W&T OFFSHORE

SPE PF&C Group Presentation
GOM Platform Decommissioning – an Operator's Perspective

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January 30, 2018

Agenda

- Decommissioning impact on owners finances
- Gulf of Mexico Decommissioning – Comparison of development vs decommissioning
- Decommissioning equipment spreads
- Long term decommissioning planning – when to start?
- Federal and State agencies impact on the decommissioning methods utilized
- Contracting considerations for decommissioning services

Owners Decommissioning Financial Impact

- Balance Sheet
  - When the asset is installed, the future decommissioning obligation becomes a liability on the owners balance sheet affecting the net worth of company.
  - The future value of the obligation is determined using an inflation rate and useful life of the asset then discounted back to present value based on the Company's risk free interest rate, to determine the current liability.
  - The liability is split in to 2 categories
    - Current Term – expenditures forecast to occur in the next 12 months
    - Long Term - expenditures forecast to occur beyond the next 12 months

Owners Decommissioning Financial Impact

- Balance Sheet

Liabilities and Shareholders' Deficit		
Current liabilities:		
Accounts payable	$	72,197
Undistributed oil and natural gas proceeds		20,084
Asset retirement obligations		29,456
Long-term debt		11,147
Accrued liabilities (Note 1)		26,550
Total current liabilities		159,434
Long-term debt: (Note 2)		
Principal		873,733
Carrying value adjustments		108,884
Long term debt, less current portion - carrying value		982,617
Asset retirement obligations, less current portion		275,560

Our ARO primarily represents the estimated present value of the amount we will incur to plug, abandon and remediate our producing properties at the end of their productive lives.

A summary of the changes to our ARO is as follows (in thousands):

Balance, December 31, 2016	$	334,438
Liabilities settled		(56,226)
Accretion of discount		12,820
Revisions of estimated liabilities (1)		13,984
Balance, September 30, 2017		305,016
Less current portion		29,456
Long-term	$	275,560

Owners Decommissioning Financial Impact

- Earnings
  - The total cost of the fixed asset (reserves), including the cost of decommissioning, is depreciated on the basis that best reflects the consumption of the economic benefits of the asset.
  - Costs from exploration, development and decommissioning phases are amortized over expected total production using a unit of production (UOP) basis.
  - UOP is the most appropriate amortization method because it reflects the pattern of consumption of the reserves' economic benefits.
  - DD&A "depreciation, depletion and amortization" $ / barrel DD&A rate is determined by dividing the company's total reserves into the total capital charges including the present value of future decommissioning
  - DD&A is booked as an expense that offsets income
  - The total DD&A for the period is determined by multiplying the $ barrel DD&A rate times the number of barrels produced.

Owners Decommissioning Financial Impact

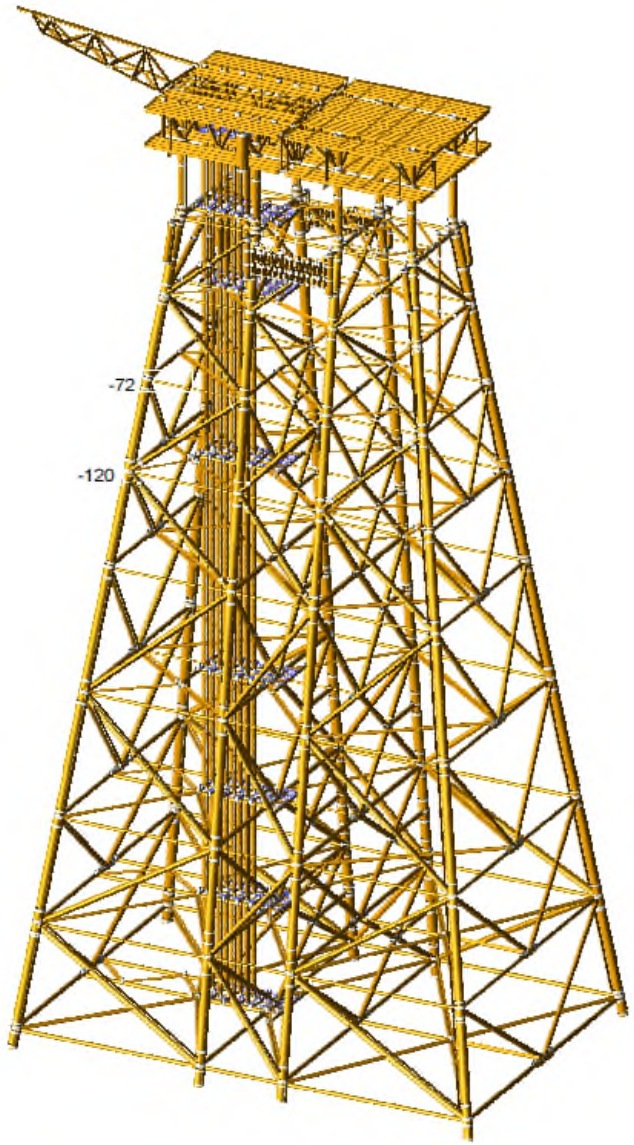
- Earnings

	2017
Revenues	$ 110,281
Operating costs and expenses:	
Lease operating expenses	35,134
Production taxes	340
Gathering and transportation	4,108
Depreciation, depletion, amortization and accretion	36,489
Ceiling test write-down of oil and natural gas properties	—
General and administrative expenses	15,631
Derivative (gain) loss	2,879
Total costs and expenses	94,581
Operating income (loss)	15,700

	2017
Operating: (1)	
Net sales:	
Oil (MBbls)	1,700
NGLs (MBbls)	299
Natural gas (MMcf)	8,130
Total oil equivalent (MBoe)	3,354
Total natural gas equivalents (MMcfe)	20,125
Average daily equivalent sales (Boe/day)	36,459
Average daily equivalent sales (Mcfe/day)	218,752
Average realized sales prices:	
Oil ($/Bbl)	$ 45.92
NGLs ($/Bbl)	22.07
Natural gas ($/Mcf)	2.97
Oil equivalent ($/Boe)	32.43
Natural gas equivalent ($/Mcfe)	5.40
Average per Boe ($/Boe):	
Lease operating expenses	$ 10.48
Gathering and transportation	1.22
Production costs	11.70
Production taxes	0.10
DD&A	10.88

Typical GOM Platform

3D Model



Development Sequence

1. Secure lease from BOEM
2. File your bond $$ with BOEM
3. Obtain BSEE drilling, platform and pipeline permits
4. Mobilize MODU and drill exploration wells in template
5. Fabricate structure and load out on barges.
6. Tow barges to site, launch or set jacket, drive piles, set deck.
7. Lay pipelines, connect to risers at seafloor.
8. Hookup and commission topsides
9. Tie-back exploration wells and drill development wells with MODU or platform rig
10. Operate and maintain platform through life of producing wells.
11. Wells deplete, lease expires
12. Inspect and maintain platform until decommissioning operations

Decommissioning Sequence - Preparation

1. Inspect platform - structural integrity, NORM / Asbestos
2. Inspect wells – casing integrity, valve operability
3. Obtain BSEE well P&A, platform removal and pipeline abandonment permits
4. Set up quarters to house workers and other equipment to begin decommissioning
5. Disconnect production equipment from pipelines and wells. Flush to make hydrocarbon free. Remediate NORM / Asbestos if required.
6. Pig and flush pipelines with seawater, disconnect pipeline from jacket riser at seafloor. Remove complete pipeline or abandon in place.
7. For wells, set cement plugs in tubing and annuli. Pressure and bubble test all plugs. Pull free casing strings (not cemented)
8. Cut all remaining casing strings at least 15’ below mudline and recover same.
9. Prepare structure for removal which could include severing deck / jacket. When complete, demobilize quarters and remaining equipment out on barges.

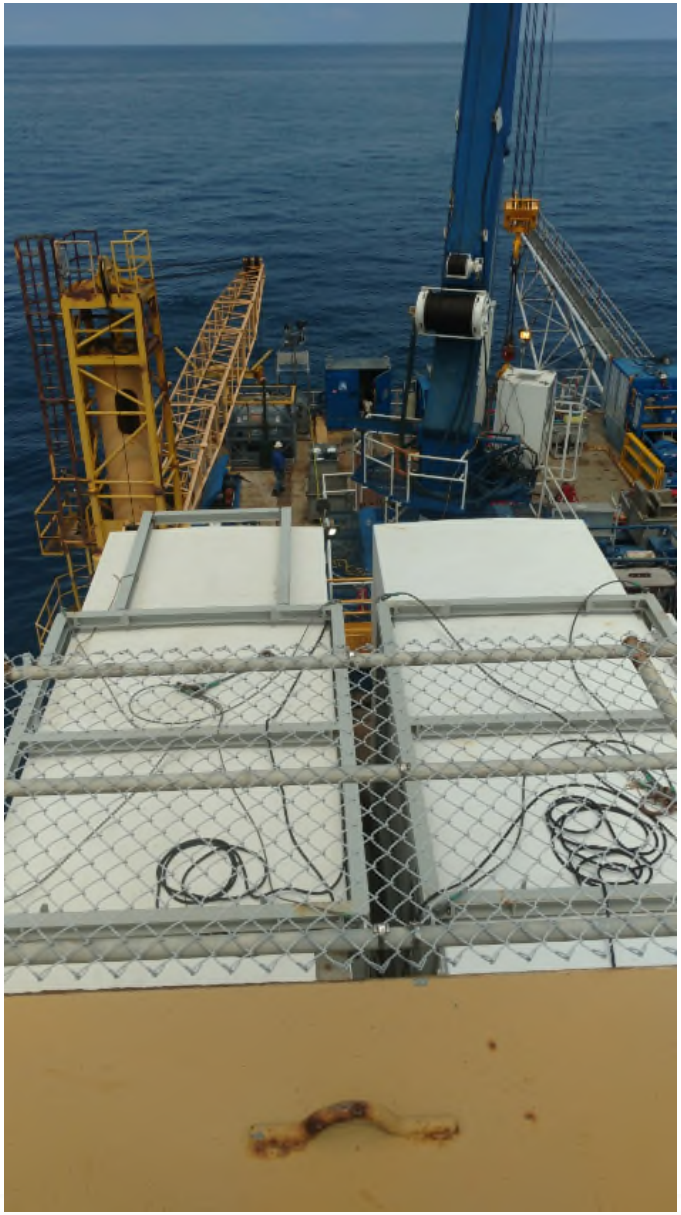
Decommissioning Removal / Site Clearance

1. Tow heavy lift vessel and material barges to site
2. Install rigging and recover topsides equipment to material barge
3. Install rigging and recover deck to material barge
4. Cut piles at least 15’ below mudline and recover if needed to reduce jacket lift weight.
5. Install rigging and make any underwater cuts to sever jacket in to multiple pieces if required to reduce jacket lift weight.
6. If jacket will be scrapped, recover jacket/pile components to material barge.
7. If jacket will be reefed, de-ballast jacket, tow to reef site and set on seafloor.
8. Set hazard marker buoy on location
9. Survey site for debris with sonar and divers.
10. Recover seafloor debris such as well templates, overboard items in storms
11. Validate recovery of debris (site clearance) with sonar (>300’ WD only) or by trawling
12. Recover hazard buoy
13. File completion reports with BSEE
14. BOEM releases bond $$

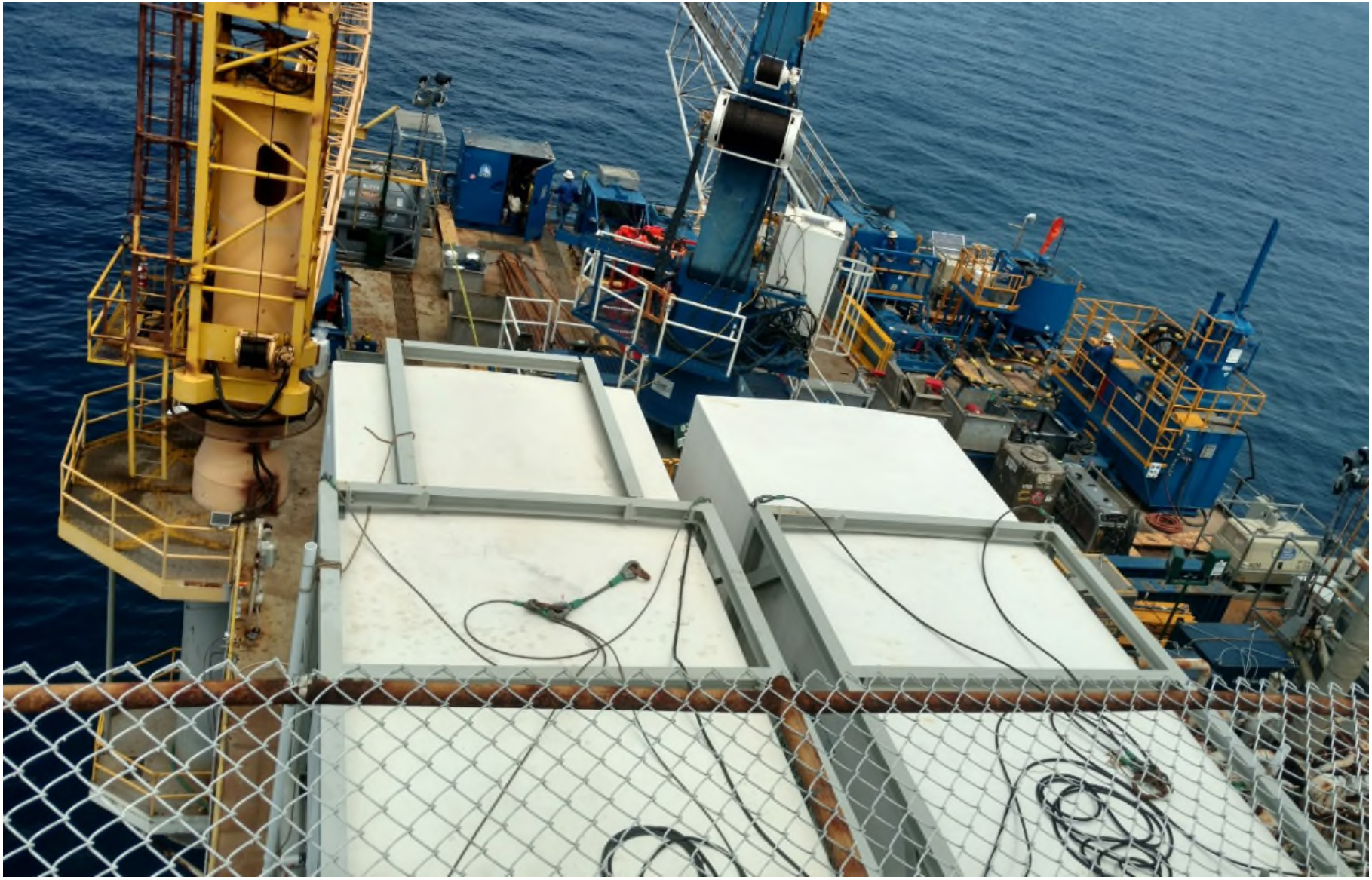
Equipment spreads for decommissioning

- Well plugging
- Platform Prep
- Structure Removal
- Debris removal
- Site clearance verification

Well plugging and casing severing



Well plugging and casing severing



Well plugging and casing severing

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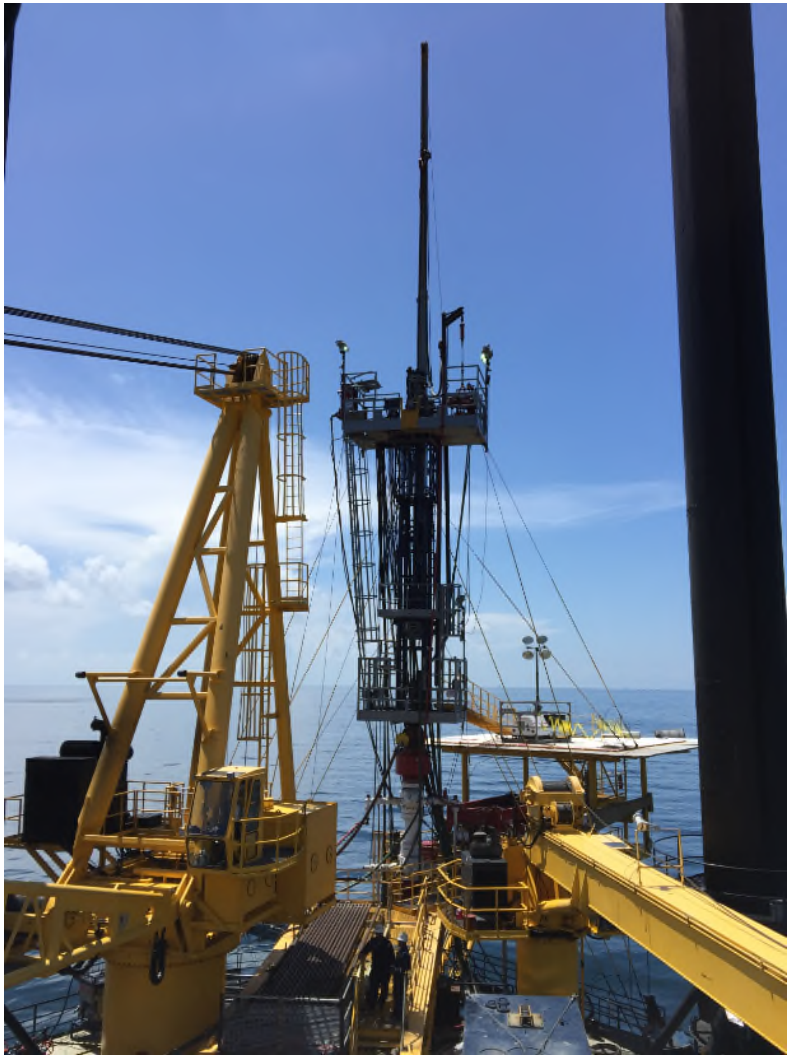
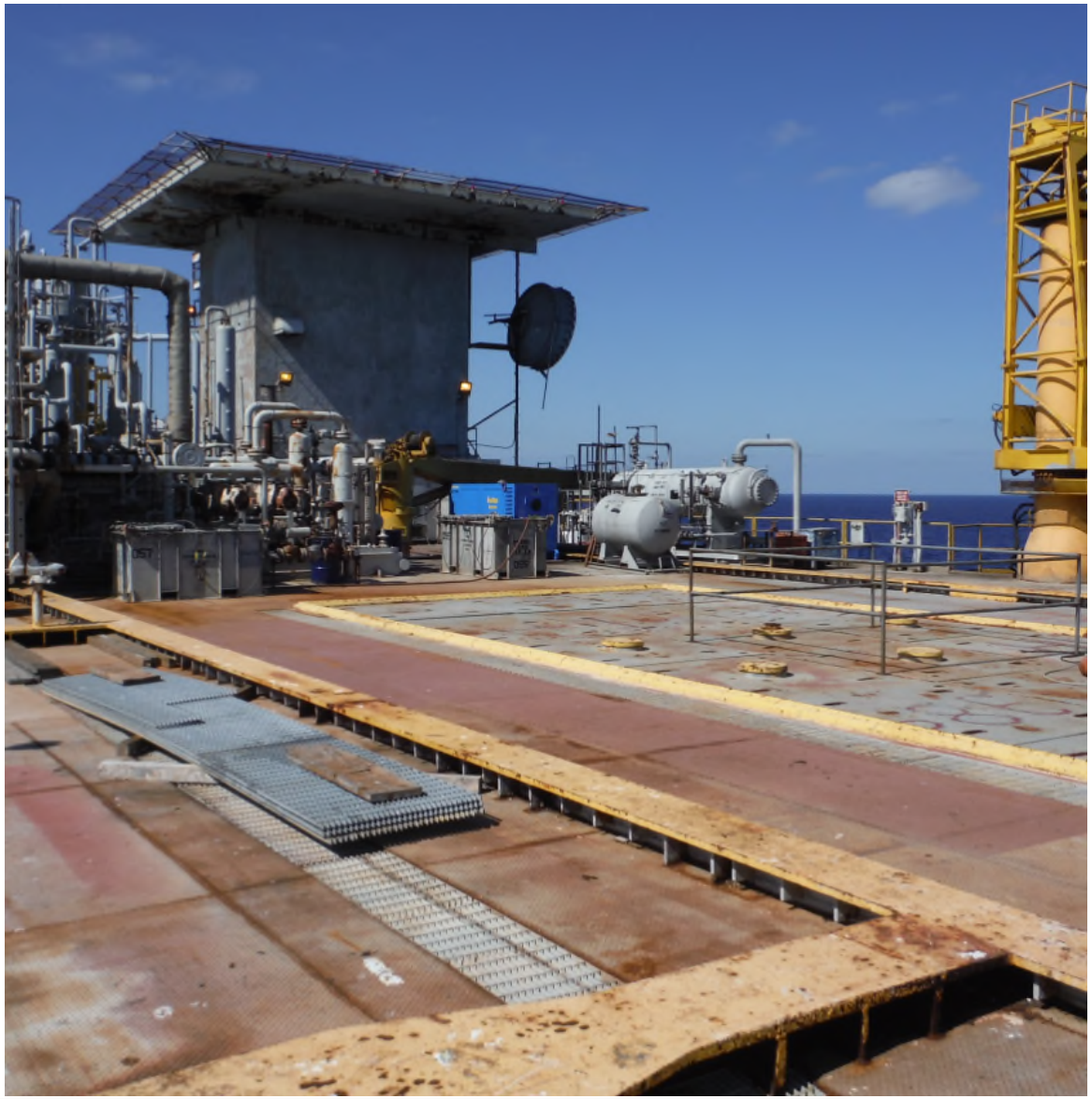


Well plugging and casing severing

Well plugging and casing severing

Platform Preparation for Removal



Platform Preparation for Removal

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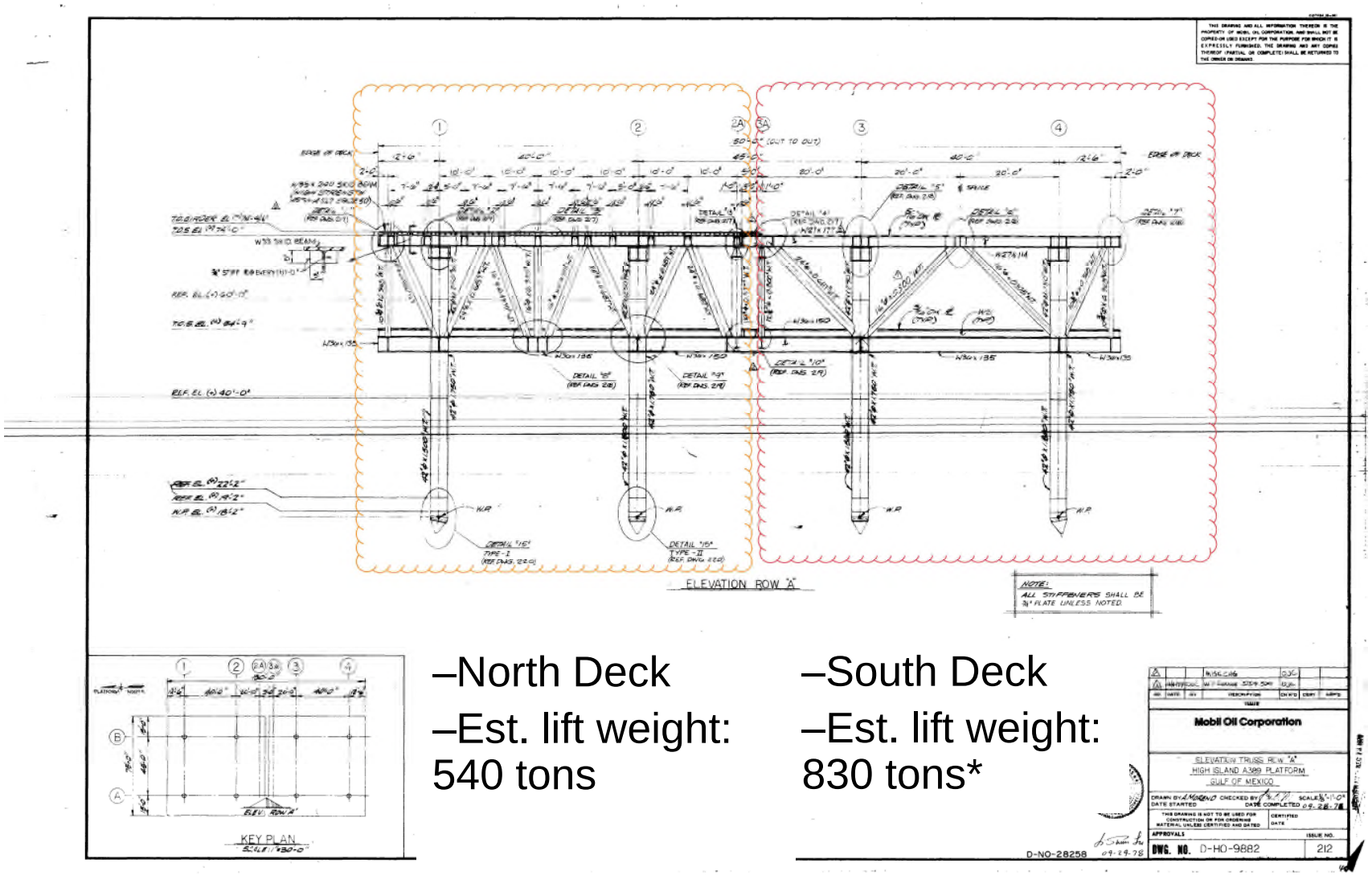
Topsides Removal



–North Deck

–Est. lift weight: 540 tons

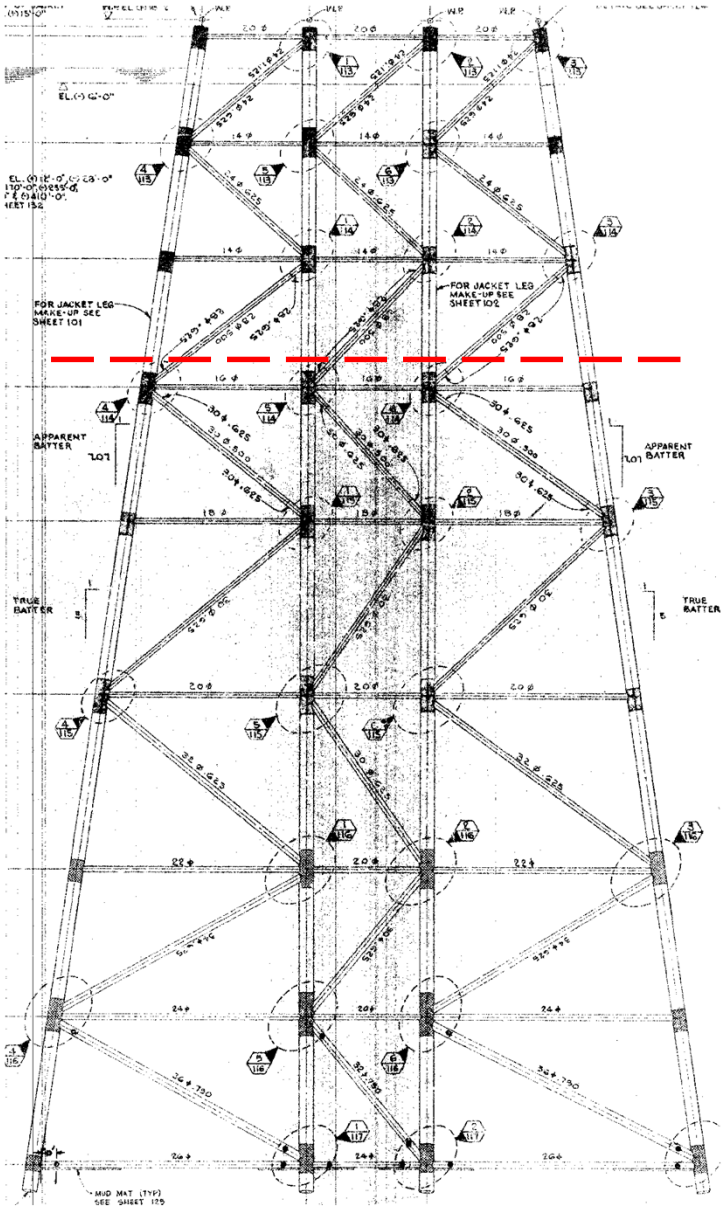
–South Deck

–Est. lift weight: 830 tons*

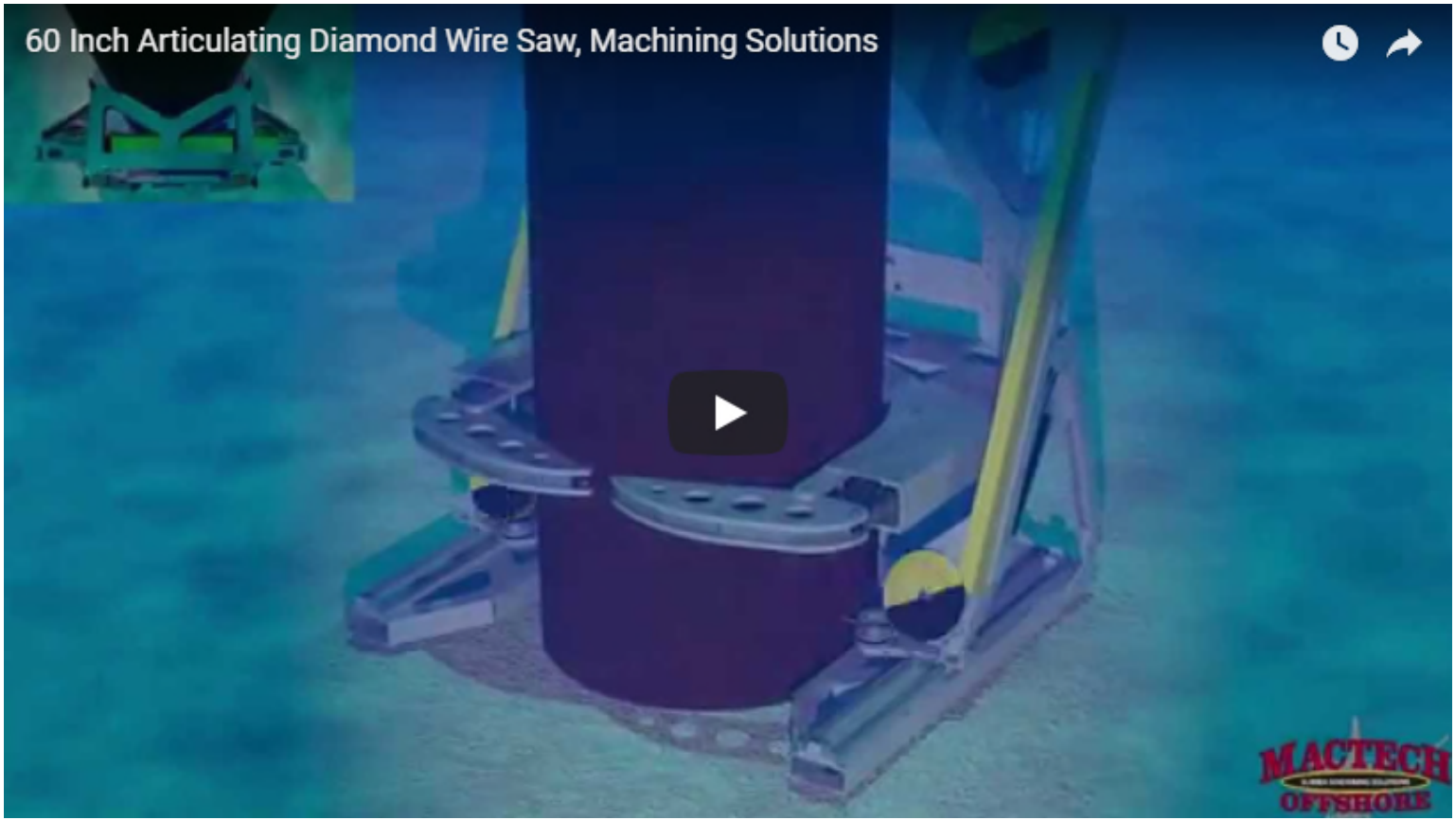
*LQ and compressor removed

Topsides Removal

Jacket Removal – Severing required



Jacket severing



Jacket Severing

Pile Severing

01.03.2017

Internal Cutting Tool

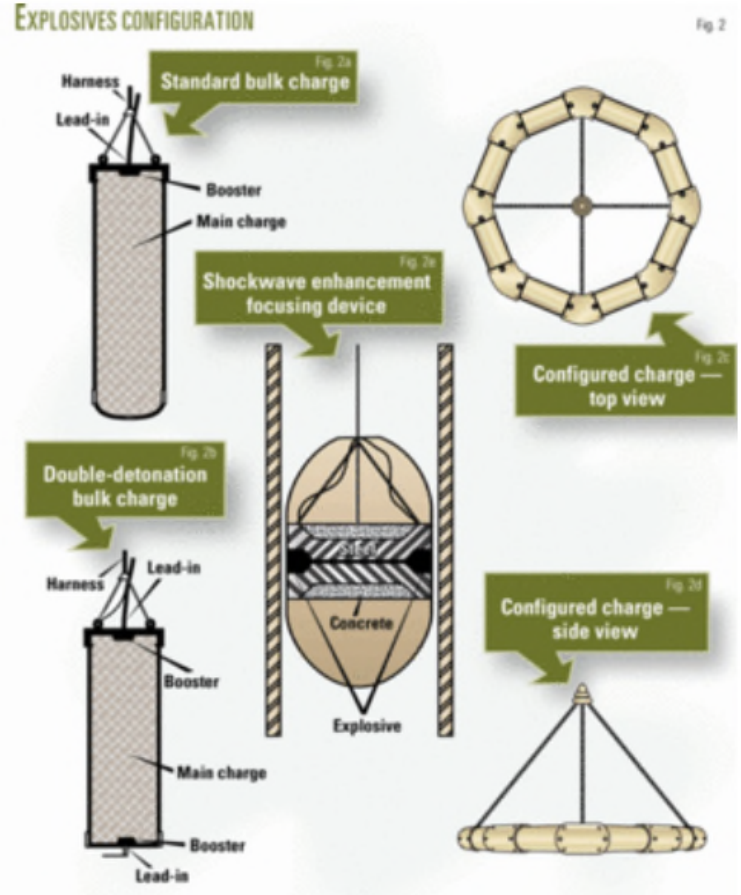
Cut piles below the mudline without external dredging

The Internal Cutting Tool (ICT) is based on Oceaneering's powerful abrasive water jet cutting (AWJC) technology and is ideal for efficient internal cutting of piles. The AWJC method uses a high-energy jet of water-borne abrasive particles to cut even the hardest steel alloys quickly and safely. The ICT produces a clean cut, which makes it easy to lift piles, steel jackets, and other subsea structures.

Specifications

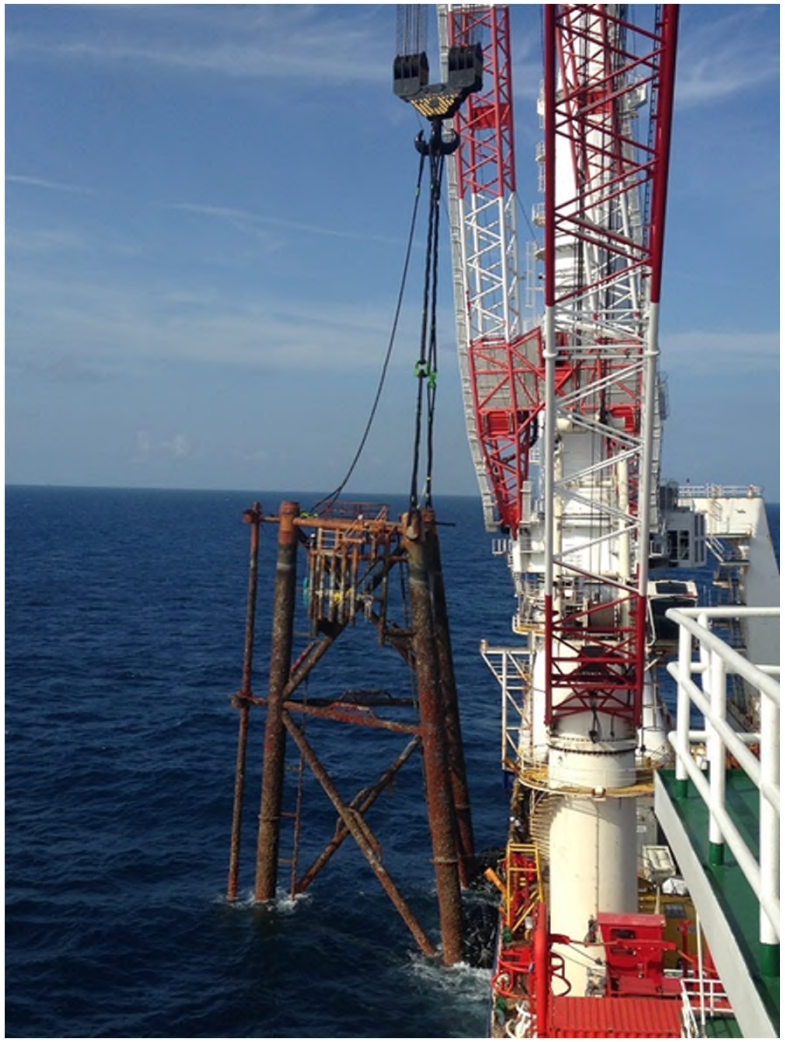
Cutting medium	Water (salt or fresh) and environmentally friendly abrasives
Pressure	7,000-30,000 psi / 500-2,000 bar
Water flow rate:	8-32 gal/min / 30-120 l/min
Typical utility requirements of vessel/platform	Sea water (32 gal/min @ 30 psi / 120 l/min @ 2 bar) Fresh water for cleaning of tool post-deployment Crane (15T capacity) and rigging assistance for handling of equipment Electric power (110 V and 220 V) Compressor work air
Typical footprint / deck space requirement	Approximately 600 ft² /60 m²

Pile Severing



Jacket Removal for Scrapping

Jacket Removal for Towing to Reef



Debris Recovery and Site Clearance Verification

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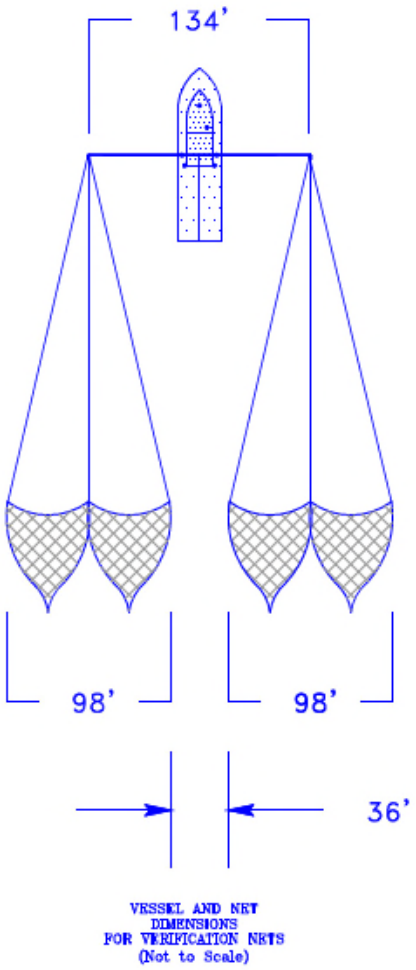
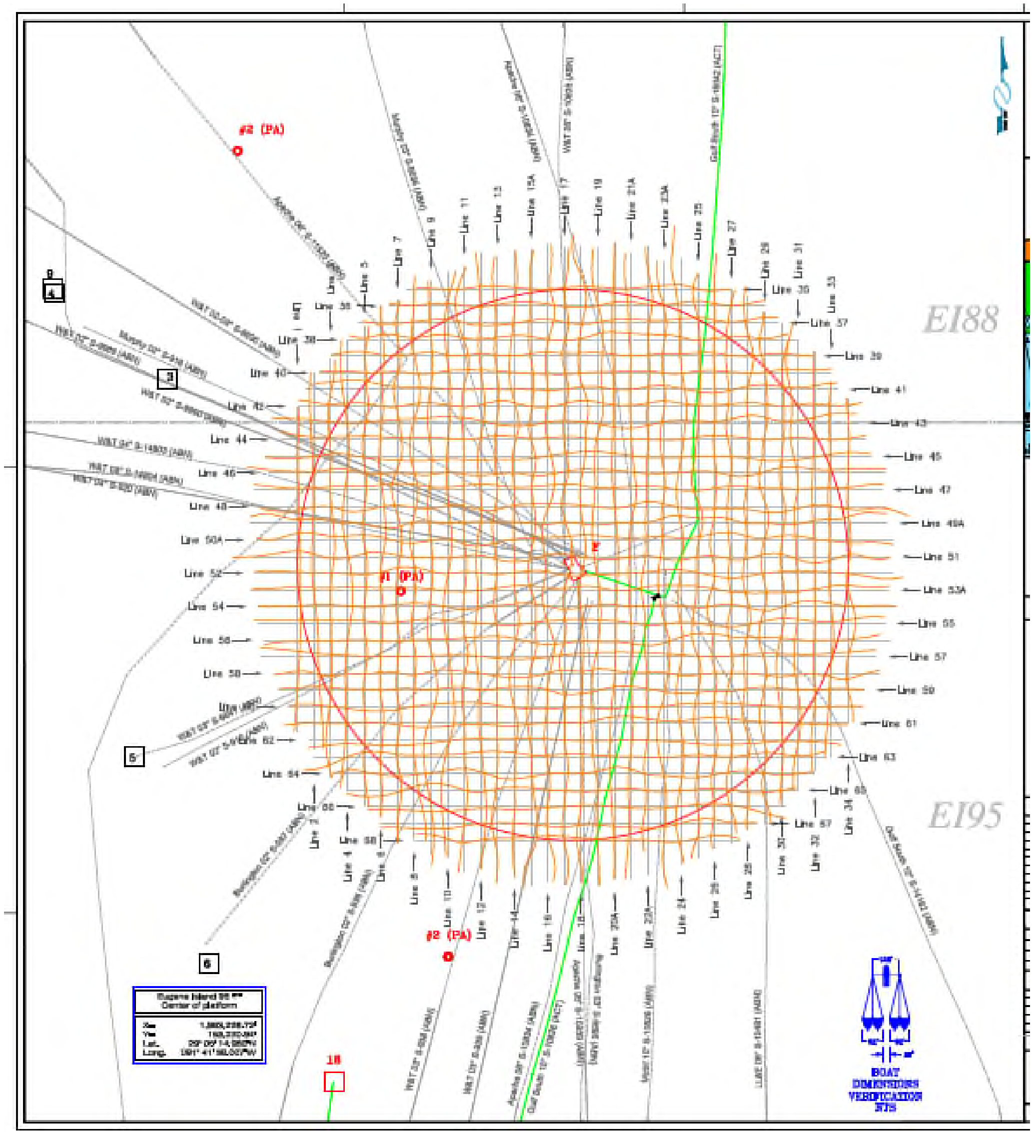
F/V Master Brandon



VESSEL AND NET
DIMENSIONS
FOR VERIFICATION NETS
(Not to Scale)

Site Clearance Verification 1320' radius, 68 trawl lines



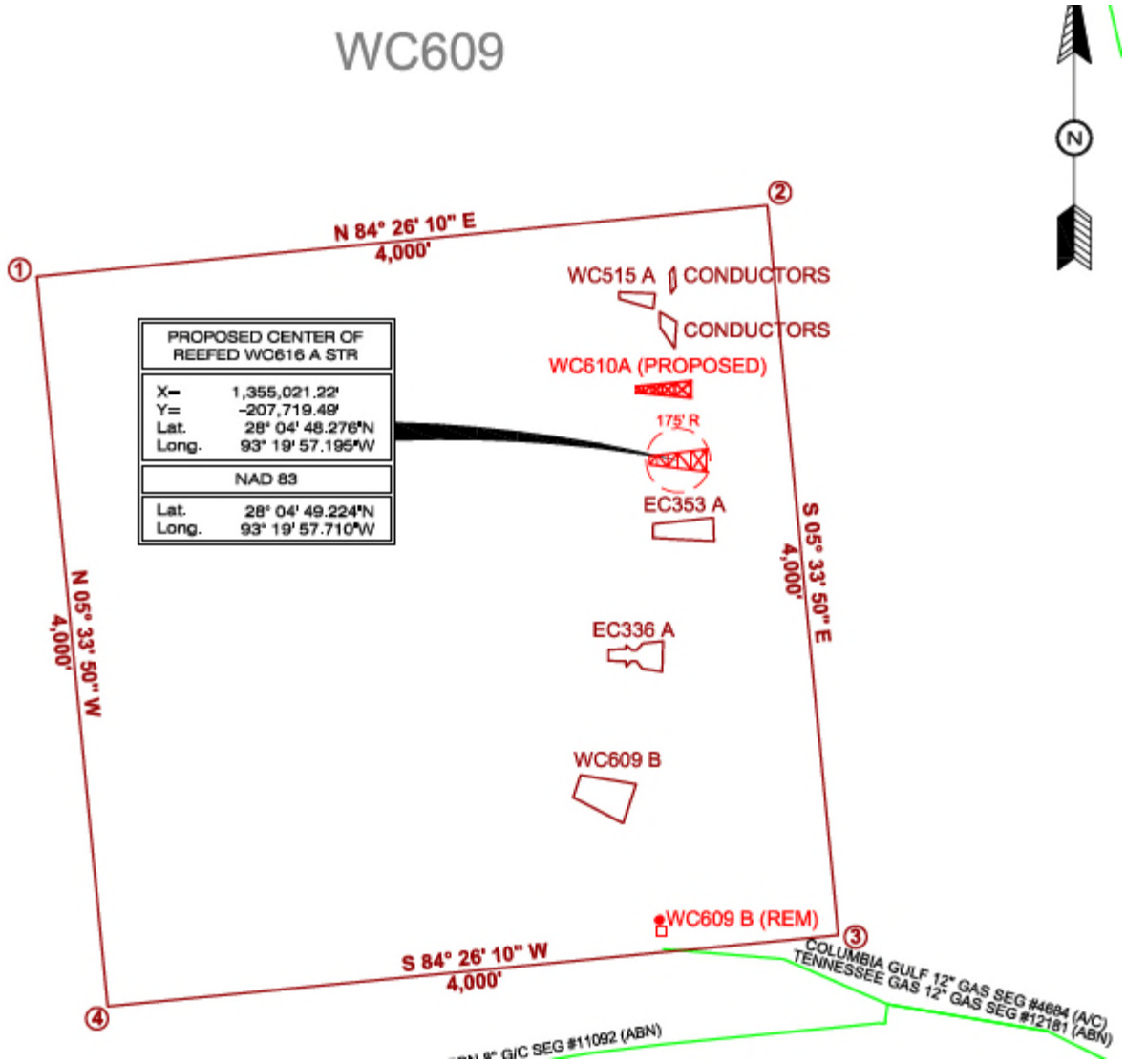
When should decommissioning planning start

- Well design
  - Casing design - centralizers
  - Cement placement in annuli
- Structures – design for decommissioning
  - Tripod vs. braced caisson
  - Skirt piles vs. piles in legs
  - Grout strings in piles
  - Launched jackets – provisions for future recovery

Agency impact on decommissioning requirements

- BSEE
  - Well P&A – very prescriptive on requirements for well design / procedures – cement quantities, testing requirements
  - Pipeline – Less prescriptive, pig, flush, disconnect each end. Some latitude on complete removal depending on future use of area.
  - Platform – Least prescriptive, cut piles 15’ BML and verify site is cleared
- State agencies
  - LDW&F and TP&W files reefing permits with USACOE to establish or add to reef site. Operator must negotiate reef donation to agency which should represent half of operator’s savings resulting from reefing.
  - LA – DNR approves leaving pipeline in place when in sediment resource areas

Adding to an existing reef site



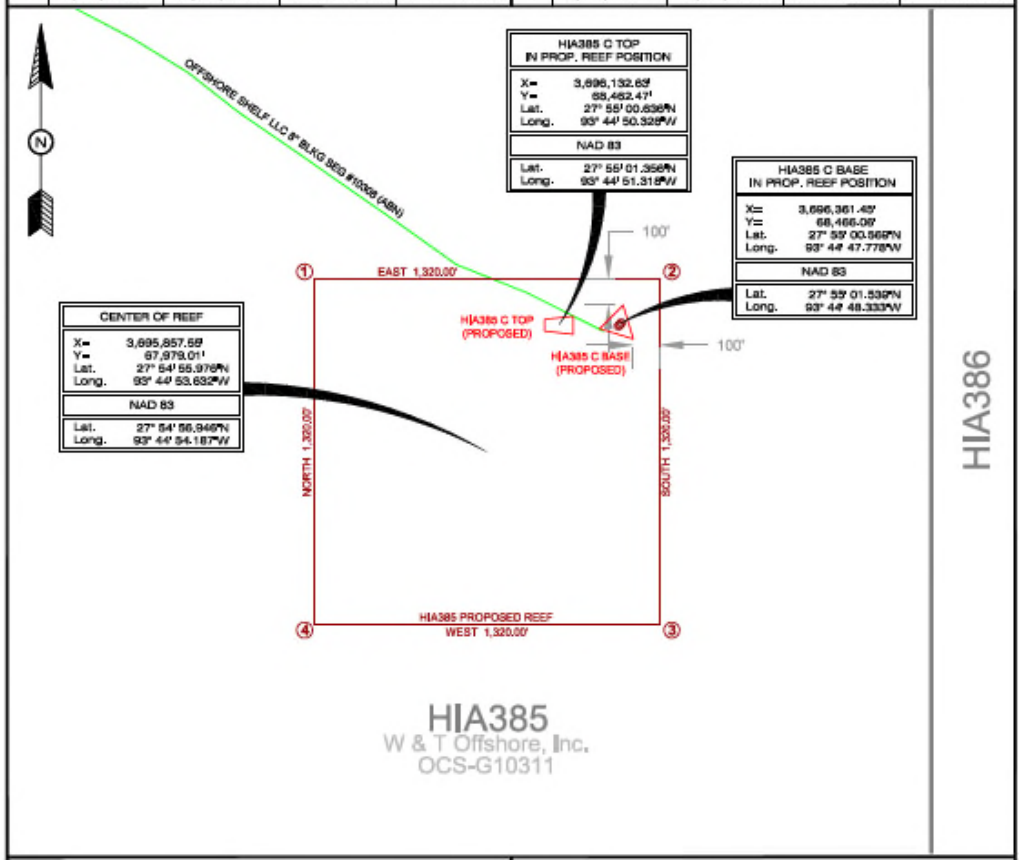
Creating new reef site

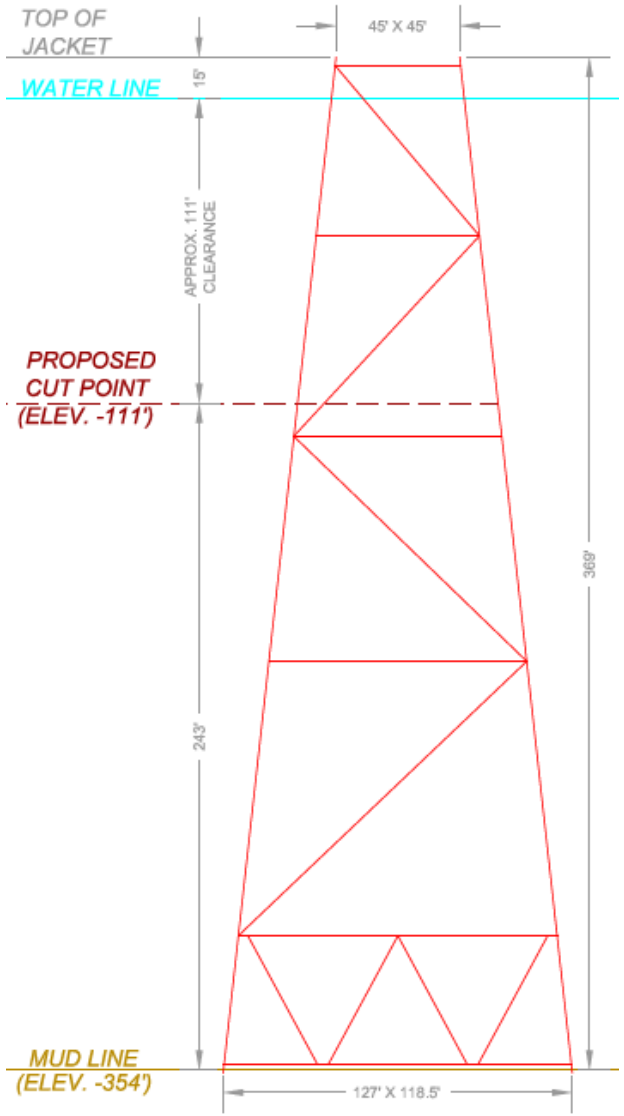
PROPOSED ARTIFICIAL REEF BOUNDARY COORDINATES (NAD27 TEXAS SOUTH CENTRAL)

TIE	X	Y	LAT	LON	TIE	X	Y	LAT	LON
1	3,695,197.55'	68,639.01'	27° 55' 02.797"N	93° 45' 00.650"W	3	3,696,517.55'	67,319.01'	27° 54' 49.155"N	93° 44' 48.614"W
2	3,696,517.55'	68,639.01'	27° 55' 02.211"N	93° 44' 45.954"W	4	3,695,197.55'	67,319.01'	27° 54' 49.742"N	93° 45' 01.311"W

PROPOSED ARTIFICIAL REEF BOUNDARY COORDINATES (NAD83 TEXAS SOUTH CENTRAL)

TIE	X	Y	LAT	LON	TIE	X	Y	LAT	LON
1	3,663,611.14'	13,192,068.48'	27° 55' 03.767"N	93° 45' 01.208"W	3	3,664,931.17'	13,190,748.46'	27° 54' 50.125"N	93° 44' 47.169"W
2	3,664,931.15'	13,192,068.47'	27° 55' 03.180"N	93° 44' 46.509"W	4	3,663,611.15'	13,190,748.47'	27° 54' 50.712"N	93° 45' 01.868"W





Contracting Strategies

- Well P&A
  - Time and materials (T&M) – scope changes frequently during job
  - Consider bidding volume such as annual contract
- Pipelines
  - Lump Sum – scope is usually well defined. Larger scope contractor's risk is minimized
  - T&M – consider when potential unknowns warrant. e.g.. depth of cover, third party subsea tie-in
- Platform Prep
  - T&M – scope many times not well defined for cleaning. May be able to use other crews working in area to perform tasks.

Contracting Strategies

- Structure removal / reefing
  - Lump Sum – scope is usually well defined.
  - Bid multiple structures in single package. Larger scope contractors risk is minimized.
- Debris Removal
  - T&M – consider as add on work (extra work) for pipeline abandonment.
- Site Clearance Verification
  - T&M – Consider bidding volume such as annual contract

Wrap Up

- Other Topics to Discuss?
  - Subsea wells?
  - Floating structures ?
- Questions ?

Thanks!