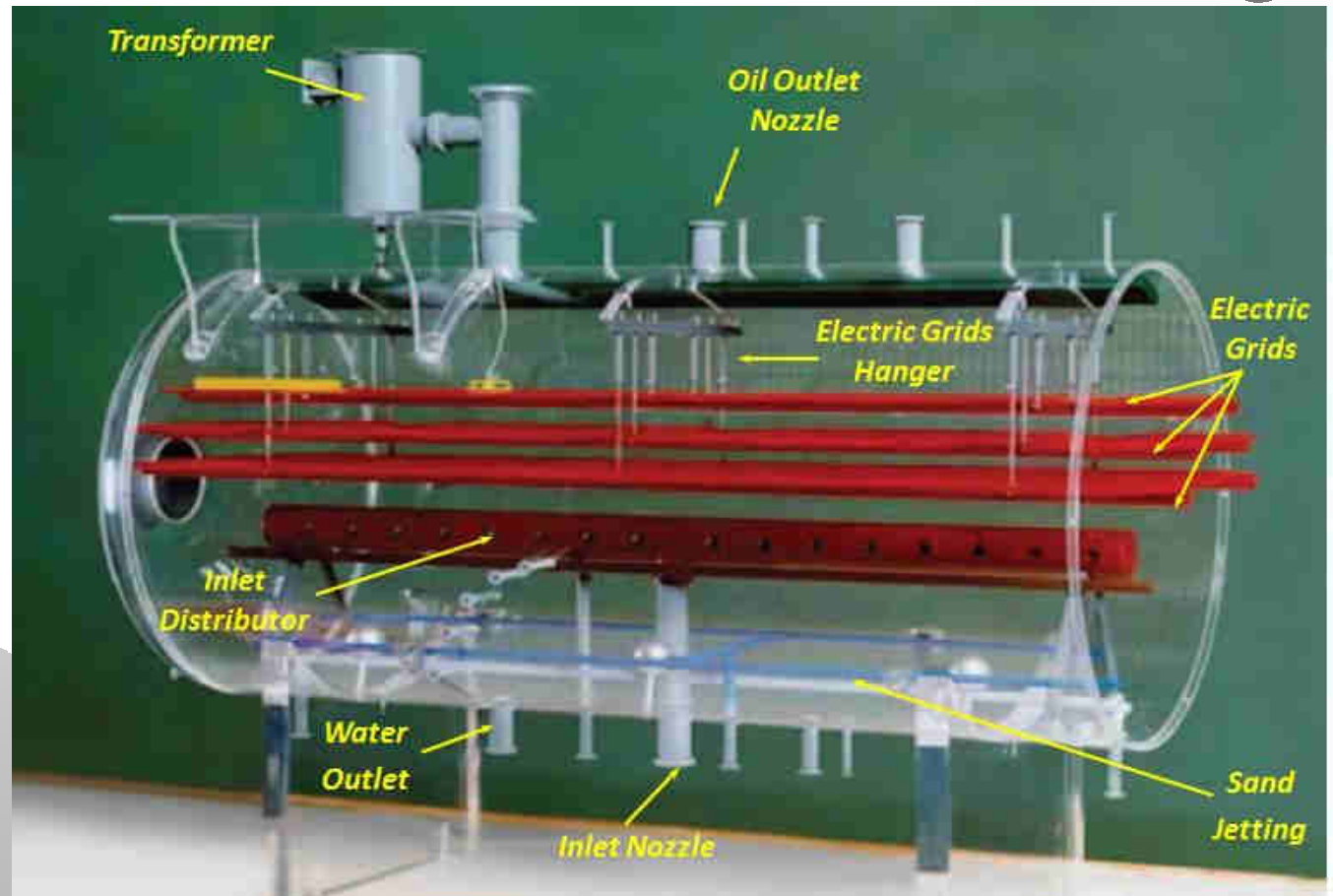
- REMOVE WATER/SAND/SALT
- MEET OIL SALES QUALITY SPECIFICATION

CHALLENGES

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- DISCHARGE OIL QUALITY CONTROL
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OPTIONS

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OIL TRANSPORT

PURPOSE

- TRANSPORT GAS TO END USER

CHALLENGES

- CHANGING FLUID PROPERTIES
- ENERGY USAGE
- LOGISTICS
- TECHNICAL COMPLEXITY
- ACCESS TO INFRASTRUCTURE
- PROCESS SAFETY RISKS/SECURITY

OPTIONS

- PIPELINE
- TANKER – SHIP OR ROAD



OIL TRANSPORT

PURPOSE

- TRANSPORT GAS TO END USER

CHALLENGES

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- LOGISTICS
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OPTIONS

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OPTIONS

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- TANKER – SHIP OR ROAD



OIL TRANSPORT

PURPOSE

- TRANSPORT GAS TO END USER

CHALLENGES

- CHANGING FLUID PROPERTIES
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- LOGISTICS
- TECHNICAL COMPLEXITY
- ACCESS TO INFRASTRUCTURE
- PROCESS SAFETY RISKS/SECURITY

OPTIONS

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- TANKER – SHIP OR ROAD



WASTE TREATMENT

PURPOSE

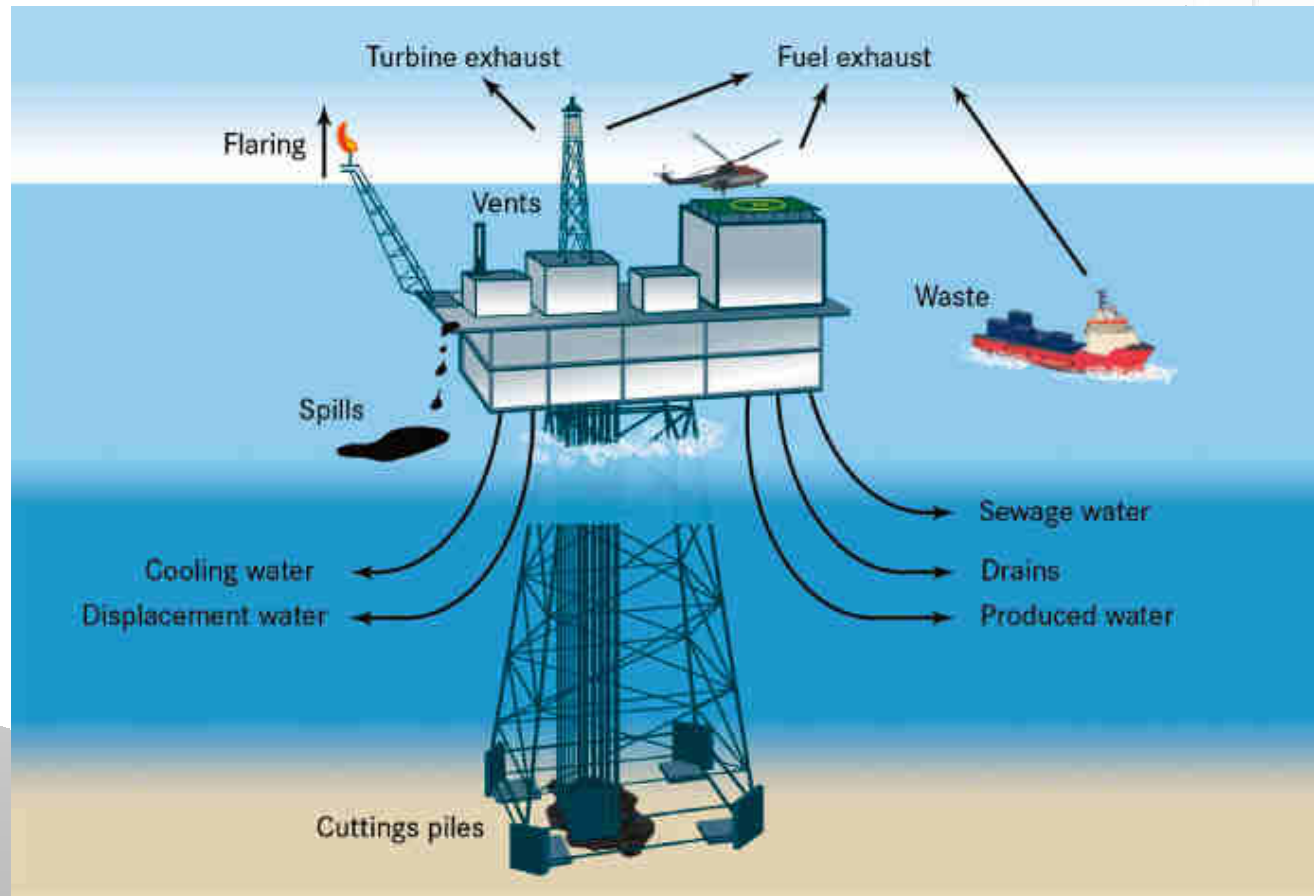
- DISPOSE OF WASTE STREAMS IN ACCORDANCE WITH ENVIRONMENTAL REGULATIONS

CHALLENGES

- CHANGING FLUID PROPERTIES
- MEASUREMENT
- LOGISTICS

OPTIONS

- LOCAL/CENTRALISED PROCESSING



OPERATING MODELS

	IN-HOUSE	OUTSOURCED	HYBRID
CORE SERVICES, e.g., OPERATIONS, ENGINEERING AND MAINTENANCE	OWNER/OPERATOR	3 RD PARTY	OPERATIONS & ENGINEERING IN-HOUSE; MAINTENANCE OUTSOURCED
NON-CORE SERVICES e.g. LOGISTICS, FABRIC MAINTENANCE, FACILITIES MANAGEMENT	VARIOUS 3 RD PARTIES		
CULTURE & KEY DECISIONS	STRONG INFLUENCE	LIMITED INFLUENCE	VARIABLE
OPERATING KNOWLEDGE AND EXPERIENCE	RETAINED IN-HOUSE	LOST FROM THE OWNER/OPERATOR	VARIABLE
SUPPORT FUNCTIONS	SIGNIFICANT EFFORT REQUIRED	MINIMUM EFFORT	MEDIUM
COST	DEPENDS ON THE CONTRACT		

KEY OPERATIONAL PERFORMANCE METRIC EXAMPLES

MEASURE	PURPOSE
AVAILABILITY - % OF TIME ASSET IS PRODUCING	MEASURE OF EQUIPMENT RELIABILITY
28 DAY PLAN COMPLIANCE	MEASURE OF PLANNING EFFECTIVENESS
OVERDUE SAFETY CRITICAL MAINTENANCE	MAINTENANCE EXECUTION EFFECTIVENESS AND POTENTIAL FOR UNREVEALED FAILURES
FAILED SAFETY CRITICAL ELEMENTS	INDICATION OF NUMBER OF FAILED SAFETY BARRIERS
SAFETY CRITICAL STAFF COMPETENCE	ABILITY OF STAFF TO UNDERTAKE THEIR DUTIES
OVERDUE SAFETY INCIDENT/AUDIT FOLLOW UP ACTIONS	INDICATION OF ORGANISATIONAL EFFECTIVENESS

Thank you.
Questions...?

