

## **SPE Workshop:**

An Industry in Transition: Emerging Challenges for  
Deepwater Oil Transportation in the Gulf of Mexico  
Houston - 14 October 2003

### **“A New Contender – Shuttle Tankers, Contractor Owner, Service as Needed“**

1. Video - Energy Week in Review, May 2003;
2. Typical shuttle tanker for GoM;
3. Shuttling works with any kind of platform, not just FPSOs;
4. Safety of Tankers;
5. Economics – Spreadsheet;
6. Conclusions.

**Peter Lovie**

Vice President Business Development

**American Shuttle Tankers L.L.C.**



Nothing new, all been done before in North Sea or GoM  
**MMS, USCG accept the principle of shuttling in GoM**  
Experienced Parents of American Shuttle Tankers, L.L.C.

**Navion A.S.**

Wholly owned company of  
Teekay (NYSE - TK)

**The Leader**

**in Shuttle Tankers in the North Sea:**

Not new - operating since 1979;  
Over 12,000 offloadings;  
Operating a fleet of 25 shuttle tankers,  
23 platforms, 50+ CoA agreements



**Skaugen PetroTrans Inc.**

Jointly owned by Teekay and  
I.M. Skaugen (Oslo – IMSK)

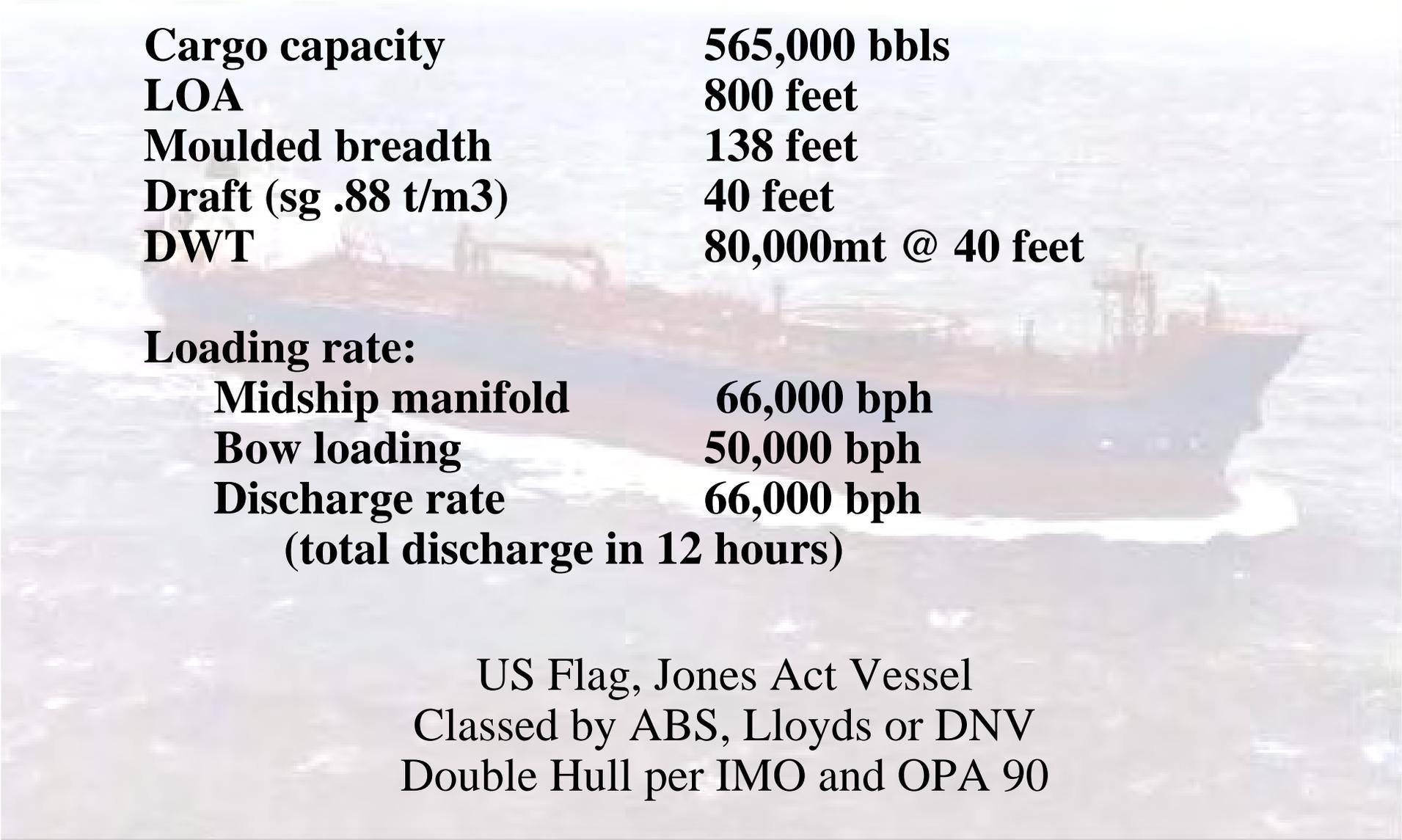
**The Leader**

**in Lightering in the U.S. Gulf of Mexico:**

Not new - operating since 1982;  
Over 9,800 lighterings;  
Operate a fleet of 10 lightering tankers



# Typical Shuttle Tanker Design for GoM



<b>Cargo capacity</b>	<b>565,000 bbls</b>
<b>LOA</b>	<b>800 feet</b>
<b>Moulded breadth</b>	<b>138 feet</b>
<b>Draft (sg .88 t/m<sup>3</sup>)</b>	<b>40 feet</b>
<b>DWT</b>	<b>80,000mt @ 40 feet</b>

## **Loading rate:**

<b>Midship manifold</b>	<b>66,000 bph</b>
<b>Bow loading</b>	<b>50,000 bph</b>
<b>Discharge rate</b>	<b>66,000 bph</b>

**(total discharge in 12 hours)**

US Flag, Jones Act Vessel  
Classed by ABS, Lloyds or DNV  
Double Hull per IMO and OPA 90

# Dynamic Positioning & Bow Loading

DP 2, i.e. redundant computer and essential vessel systems

DP system designed to connect in  $H_{sig} = 5.5$  m.  
25-30 knot winds

Fast efficient operation in all but hurricanes - no OSVs needed for hose & mooring support

Ease of cargo hose handling;  
Automatic coupling system;  
Dry-break connection;  
Automatic disconnect (ESD).



# **Separate Storage Shuttling™ and why it makes sense in GoM**

**Before:**

**Shuttle tankers feasible only with platforms with storage  
(e.g. FPSOs, Gravity Based Structures)**

**Despite MMS Record of Decision on FPSOs in Dec. 2001,  
today there are still no FPSOs committed for GoM**

**Now with S-S-S™:**

**Shuttle Tankers can work with any kind  
of platform commonly used in GoM:**

**Semisubmersibles,  
Spars,  
or TLPs**

# Separate Storage Shuttling™ (S-S-S™) Patents pending

At one field, may use multiple shuttle tankers

plus

one storage vessel adjacent to platform



## Shuttle Tankers (DP-2)

U.S. flag in U.S. waters,  
Jones Act, double hull, OPA 90

## Storage Vessel (DP-2)

Foreign flag in U.S. waters  
(important economy), double hull,  
OPA 90, several vessels available  
now.

# Separate Storage Shuttling™ ( S-S-S™): Patents pending

Typical Separate Storage Vessel:  
an existing large shuttle tanker from North Sea.



# Separate Storage Shuttling™ (S-S-S™) patents pending

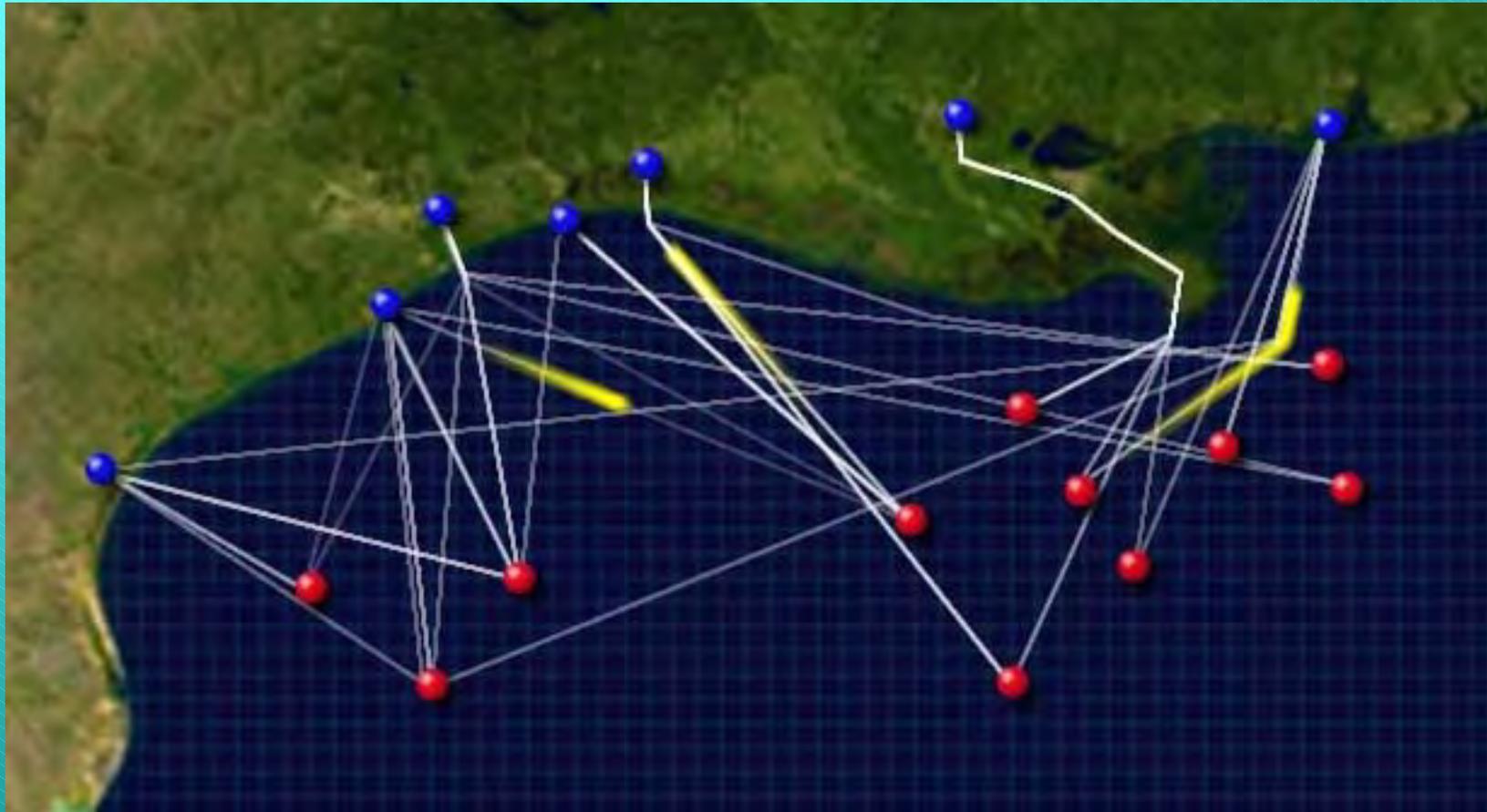
Once linked only to FPSOs,  
transportation of oil by shuttle tankers  
is now possible from any kind of platform,  
using this new combination of existing technologies,  
enabling service to a much broader market.



Ready for  
**Emerging Challenges for Deepwater Oil  
Transportation in the Gulf of Mexico**

# Freedom to go where you want, when you want

Projection of flexibility: shuttle tankers serving typical future production locations (red dots) and existing ports (blue dots)



# Safety of Tankers

## Summary - MMS' Final EIS on FPSOs for GoM

(January 2001, see [www.mms.gov](http://www.mms.gov), Deepwater Environment, EIS, pp. xiv-xv, pp. 13-14 of 793 in .pdf download)

page. xv:

“risk of oil spills during offloading from the FPSO to the shuttle tanker is similar to that for lightering operations in the GOM, where there is a history of low spill frequency and low spill volumes”

“the oil spill risk for shuttle tanker transport is comparable to and slightly less than that of pipeline transport”

MMS acknowledges risk calculations on tankers based on history from 1970s although recent regulatory & risk reducing measures (e.g. OPA 90) not represented in calculated risks for tanker spills, i.e. EIS assessment is conservative.

## Economics:

Economic prize of shuttling is often large,  
but “apples and apples” comparison not simple

### Shuttle Tankers

No commingling with other  
production, can go wherever  
you want for best margin;

Simple \$/bbl tariff;

Freedom to vie for best prices;

Long term commitment with  
flexibility on lifting point and  
destination.

### Pipelines

Commingling of production, loss  
of value or penalty;

Tariffs: Trunkline to hub, then

+ Hub to refinery

+ Quality bank penalties

+ Fixed destination(s)

Not possible

Long term commitments.

# Typical GoM Field Development Scenarios

Field Parameters:					Data Source, Comments
Field Name:	- -	<i>Jefferson</i>	<i>Franklin</i>	<i>Washington</i>	American Tradition of Pioneering Visionaries
Average distance from platform to refinery dock, one way:	nautical miles	300	400	400	Implies a fairly remote location or longer distance to destination
Water depth:	feet	5,000	10,000	10,000	Water depth has no effect on shuttling
Commercially Recoverable Reserves:	mmbbl	75	200	400	Assume production ceases when cash flow goes negative, not all technically recoverable
Initial GOR (information only):	scf/bbl	1,000	1,300	1,000	Assume gas line, shuttling competes with oil line
API Gravity, average, info only:	degrees	25.0	35.0	30.0	
Sulfur, information only, say:	percent	1.00	0.10	0.50	Value often 1.0 to 2.0%, important for computing quality bank penalty.
Recovery time:	months	72	120	180	
Peak production rate:	bopd	50,000	75,000	150,000	
<b>Economics via <u>pipeline</u> system, platform flange to refinery tank</b>					
<b>Total effective tariff:</b>	<b>\$/bbl</b>	<b>2.75</b>	<b>2.69</b>	<b>2.13</b>	
<b>Economics via <u>shuttle tanker</u> system, platform flange to refinery tank</b>					
<b>Total effective tariff:</b>	<b>\$/bbl</b>	<b>2.02</b>	<b>1.80</b>	<b>1.27</b>	
<b>Ratio of total effective tariffs, Shuttle / Pipeline:</b>	<b>Ratio</b>	<b>0.73</b>	<b>0.67</b>	<b>0.60</b>	
<b>Savings during field life with Shuttle Tankers:</b>	<b>\$million</b>	<b>55</b>	<b>178</b>	<b>343</b>	Simple estimate, NPV effect ignored

# Conclusions: A New Free Market for Transportation



[www.astllc.com](http://www.astllc.com)

