

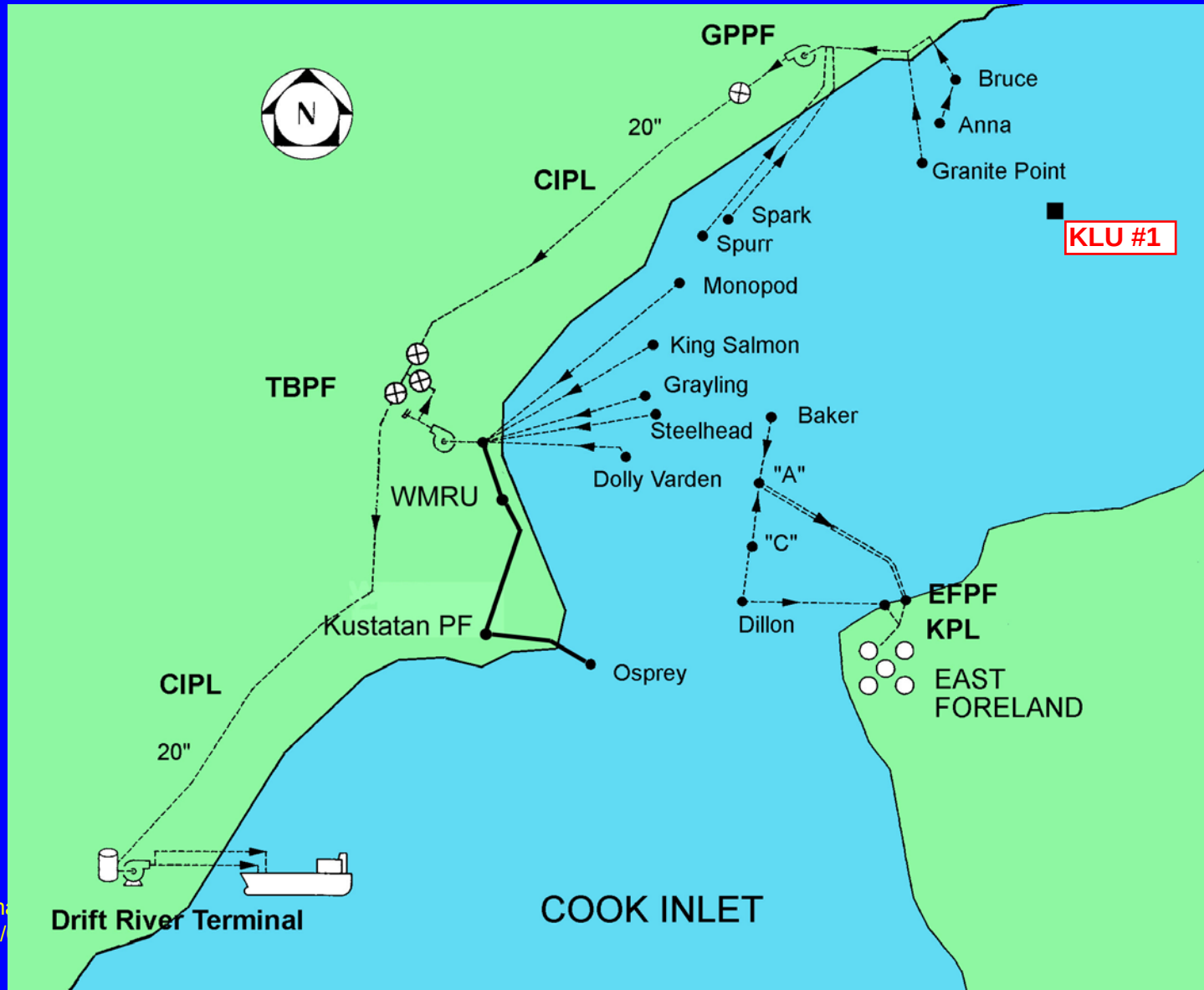
Kitchen Development Scenarios

Escopeta Oil Co.

Gas Development Presentation

- **Cook Inlet Background**
- **Cook Inlet Design Criteria**
- **Development Options**
 - Outrigger Caisson
 - Subsea
 - Two-Deck Platform
 - Three-Deck Platform
- **Pipelines**
- **Economics**

KLU #1 Location



Environmental Conditions

- **Waterdepth MLLW:** 100 feet
- **Tides:** 30 feet
- **Surface current*:** 10.5 feet per second
- **Bottom current:** 5.3 feet per second
- **Ice thickness*:** 34-inch
- **Wave height*:** 28 feet
- **Earthquake:** API RP2A Zone 4
- **Temperature - air:** minus 40° F (minimum)
- **Temperature – water:** 28 ° F (minimum)

* One hundred-year occurrence

Field Development Assumptions

If Gas Only

- Gas Wells: 5
- Initial Production Rate: 50 MMCF/d

If Oil and Gas

- Gas Wells: 5 Oil Wells : 12
- Initial Production Rate:
- 50 MMCF/d and 12,000 BOPD

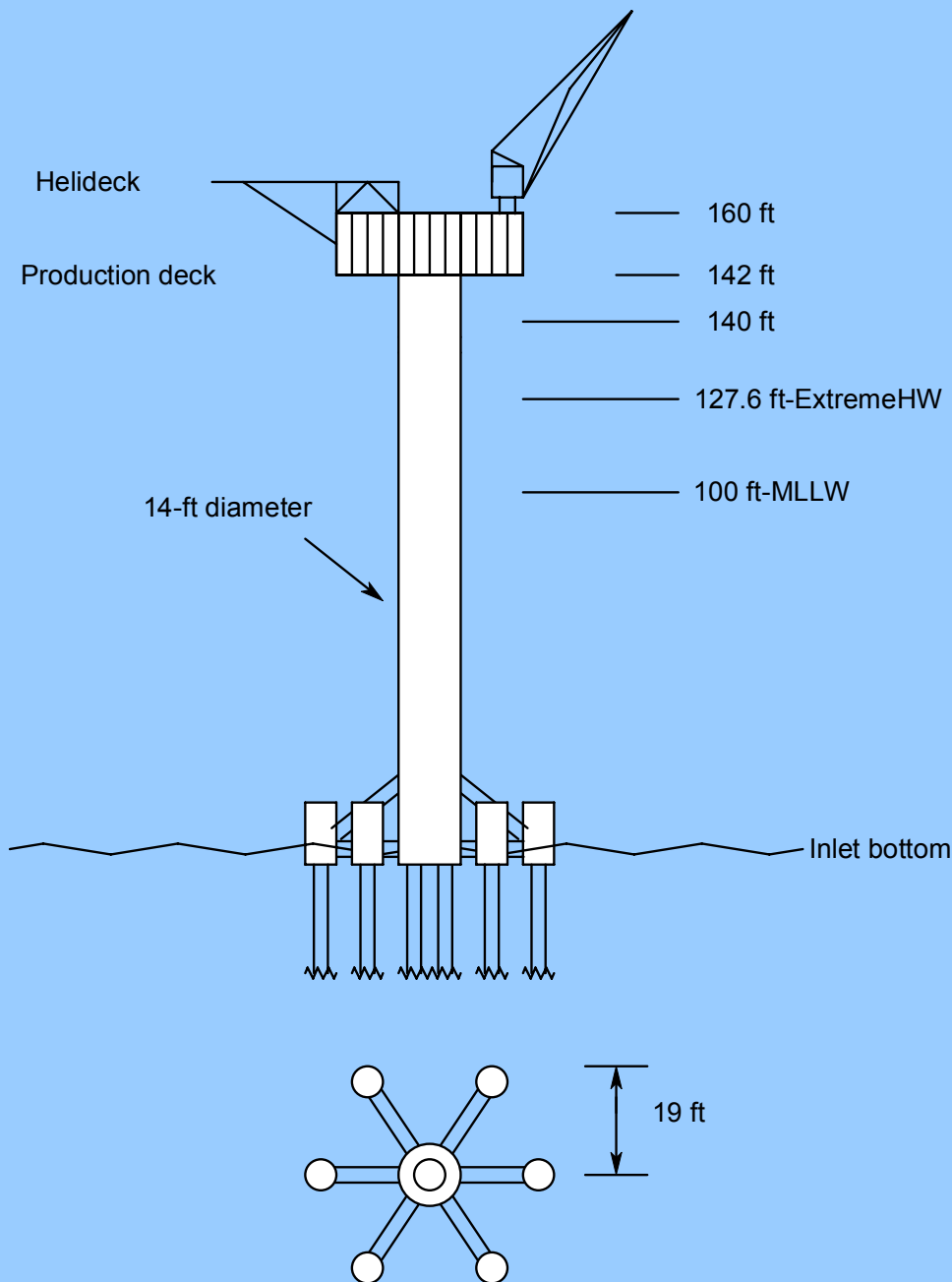
Development Options

1. **Outrigger Caisson**
2. **Subsea**
3. **Two-Deck Platform**
4. **Three-Deck Platform**

KLU #1

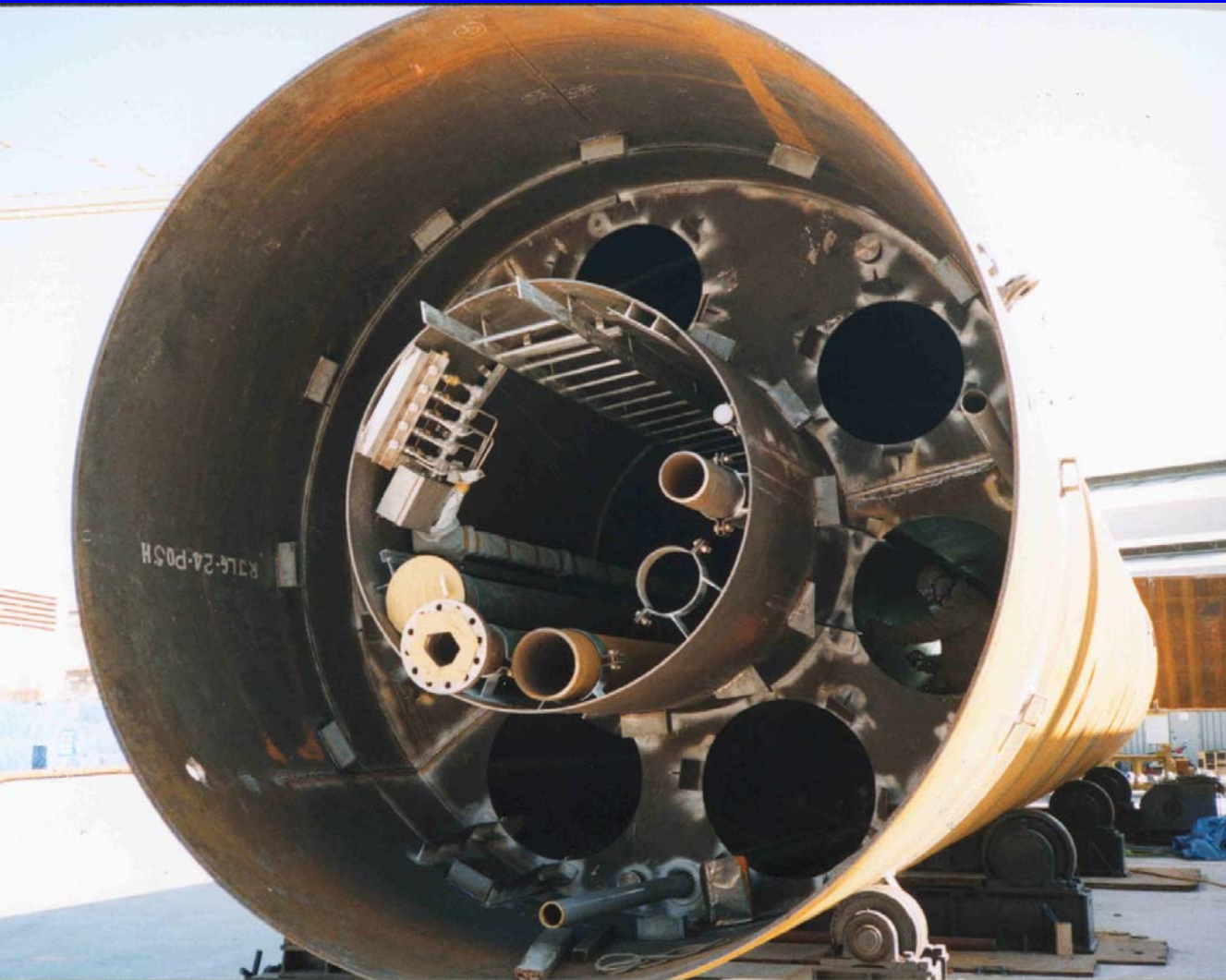
Caisson Platform Development

- **Outrigger caisson platform**
 - Six well capability
 - Deck with heliport
 - Emergency quarters
- **Pipeline to Tyonek Platform or to shore**
 - Single 10-inch gas pipeline
- **Umbilical to Kitchen Lights**
 - Power, methanol and controls



Self-installing outrigger caisson platform concept for six wells

Cross-Section of Platform Osprey Leg

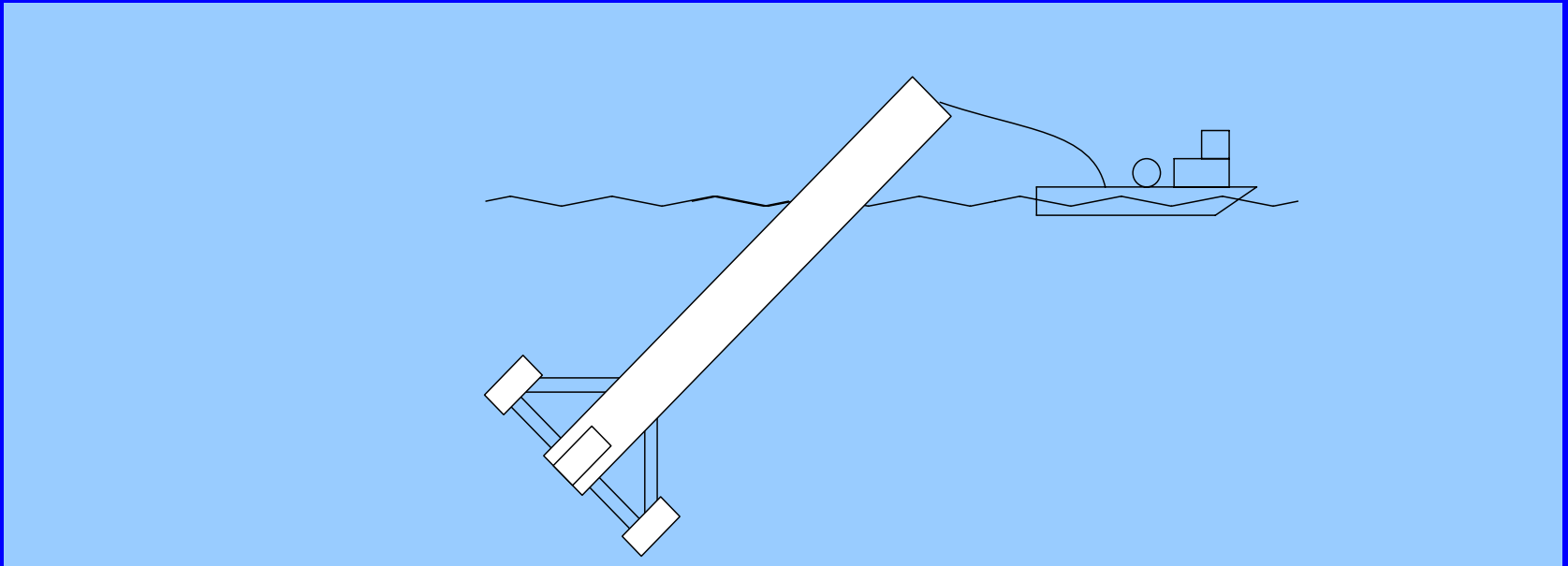
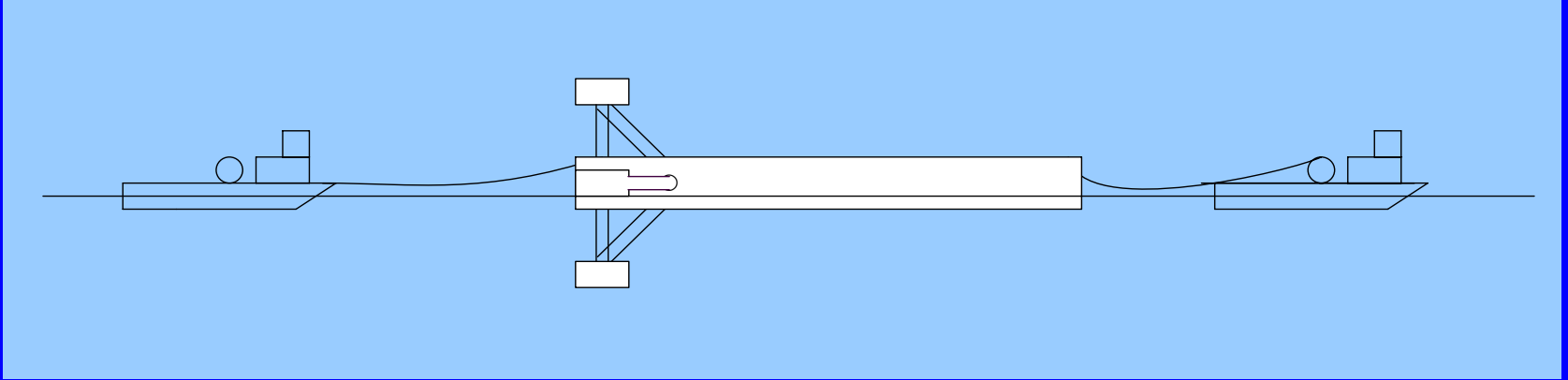


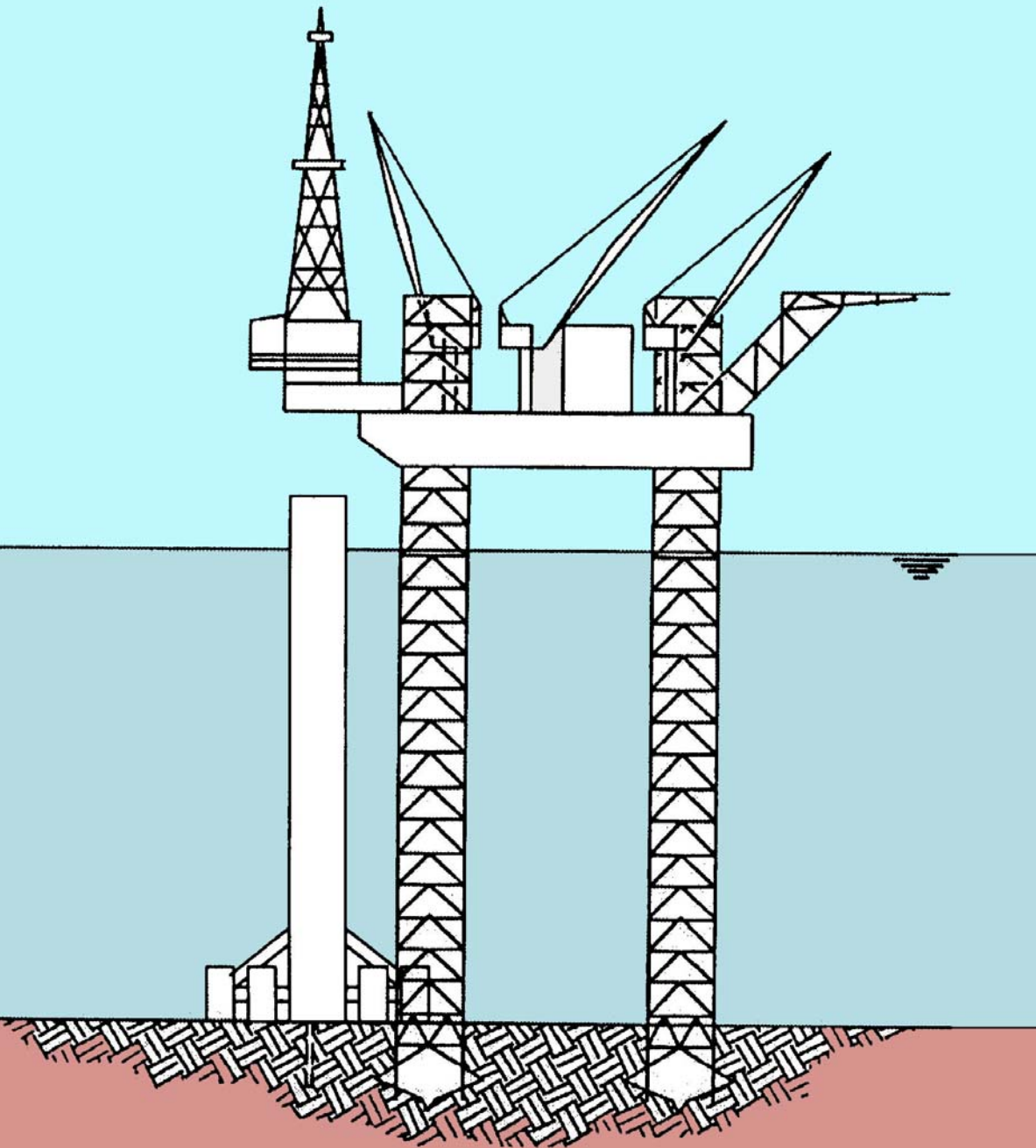
Kitchen Lights
caisson will
be identical to
Cook Inlet
platform legs

Fabrication & Transportation

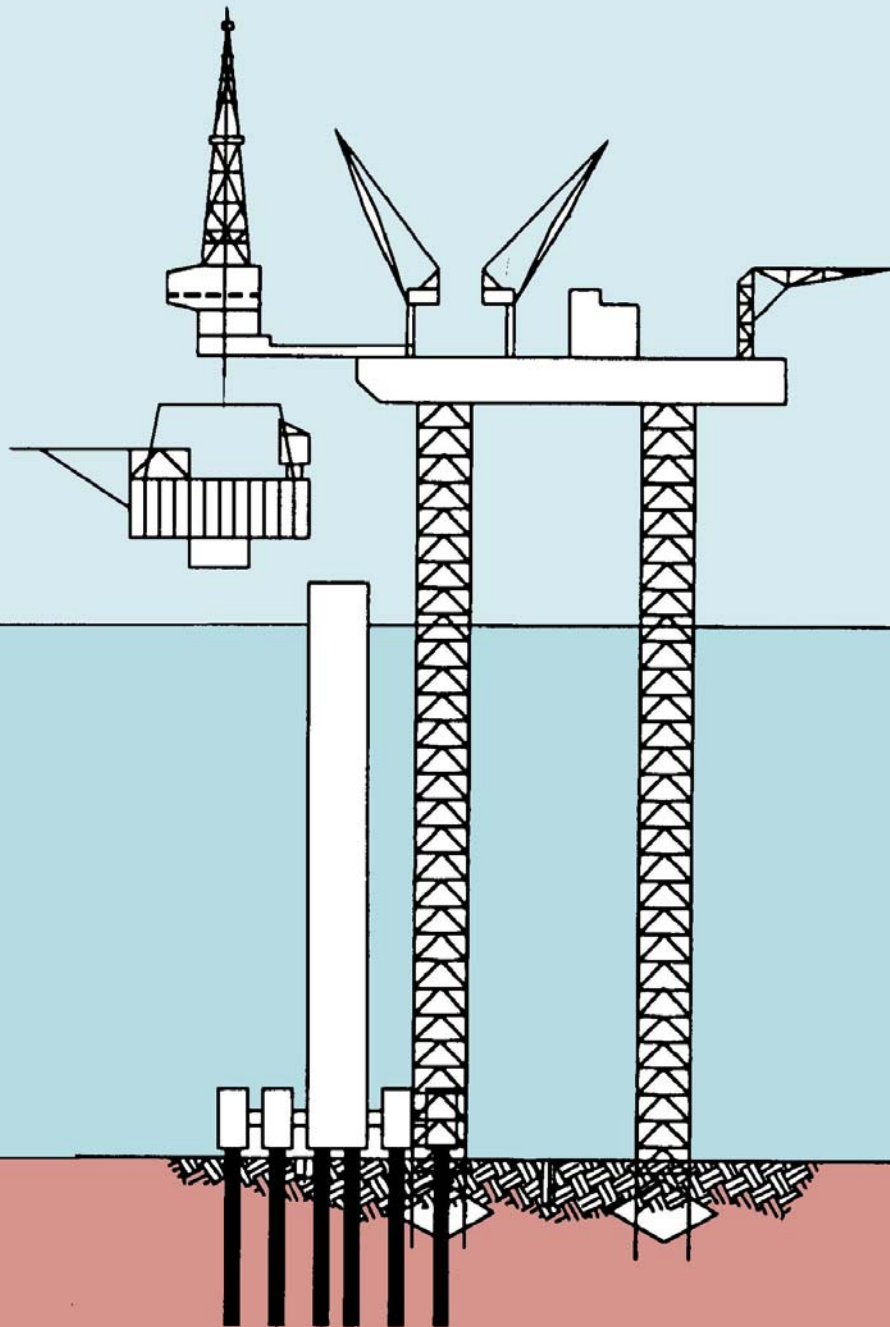
- **Fabricate caisson structure**
 - Anchorage
 - Vancouver, Washington
 - SF Bay area
- **Tow caisson to Cook Inlet**

Installation Procedure





**After upending
the caisson is
set on bottom
and jack-up
drilling unit
moves onto
location**



Assuming the well is successful the jack-up unit is used to drive piles and install the deck .

Annulus of caisson is filled with grout

Outrigger Caisson Platform

- **Advantages**
 - No derrick barge needed for installation
 - Minimum cost
 - Short timeline to production
- **Disadvantages**
 - Has not been done in Cook Inlet
 - Jack-up needed for well intervention (summer)

Development Options

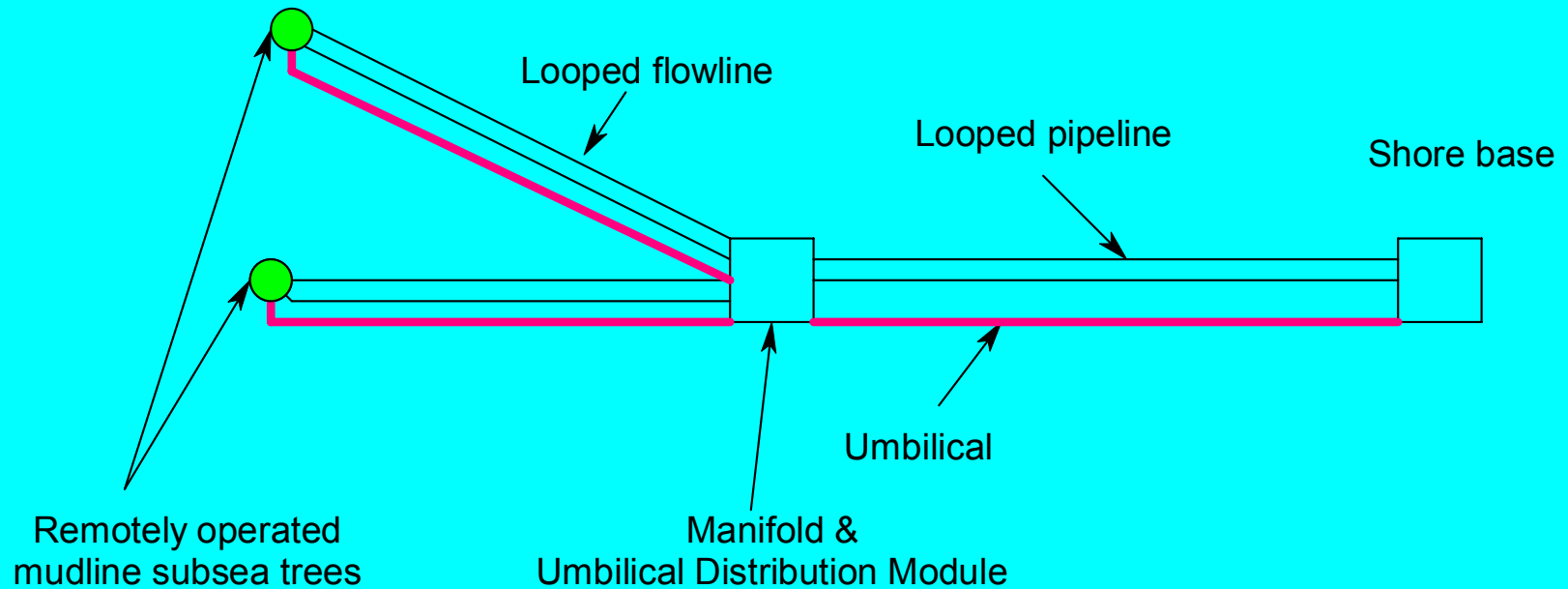
1. Outrigger Caisson
- 2. Subsea**
3. Two-Deck Platform
4. Three-Deck Platform

Kitchen

Subsea Development

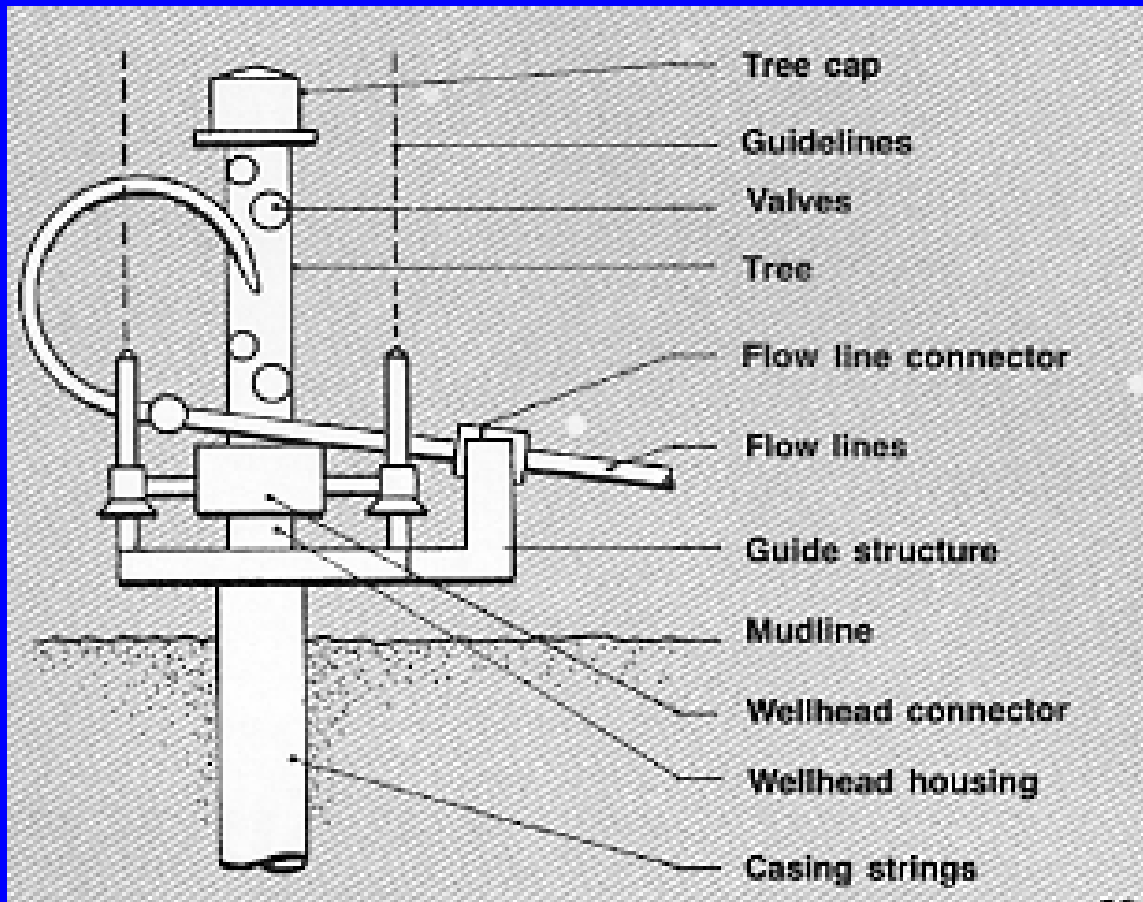
- **Subsea Wells**
 - Individual wells with flowlines to subsea manifold, or,
 - Six well template
- **Pipelines to Tyonek Platform or to East Forelands Prod. Facility**
 - Dual pipelines (for pigging)
- **Umbilical to Kitchen Lights**
 - Power, methanol and controls

Multiple Individual Wells



Multiple subsea wells schematic

Individual Subsea Well Completions

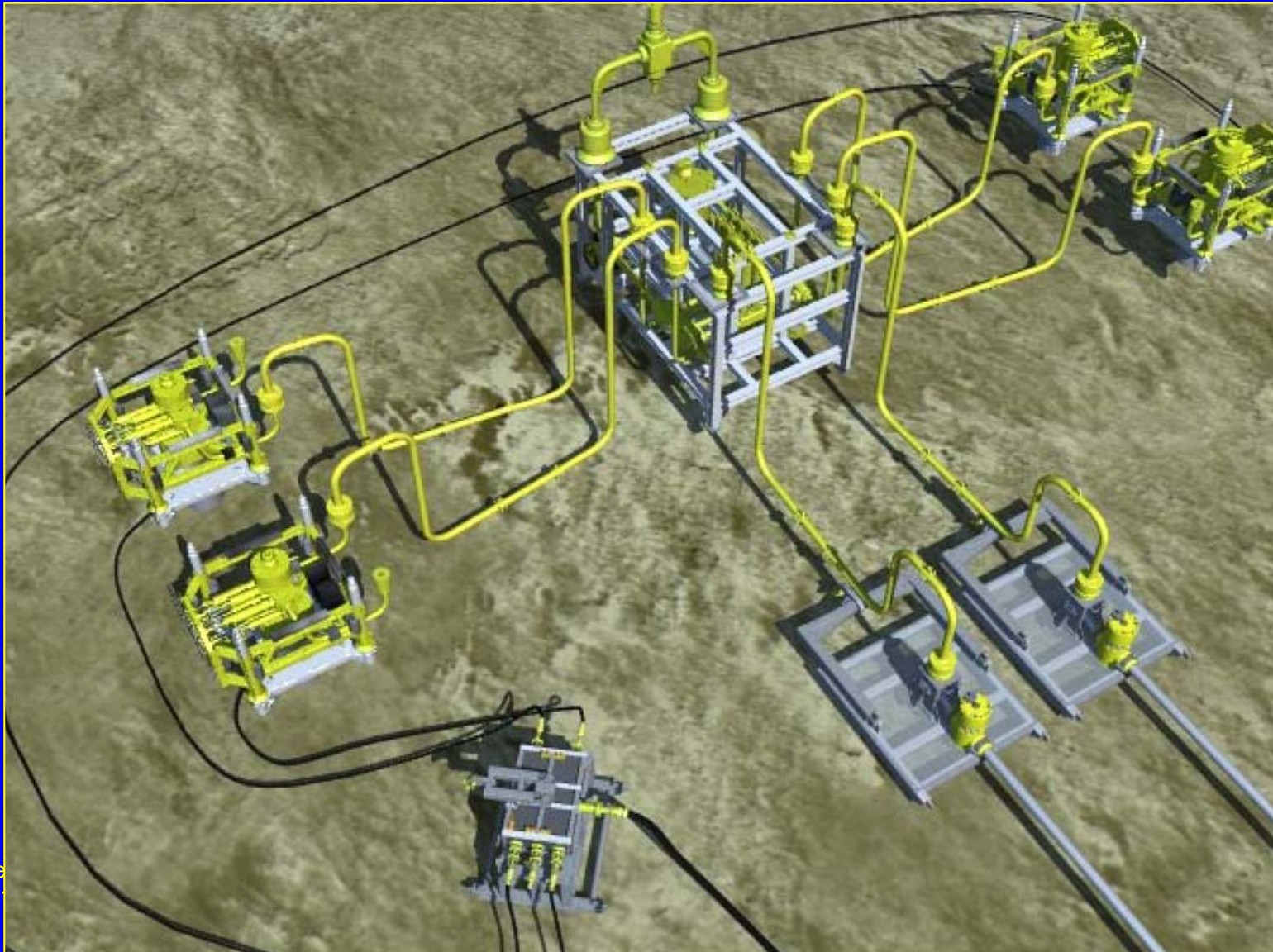


Subsea hookup performed by divers and/or guideline system

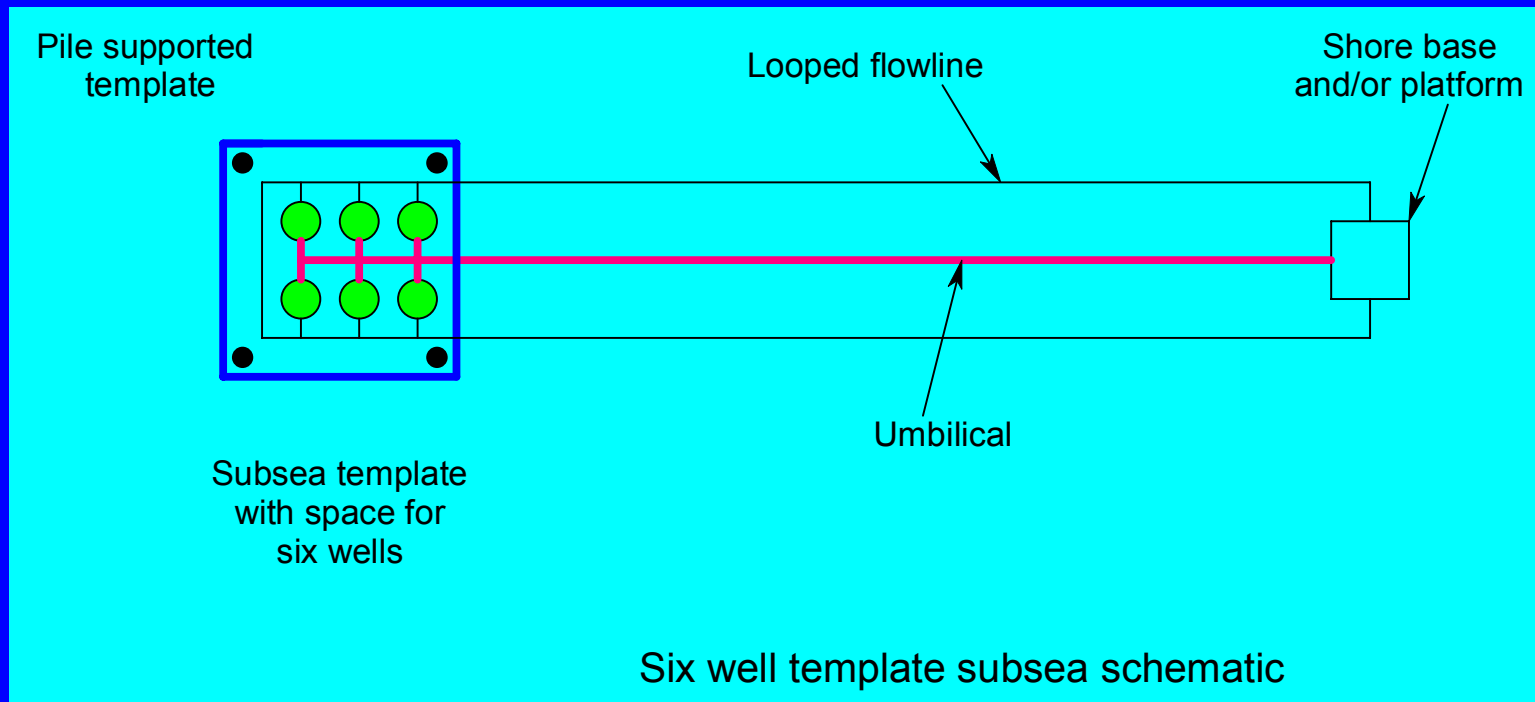
Wellhead Example



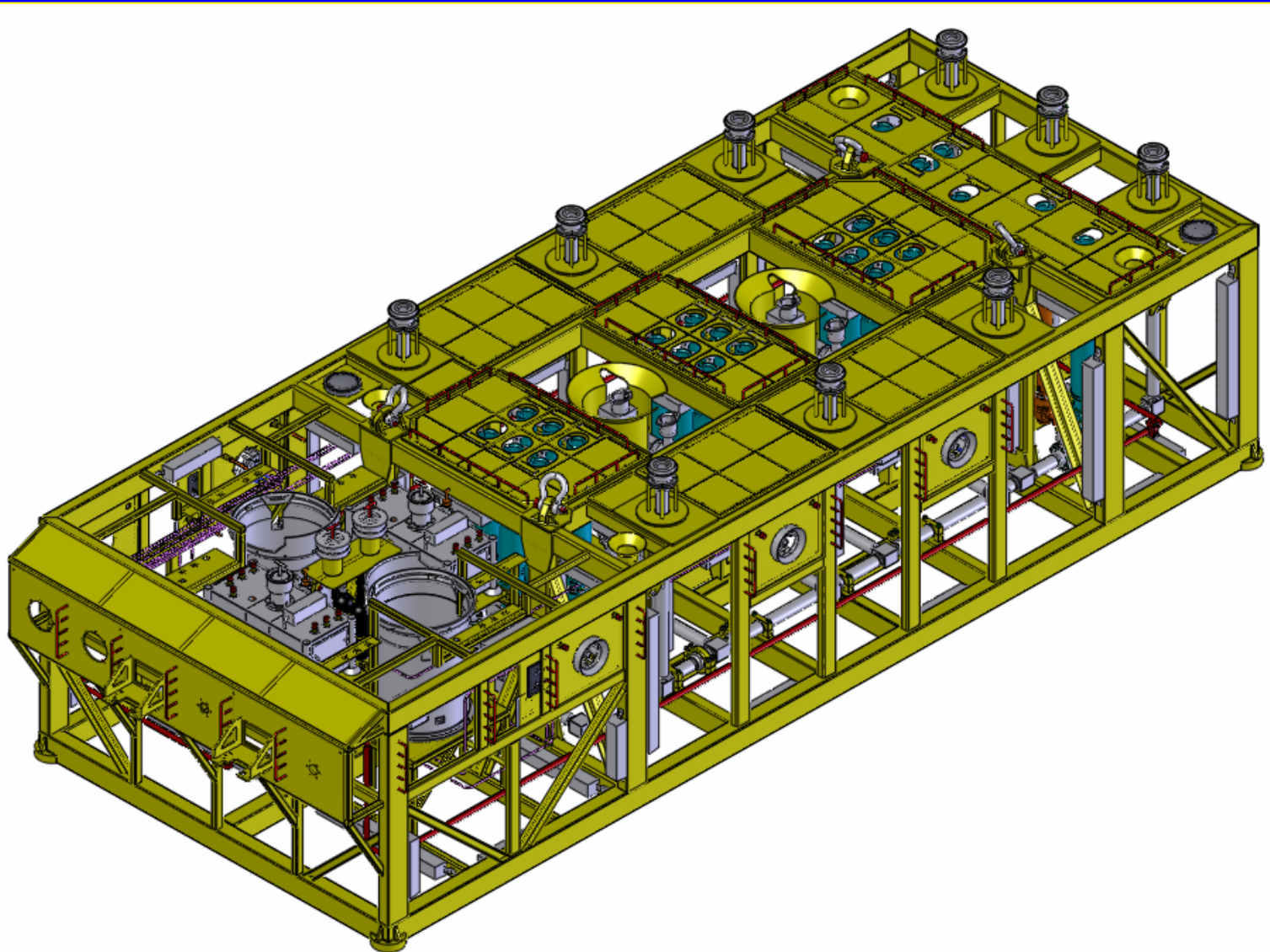
Tree and Manifold Layout



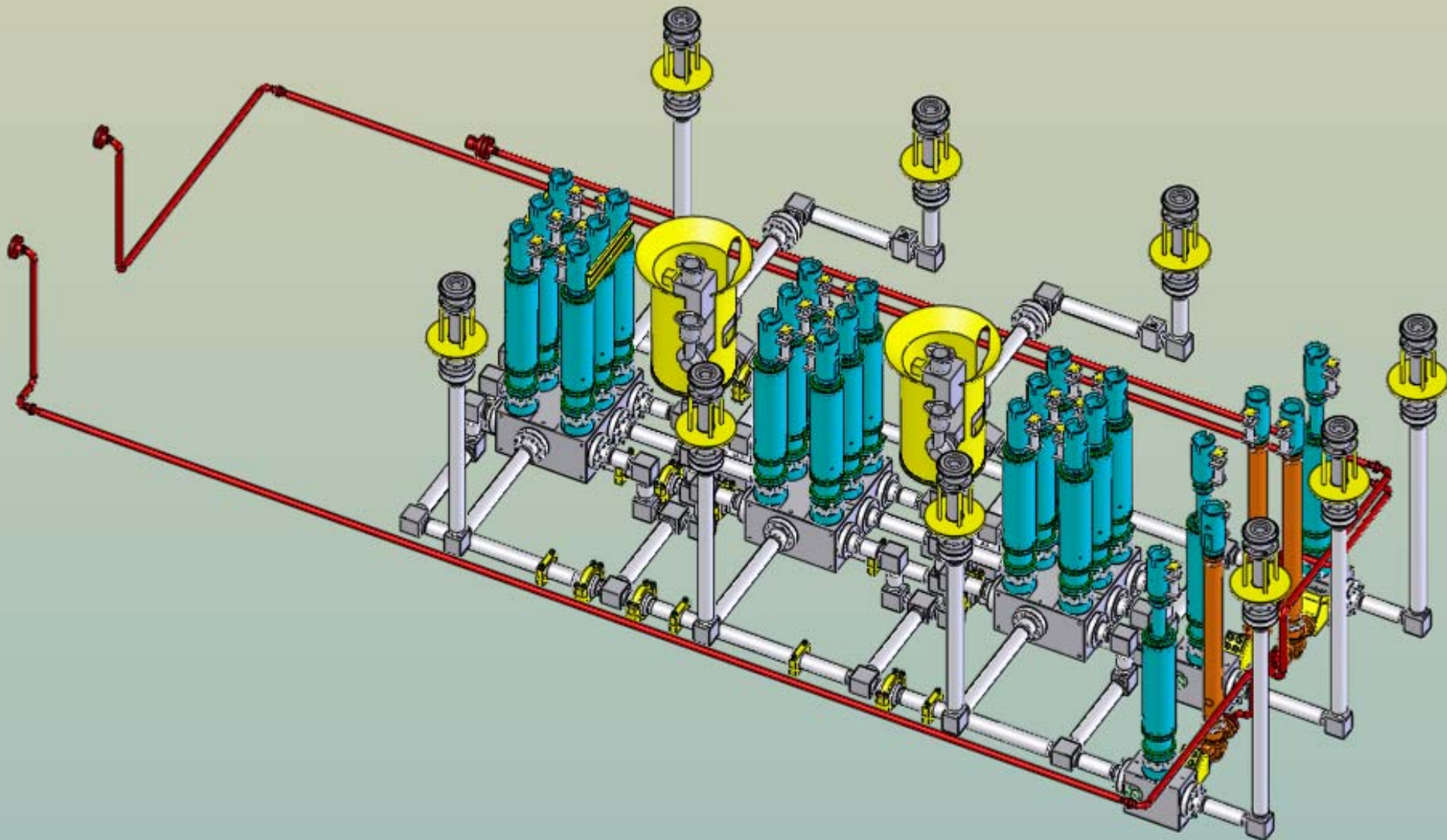
Six Well Subsea Template



Six-Well Tempalte Example



Template Example Schematic



Subsea Development

- **Advantages**
 - No derrick barge needed for installation
 - Short timeline to production
- **Disadvantages**
 - Has not been done in Cook Inlet
 - Complicated hook-up using divers
 - Jack-up needed for well intervention (summer)

Development Options

1. Outrigger Caisson
2. Subsea
- 3. Two-Deck Platform**
4. Three-Deck Platform



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Kitchen

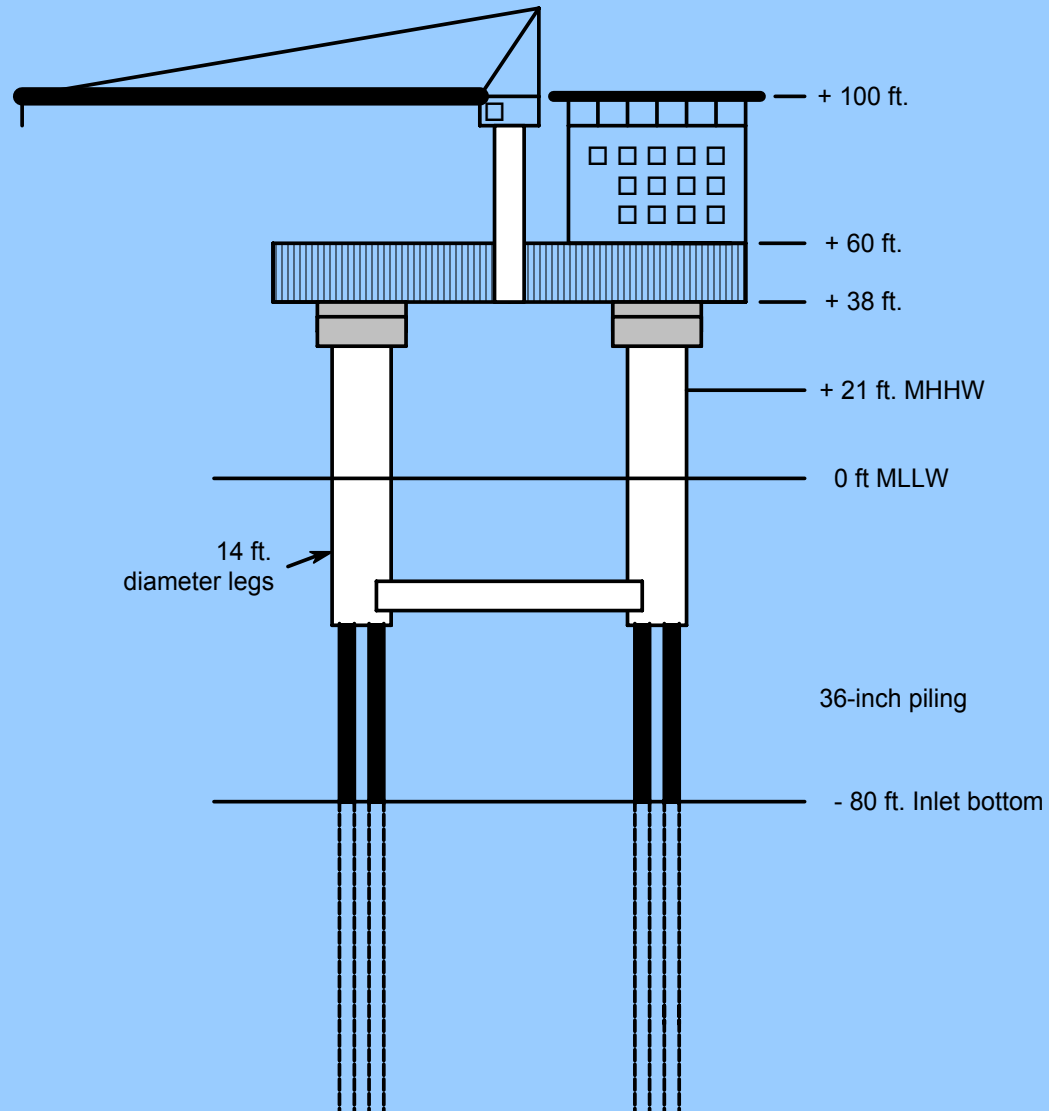
Two-Deck Development

- **Platform**
 - 28-well capacity
- **Pipelines to East Forelands Prod. Fac.**
 - Wet oil and gas pipelines
- **Water Injection Pipeline from EFPF**
 - Produced water and make-up water
- **Umbilical cable from EFPF**
 - Power, methanol and controls

Kitchen Application

- **Osprey Concept Limitation**
 - Tower floatation requirement
- **Deeper Water Concept**
 - Columns only needed in tidal (ice) zone
 - Different installation method

“Deep” Water Two-Deck Platform



Two-Deck Platform

- **Advantages**
 - No derrick barge needed for installation
- **Disadvantages**
 - Has not been done in this water depth in Cook Inlet
 - No space for production facilities
 - Cost

Development Options

1. Outrigger Caisson
2. Subsea
3. Two-Deck Platform
4. **Three-Deck Platform**

Kitchen

Three-Deck Development

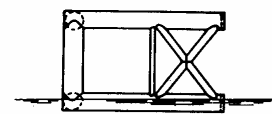
- **Platform**
 - 32-well capacity
- **Pipelines to East Forelands Prod. Fac.**
 - Clean oil and treated gas pipelines
- **Umbilical cable from EFPF**
 - Power, methanol and controls

Three-Deck Cook Inlet Platform

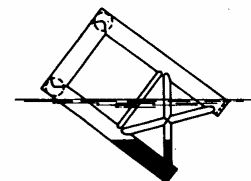


- Platform “C”
- Installed 1967
- 68 ft MLLW
- 32 well capacity
- Leg diameter – 15.5 ft
- Tower – 1,450 ton
- Deck – 2,000 ton
- Piling – 2,200 ton

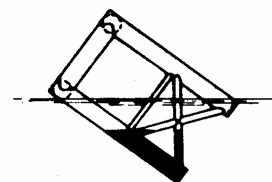
Upending, April 1967



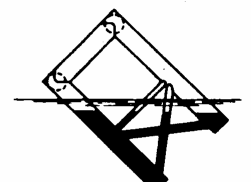
STAGE 1



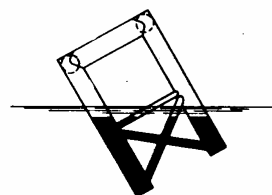
STAGE 2 , 6 MINUTES



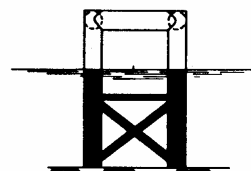
STAGE 3 , 8 MINUTES



STAGE 4 , 21 MINUTES



STAGE 5



STAGE 6 , 30 MINUTES

Installing Decks



Three-Deck Cook Inlet platform

- **Advantages**

- Proven design
- Design adaptable to size requirements
- Space for production and water injection equipment

- **Disadvantages**

- Requires derrick barge for installation
- Expensive

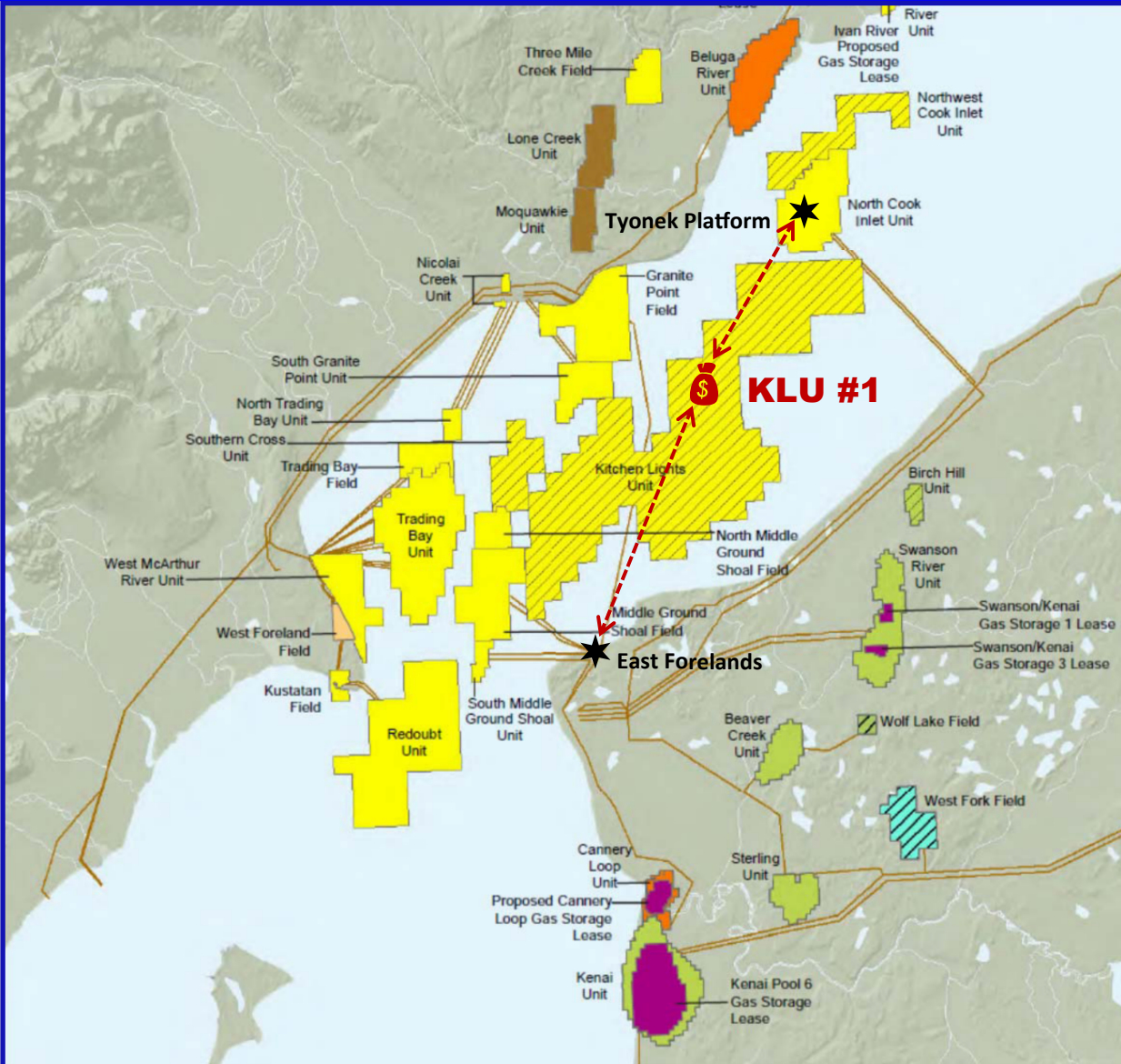
Gas Development Pipeline(s)

- **Gas pipeline, 10-inch, from Kitchen Lights to:**
 - Tyonek platform (about 12 miles), or to
 - East Forelands Production Facility (about 15 miles)
 - Anticipated production 50 MMCF per day
 - Dual and looped pipelines are needed for the subsea case to provide pigging capability
- **Umbilical to Kitchen Lights Unit**
 - Power
 - Methanol
 - Controls

Gas & Oil Development Pipelines

- **Gas and oil pipelines, 10 and 8-inch, from Kitchen to:**
 - New Shore Facility (about 8 miles), or to
 - East Forelands Production Facility (about 15 miles)
 - Anticipated production 50 MMCF/d and 12,000 BOPD
 - Dual and looped pipelines are needed for the subsea case to provide pigging capability
- **Umbilical to Kitchen Lights**
 - Power
 - Methanol
 - Controls

Gas Pipeline Route Options



In this option
Kitchen gas will
be transported to
the Tyonek Platform
or the EFPP

Umbilical cable is
routed to the
Kitchen Lights

Capital Costs

(based on five gas wells and pipeline option 2)

Development Option	Capital Cost (includes wells, structure, pipelines and facilities) \$ Millions
Outrigger Caisson	134
Subsea Template	173
Two-Deck Platform	168
Three-Deck Platform	210

Capital Costs

(based on five gas and twelve oil wells)

Development Option	Capital Cost (includes wells, structure, pipelines and facilities) \$ Millions
Outrigger Caisson	NA
Subsea Template	NA
Two-Deck Platform	422
Three-Deck Platform	426

Kitchen Development Timing

Year Number: Quarter	1				2				3				4																	
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Gas Discovery deemed commercial and permits in hand																														
Caisson or Subsea Development	Design, fab & install						Drill 5 wells																							
									First Production																					
Platform Development	Design, fabricate & install platform and pipeline												Drill 5 wells																	
														First Production																
Oil Discovery deemed commercial and permits in hand																														
Produce subsea well to platform																														
Platform Development													Drill 12 development wells																	
	Design, fabricate and install platform and pipelines																													



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KLU - 43