

# **PLATFORM INFORMATION**

## **COOK INLET, ALASKA**

Compiled by

Belmar Engineering, Redondo Beach, California

for the

Cook Inlet Regional Citizens Advisory Council

First Edition 1993

## **INTRODUCTION**

### **1. General**

This document is a compendium of available information on the sixteen off-shore platforms that were installed in upper Cook Inlet from 1964 to 2000. The original report was prepared by Belmar Engineering for the Cook Inlet Regional Citizens Advisory Council (Cook Inlet RCAC) as Task 1 of a study to compile background information of the Cook Inlet platforms and to examine the structural integrity of a number of sample platforms. The location and the current operators of the platforms are shown on Figure 1.

### **2. Data Sources**

The information, including design data, photographs, drawings, and maps were obtained from the operating companies and from Belmar files.

### **3. Report Organization**

The platforms are listed in the report in the sequence in which they were constructed. Table 1 lists the platforms by ascending installation date, Table 2, 3, and 4 list the platform alphabetically by name, field name, and operator respectively.

### **4. Data Sheet Information**

The information that is condensed on the data sheets includes general information regarding the design, fabrication, installation and operation of each platform. Environmental design criteria that were used for the design are listed. Summary information is included regarding any modifications that have been made to the topsides and whether or not the structure has been re-assessed. Also included is information regarding the corrosion protective systems and information regarding API RP 2A underwater inspections. The information for the Hilcorp operated platforms was updated by Cook Inlet RCAC staff in cooperation with Hilcorp in 2014.

### **5. Glossary**

A glossary of the terminology used in this compendium is included on page 5 of the introduction.

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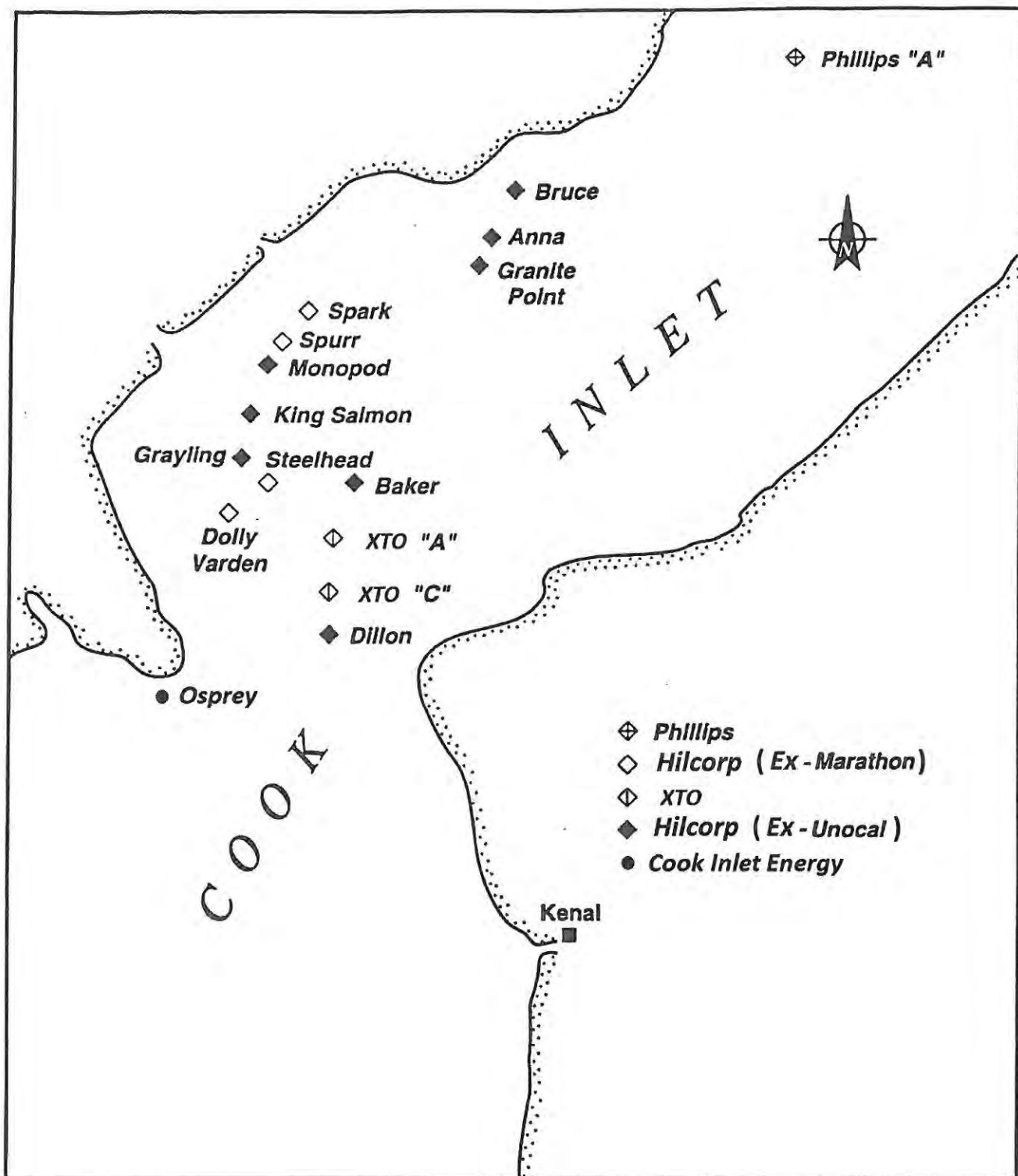


Figure 1. Cook Inlet platform location map

Table 1. Sequenced by platform installation date.

1.....	Middle Ground Shoal.....	Platform A.....	1964
2.....	Middle Ground Shoal.....	Platform Baker .....	1965
3.....	Granite Point .....	Platform Granite Point....	1966
4.....	Trading Bay .....	Platform Monopod .....	1966
5.....	Granite Point .....	Platform Anna .....	1966
6.....	Granite Point .....	Platform Bruce .....	1966
7.....	Middle Ground Shoal.....	Platform Dillon .....	1966
8.....	Middle Ground Shoal.....	Platform C.....	1967
9.....	McArthur River.....	Platform King Salmon.....	1967
10.....	McArthur River.....	Platform Grayling.....	1967
11.....	McArthur River.....	Platform Dolly Varden....	1967
12.....	North Cook Inlet .....	Platform Tyonek .....	1968
13.....	Trading Bay .....	Platform Spurr.....	1968
14.....	Trading Bay .....	Platform Spark .....	1968
15.....	McArthur River.....	Platform Steelhead .....	1986
16.....	Redoubt Shoal.....	Platform Osprey.....	2000

Table 2. Alphabetical by platform name.

A .....	Middle Ground Shoal.....	1
Anna .....	Granite Point .....	5
Baker.....	Middle Ground Shoal.....	2
Bruce.....	Granite Point .....	6
C .....	Middle Ground Shoal.....	8
Dillon.....	Middle Ground Shoal.....	7
Dolly Varden .....	McArthur River.....	11
Granite Point .....	Granite Point .....	3
Grayling.....	McArthur River.....	10
King Salmon .....	McArthur River.....	9
Monopod .....	Trading Bay .....	4
Osprey.....	Redoubt Shoal.....	16
Spark.....	Trading Bay .....	14
Spurr .....	Trading Bay .....	13
Steelhead.....	McArthur River.....	15
Tyonek.....	North Cook Inlet .....	12

Table 3. Alphabetical by field name.

Granite Point.....	Platform Anna .....	5
Granite Point.....	Platform Bruce.....	6
Granite Point.....	Platform Granite Point .....	3
McArthur River .....	Platform Dolly Varden .....	11
McArthur River .....	Platform Grayling .....	10
McArthur River .....	Platform King Salmon .....	9
McArthur River .....	Platform Steelhead.....	15
Middle Ground Shoal .....	Platform A .....	1
Middle Ground Shoal .....	Platform Baker.....	2
Middle Ground Shoal .....	Platform C .....	8
Middle Ground Shoal .....	Platform Dillon .....	7
North Cook Inlet.....	Platform Tyonek.....	12
Redoubt Shoal.....	Platform Osprey.....	16
Trading Bay.....	Monopod .....	4
Trading Bay.....	Platform Spark.....	14
Trading Bay.....	Platform Spurr .....	13

Table 4. Sorted by operator.

Cook Inlet Energy.....	Redoubt Shoal.....	Osprey .....	16
Hilcorp.....	McArthur River.....	Dolly Varden .....	11
Hilcorp.....	McArthur River.....	Steelhead.....	15
Hilcorp.....	Trading Bay .....	Spark.....	14
Hilcorp.....	Trading Bay .....	Spurr .....	13
Hilcorp.....	Granite Point .....	Anna .....	5
Hilcorp.....	Granite Point .....	Bruce.....	6
Hilcorp.....	Granite Point .....	Granite Point .....	3
Hilcorp.....	McArthur River.....	Grayling.....	10
Hilcorp.....	McArthur River.....	King Salmon .....	9
Hilcorp.....	Middle Ground Shoal.....	Baker.....	2
Hilcorp.....	Middle Ground Shoal.....	Dillon.....	7
Hilcorp.....	Trading Bay .....	Monopod .....	4
Phillips .....	North Cook Inlet .....	Tyonek.....	12
XTO.....	Middle Ground Shoal.....	Platform A.....	1
XTO.....	Middle Ground Shoal.....	Platform C.....	8

## GLOSSARY

AISC.....	American Institute of Steel Construction
API.....	American Petroleum Institute
API RP 2A.....	Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms
Cantilever .....	Platform deck extension buttressed by a support frame
fps.....	Feet per second
kips.....	Kilopounds, i.e., one thousand pounds
ksi.....	Kips per square inch
MLLW .....	Mean Low Low Water
psi.....	Pounds per square inch
Seismic ground motion.....	Horizontal ground acceleration due to an earth- quake
Shadow effect.....	Front legs take the brunt of the ice load.
UBC.....	Uniform Building Code

# PLATFORM A

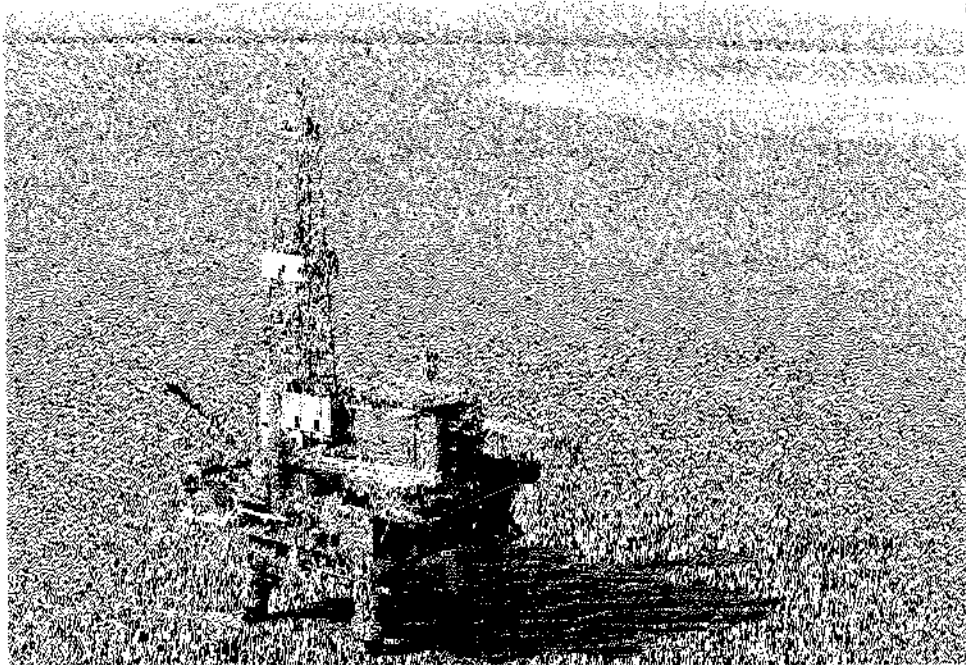
MIDDLE GROUND SHOAL FIELD

INSTALLED 1964

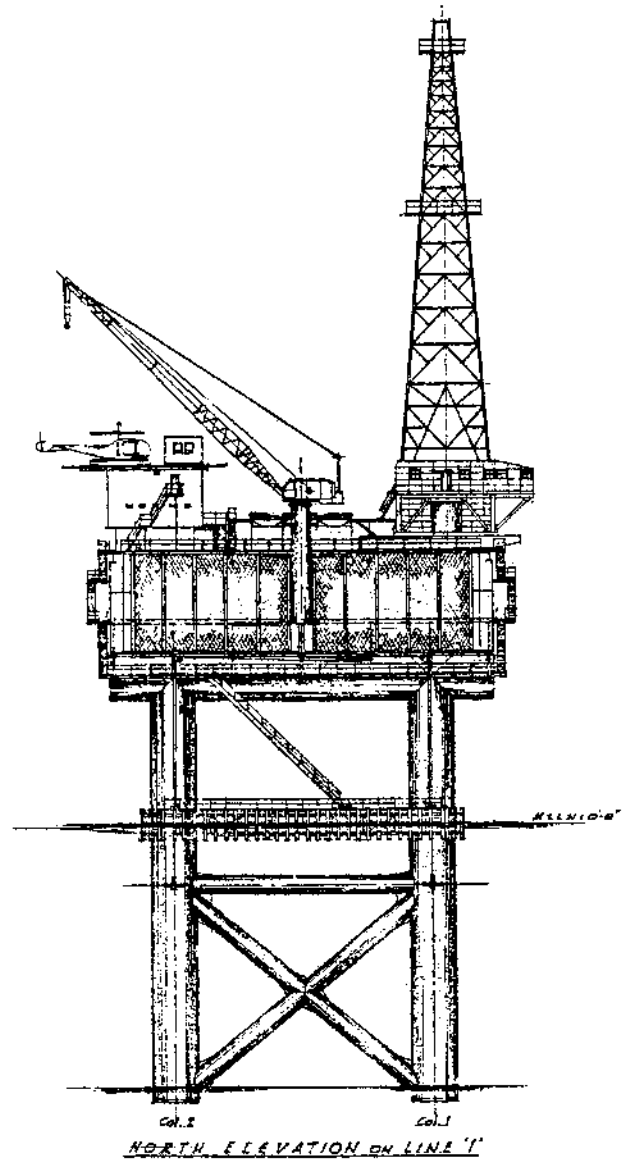
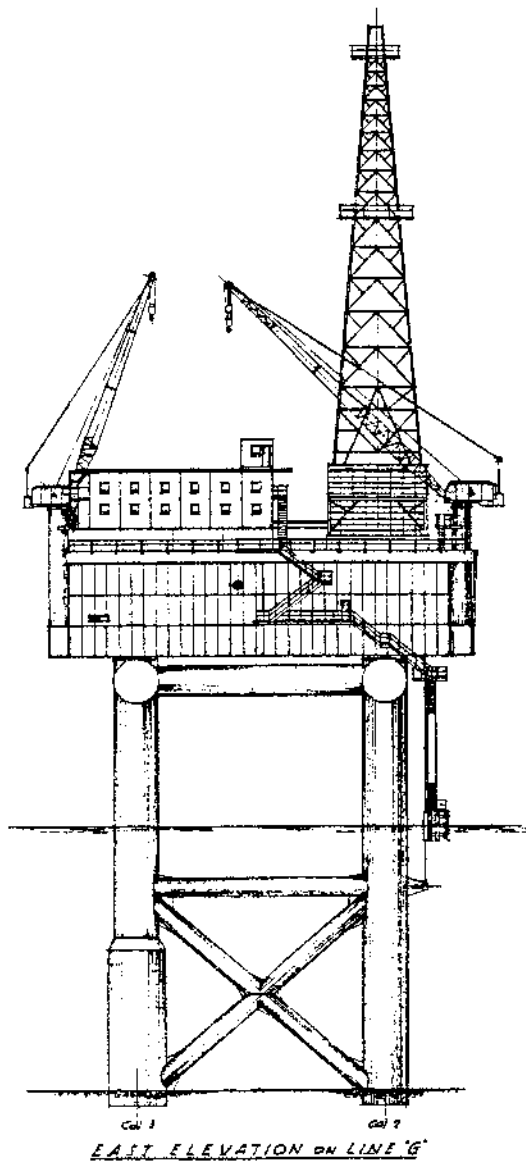


## MGS Platform A

1. *Field name:*.....Middle Ground Shoal field
  2. *Platform operator:*.....Shell Western E&P Inc.
  3. *Platform owners:*.....Shell Western E&P Inc.
  4. *Original operator:*.....Shell
  5. *Structural design firm:*.....Earl & Wright
  6. *Fabrication yard (structure):*.....Kaiser Steel in Oakland, California
  7. *Installation year and contractor:*.....1964, Kaiser Steel
  8. *Waterdepth (at MLLW):*.....83 feet
  9. *Number and diameter of legs:*.....Four legs; 14.5 feet diameter. Legs 3 and 4 bell out to 18.5 feet diameter below minus 29 feet MLLW.
  10. *Number, size and penetration of piling:*.....Thirty two 32-inch diameter piling with 30 feet penetration
  11. *Number, size and penetration of inner piling:*.....Thirty two 24-inch diameter with 120 feet penetration
  12. *Method of installation (driven, drilled, combination):*.....32-inch driven, 24-inch drilled
  13. *Length of grouted interval in legs:*.....From -20 to +36 ft MLLW
  14. *Design codes used (UBC, AISC, API RP 2A, etc):*.....AISC; Zone 3 UBC (1961)
- 
15. *Number of completed wells in each leg through piling:*.....Eight wells in each of legs 1, 2 and 4
  16. *Other completed wells in each leg:*.....None
  17. *Top girders used as storage tanks ?*.....Yes
  18. *If so, what type of liquid:*.....Diesel fuel
- 
19. *Design criteria used:*
    - (1) *Ice thickness and strength:*.....6 ft on two front legs, 3 ft on two back legs; 300 psi
    - (2) *Wave height and period:*.....41.5 feet with a 10.8 second period
    - (3) *Wind:*.....65 mph with 100 mph gusts
    - (4) *Earthquake:*.....0.15 g per UBC 1961, Zone 3
    - (5) *Temperature:*.....Minus 38° F above water, plus 28° F below water
    - (6) *Current:*.....10 feet per second
  20. *Design considerations:*.....20 year design life
- 
21. *Unusual circumstances during installation ?*.....None
  22. *Significant modification or additions to topsides:*.....Yes, added lower deck in 1965, 40 x 30 foot gas compressor cantilever and 12 x 30 radiator cantilever in early 1970's, new quarters building and drilling rig in 1989.
  23. *Any significant structural damage incidents ?*.....In 1971 the six foot horizontal brace between legs 1 and 4 was sheared off due to an iceberg becoming trapped inside the tower frame. The brace was replaced the same year. Reference: 1975 OTC paper 2165.
  24. *Has platform structural design been re-assessed ?*.....Yes
  25. *If so, by whom and for what reason:*.....In 1971 by Earl & Wright and by Shell Head Office Civil Engineering to analyze consequences of loss of horizontal brace. In 1988 by Earl & Wright to review adequacy of deck structure. In 1993 dynamic analysis by Shell HOCE for new drilling program
- 
26. *Type of steel used; above water and below water:*.....Lukens Lt-75-QT and Sheffield Super-Lo-Temp where low temperature steel required. A-36 elsewhere.
  27. *Steel corrosion allowance used:*.....None initially. Corrosion wraps added in 1965 and 1966 through the tidal zone on all four legs.
  28. *Type of cathodic protection:*.....Impressed current system
- 
29. *Dates and API RP 2A levels of underwater inspection:*.....Level II in 1971 and 1978. Level III in 1978, 1983 and 1988.
-



MGS Platform "A" with new quarters and drilling rig.



Elevations of MGS Platform A with original quarters and drilling rig.  
 Note the adjustable boat landing which was removed during  
 the first year of operation.

# PLATFORM BAKER

MIDDLE GROUND SHOAL FIELD

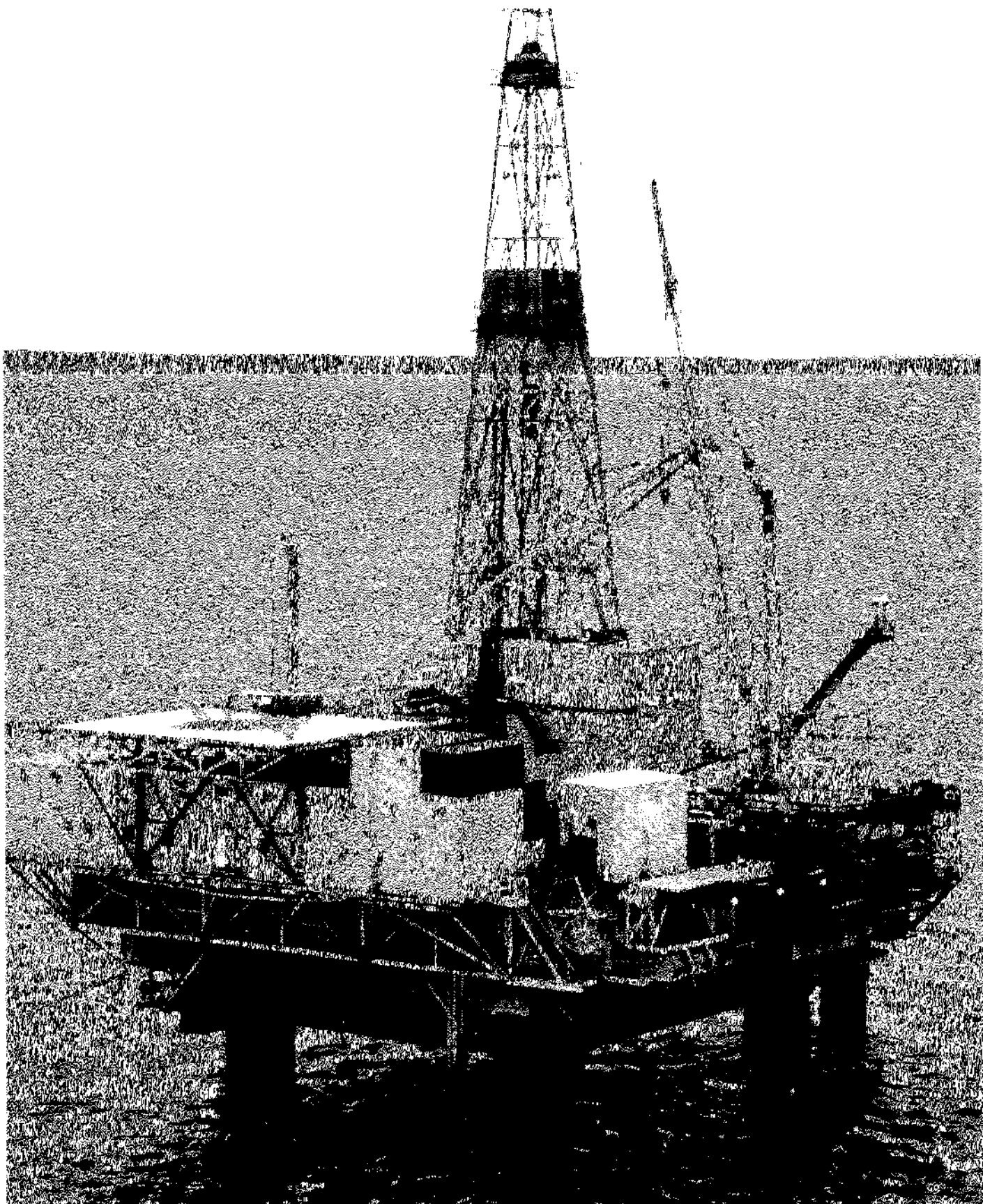
INSTALLED 1965

PLATFORM BAKER	
2014 UPDATED INFORMATION	
Field Name:	Middle Ground Shoal Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Amoco
Structural Design firm:	Earl & Wright/McDermott
Fabrication yard (structure):	Kaiser Steel in Oakland, California
Installation year and contractor:	1965; McDermott
Water depth (at MLLW):	102 feet
Number and diameter of legs:	Four legs; 14 feet diameter; one well protector leg
Number, size and penetration of piling:	Each leg has seven piles in an outer ring and one pile in the center
Number, size and penetration of inner piling:	None
Method of installation (driven, drilled, combination):	Combination
Length of grouted interval in legs:	136 feet
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	Leg 1: 8 wells Leg 2: 8 wells Leg 3: 0 wells Leg 4: 8 wells Leg 5: 1 well
Top girders storage tank liquid & capacity:	Produced Water (B-T-0380): 112,728 gal Crude Oil (B-T-0381, B-T-0382): 112,728 gal Produced Water (B-T-0383): 27,720 gal Power Oil (B-T-0384): 27,720 gal Diesel (B-T-0385): 112,728 gal
Design criteria	
Ice thickness and strength:	Front legs 120 kips/ft. of diameter, back legs 50 kips/ft.
Wave height and period:	30 feet with 9 second period
Wind:	80 mph above elevation 25 feet
Earthquake:	0.1 seismic ground motion
Current:	3900 kips per leg impact load, seismic, ice and current loads applied simultaneously
Other Considerations:	Shadow effect

Unusual circumstances during installation:	None
Significant modification or damage to topsides:	Minor module additions (quarters extension and Sea King crane). Damaged structural members and structural member removal requiring engineering evaluation of structural integrity. Light, moderate and extreme local and general corrosion. Last inspected: 9/12
Significant structural damage incidents:	Tank explosion in 1968/1969
Platform structural design reassessment company & year:	2001 - Hopper Elmore Associates
Type of steel used	
Above water:	A-537 Sheffield Low Temp
Below water:	50 MV Steel (50 ksi)
Steel corrosion allowance:	A-36 Steel corrosion wrap. 44' x 1/2"
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	April, June and July of 2008, Offshore Divers carried out a scheduled API Level 2 and 3 inspection.

## Platform Baker

1. Field name:.....Middle Ground Shoal field
  2. Platform operator:.....Unocal
  3. Platform owner(s):.....Unocal
  4. Original operator:.....Amoco
  5. Structural design firm:.....Earl & Wright/McDermott
  6. Fabrication yard (structure):.....Kaiser Steel, Oakland, California
  7. Installation year and contractor:.....1965; McDermott
  8. Waterdepth (at MLLW):.....102 feet
  9. Number and diameter of legs:.....Four legs; 14 feet diameter, one well protector leg
  10. Number, size and penetration of piling:.....Thirty two 33 inch diameter piling with 85 feet penetration.  
Each leg has seven piles in an outer ring and one pile in the center.
  11. Number, size and penetration of inner piling:.....None
  12. Method of installation (driven, drilled, combination):.....Combination
  13. Length of grouted interval in legs:.....136 feet
  14. Design codes used (UBC, AISC, API RP 2A, etc):.....UBC, AISC
- 
15. Number of completed wells in each leg through piling:.....Three legs have respectively 5 wells, 7 wells, and 5 wells.  
One leg does not have any wells.
  16. Other completed wells:.....One well in the well protector leg.
  17. Top girders used as storage tanks ?.....Yes
  18. If so, what type of liquid:.....Potable water, drill water, produced water, diesel fuel, crude oil, power oil.
- 
19. Design criteria used:
    - (1) Ice thickness and strength:.....Front legs 120 kips/ft of diameter, back legs 50 kips/ft
    - (2) Wave height and period:.....30 feet with 9 second period
    - (3) Wind:.....80 mph above elevation 25 feet
    - (4) Earthquake:.....0.1 g seismic ground motion
    - (5) Temperature:.....
    - (6) Other:.....3900 kips per leg impact load. Seismic, ice and current loads applied simultaneously.
  20. Design considerations:.....Shadow effect
- 
21. Unusual circumstances during installation ?.....None
  22. Significant modification or additions to topsides:.....Quarters extension and Sea King crane.
  23. Any significant structural damage incidents ?.....None (there was a 1968 or 1969 tank explosion)
  24. Has platform structural design been re-assessed ?.....Yes, 1993
  25. If so, by whom and for what reason:.....Hopper & Associates; Acquisition by Unocal from Amoco, planned drilling program and evaluation of non-low temperature steel concerns.
- 
26. Type of steel used; above water and below water:.....A-537 Sheffield in critical areas above water; 50 MV below water.
  27. Steel corrosion allowance used:.....An 1/2 inch thick A-36 wear plate in the tidal zone.
  28. Type of cathodic protection:.....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection:.....Annual - cathodic protection surveys. 1992 - Level III scour and flooded member surveys.
-



Platform Baker in the Middle Ground Shoal field.



Installed 1965  
 Designed by Earl & Wright  
 Jacket Wt. 2533 tons

8 Piles per leg 33" dia.  
 Penetration 85'

Leg dia. 14.0'

Wind Speed  
 80 mph above 25' elev.

Ice Load

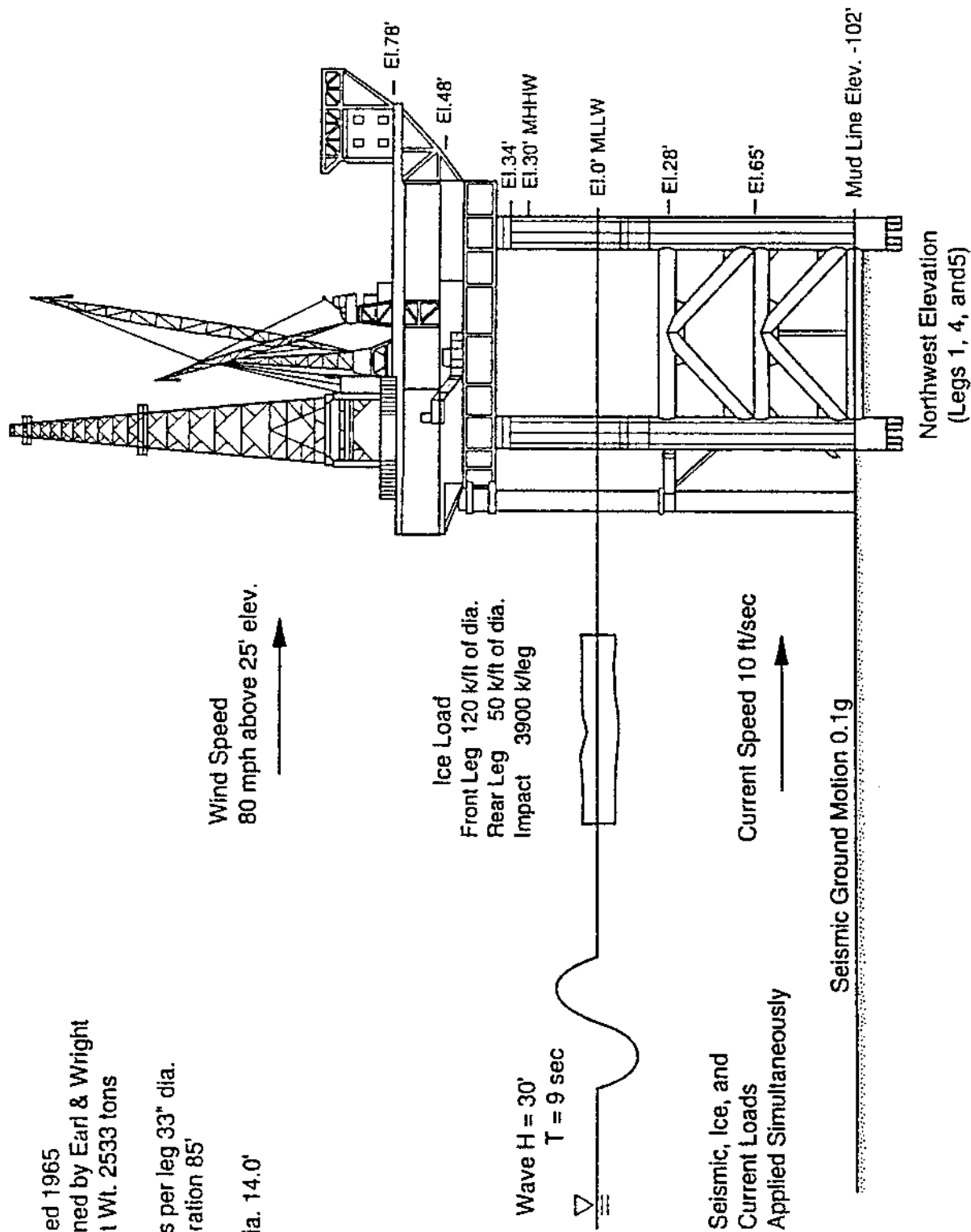
Front Leg 120 k/ft of dia.  
 Rear Leg 50 k/ft of dia.  
 Impact 3900 k/leg

Wave H = 30'  
 T = 9 sec

Seismic, Ice, and  
 Current Loads  
 Applied Simultaneously

Current Speed 10 ft/sec

Seismic Ground Motion 0.1g



Elevation of MGS field platform Baker. Note the fifth leg which contains one well.

# PLATFORM GRANITE POINT

GRANITE POINT FIELD

INSTALLED 1966

PLATFORM GRANITE POINT	
2014 UPDATED INFORMATION	
Field Name:	Granite Point Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Mobil
Structural Design firm:	Brown & Root
Fabrication yard (structure):	Kaiser Steel, Oakland, California
Installation year and contractor:	1966; Brown & Root
Water depth (at MLLW):	75 feet
Number and diameter of legs:	Four legs; 17 feet diameter
Number, size and penetration of piling:	Twelve piles per leg; 33 inch diameter; driven to 40 feet
Number, size and penetration of inner piling:	Twelve piles per leg; 26 inch diameter; driven to 105 feet
Method of installation (driven, drilled, combination):	Driven
Length of grouted interval in legs:	137 feet
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	Leg 1: 8 wells Leg 2: 0 wells Leg 3: 11 wells Leg 4: 2 wells
Top girders storage tank liquid & capacity:	Crude Oil (P-T-0180): 21,000 gal Diesel Based Mud (P-T-0480): 119,700 gal Seawater (P-T-0780) Potable Water (P-T-0890B): 24,612 gal Produced Water (P-T-3050): 57,750 gal Diesel Storage (P-T-3210): 118,860 gal
Design criteria	
Ice thickness and strength:	5 feet thickness; 43.2 kips/ft.
Wave height and period:	28 feet
Temperature:	Minus 38° F to plus 70° F
Current:	Current speed 8 knots
Other Considerations:	
Unusual circumstances during installation:	Platform adrift prior to setting down

Significant modification or damage to topsides:	Module additions and replacement of living quarters (Unocal). Added waterflood (expansion of waterhandling capacity). Damaged structural members and removal of structural members, requiring engineering evaluation of structural integrity. Light to extreme general and local corrosion. Last inspected: 6/12
Significant structural damage incidents:	Jan 15 2009, OSV Monarch struck South two legs of the platform, causing damage to the leg 4 ice-breaker and out of service pump house, as well as the subsea pile guide on the south side of Leg 1
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	A-537
Below water:	A-36
Steel corrosion allowance:	1/2 inch corrosion wrap through the tidal zone. 40' x 1/2" + ice breaker
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	May 2009, Global Offshore Divers carried out a scheduled API Level 2 and 3 inspection.

## Platform Granite Point

1. Field name:.....Granite Point field
  2. Platform operator:.....Unocal
  3. Platform owner(s):.....Mobil and Unocal
  4. Original operator:.....Mobil
  5. Structural design firm:.....Brown & Root
  6. Fabrication yard (structure):.....Kaiser Steel, Oakland, California
  7. Installation year and contractor:.....1966; Brown & Root
  8. Waterdepth (at MLLW):.....75 feet
  9. Number and diameter of legs:.....Four legs; 17 feet diameter
  10. Number, size and penetration of piling:.....Twelve piles per leg; 33 inch diameter; driven to 40 feet
  11. Number, size and penetration of inner piling:.....Twelve piles per leg; 26 inch diameter; driven to 105 feet
  12. Method of installation (driven, drilled, combination):.....Driven
  13. Length of grouted interval in legs:.....137 feet
  14. Design codes used (UBC, AISC, API RP 2A, etc):.....UBC, AISC
- 
15. Number of completed wells in each leg through piling:.....Leg 1 - nine wells; Leg 3 - eleven wells;  
No wells in Legs 2 and 3
  16. Other completed wells in each leg:.....None
  17. Top girders used as storage tanks?.....Yes
  18. If so, what type of liquid:.....Potable water; drill water; Cook Inlet water; diesel fuel;  
crude oil.
- 
19. Design criteria used:
    - (1) Ice thickness and strength:.....Five foot thick; 43.2 ksi/ft
    - (2) Wave height and period:.....28 feet
    - (3) Wind:.....Not available
    - (4) Earthquake:.....
    - (5) Temperature:.....Minus 38° F to plus 70° F
    - (6) Current:.....Current speed 8 knots
  20. Design considerations:.....
- 
21. Unusual circumstances during installation?.....Platform adrift prior to setting down.
  22. Significant modification or additions to topsides:.....Added waterflood; currently expanding waterhandling  
capacity.
  23. Any significant structural damage incidents?.....None
  24. Has platform structural design been re-assessed?.....No
  25. If so, by whom and for what reason:.....
- 
26. Type of steel used; above water and below water:.....Above water A-537; below water A-36
  27. Steel corrosion allowance used:.....½ inch corrosion wrap through the tidal zone.
  28. Type of cathodic protection:.....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection:.....None
-



View of Granite Point platform in the Granite Point field.

Installed 1966

Designed by Brown & Root

Jacket Wt. 3400 tons

3 Primary Deck Trusses 500 tons each

12 Piles per leg 33" dia.

Penetration 40' 26" insert

Piles driven to 105' penetration

Wind Speed ?

Design Temperature  
minus 38°F

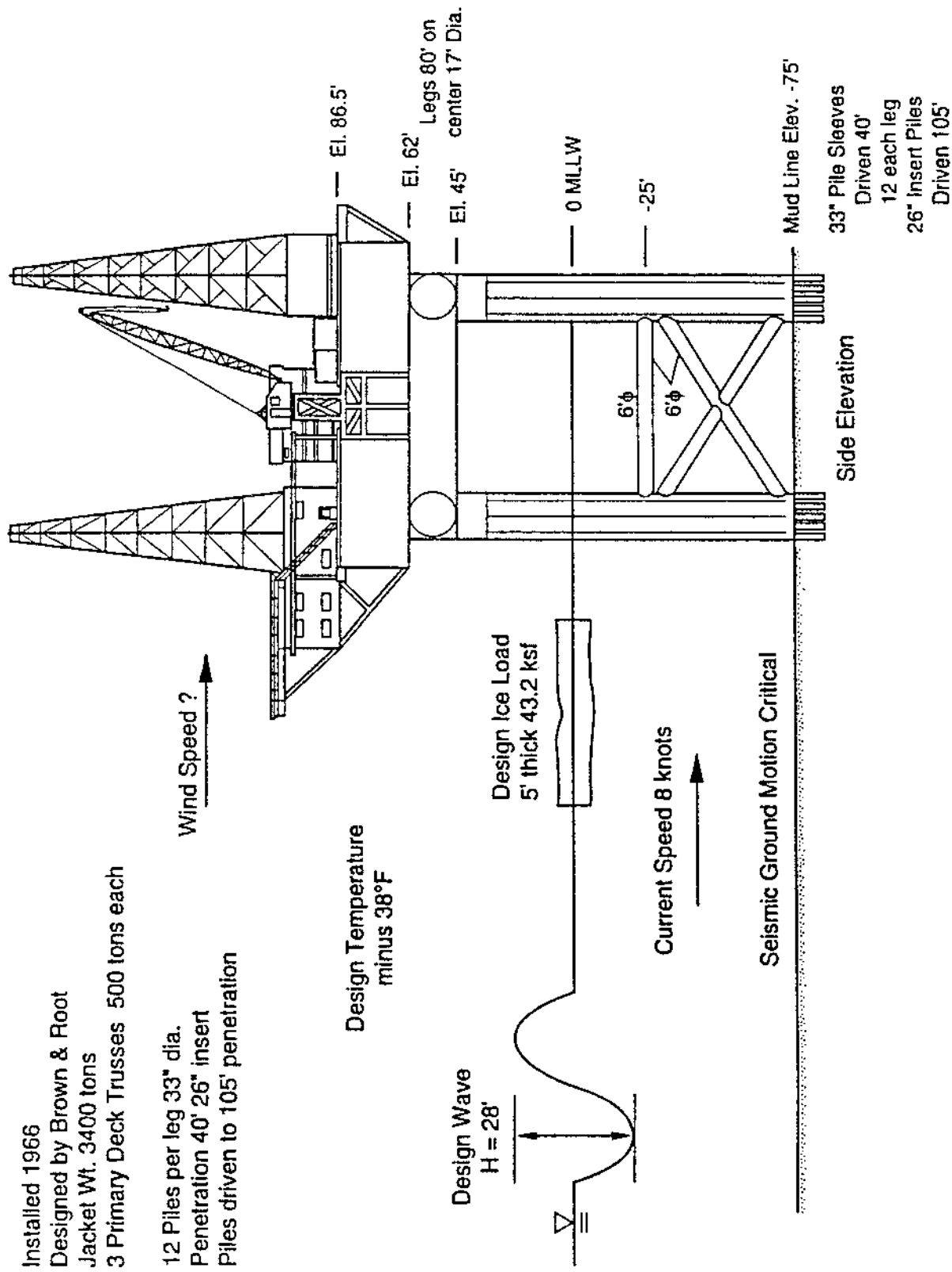
Design Wave

H = 28'

Design Ice Load  
5' thick 43.2 ksf

Current Speed 8 knots

Seismic Ground Motion Critical



Elevation view and summary details of platform Granite Point.

# MONOPOD PLATFORM

TRADING BAY FIELD

INSTALLED 1966

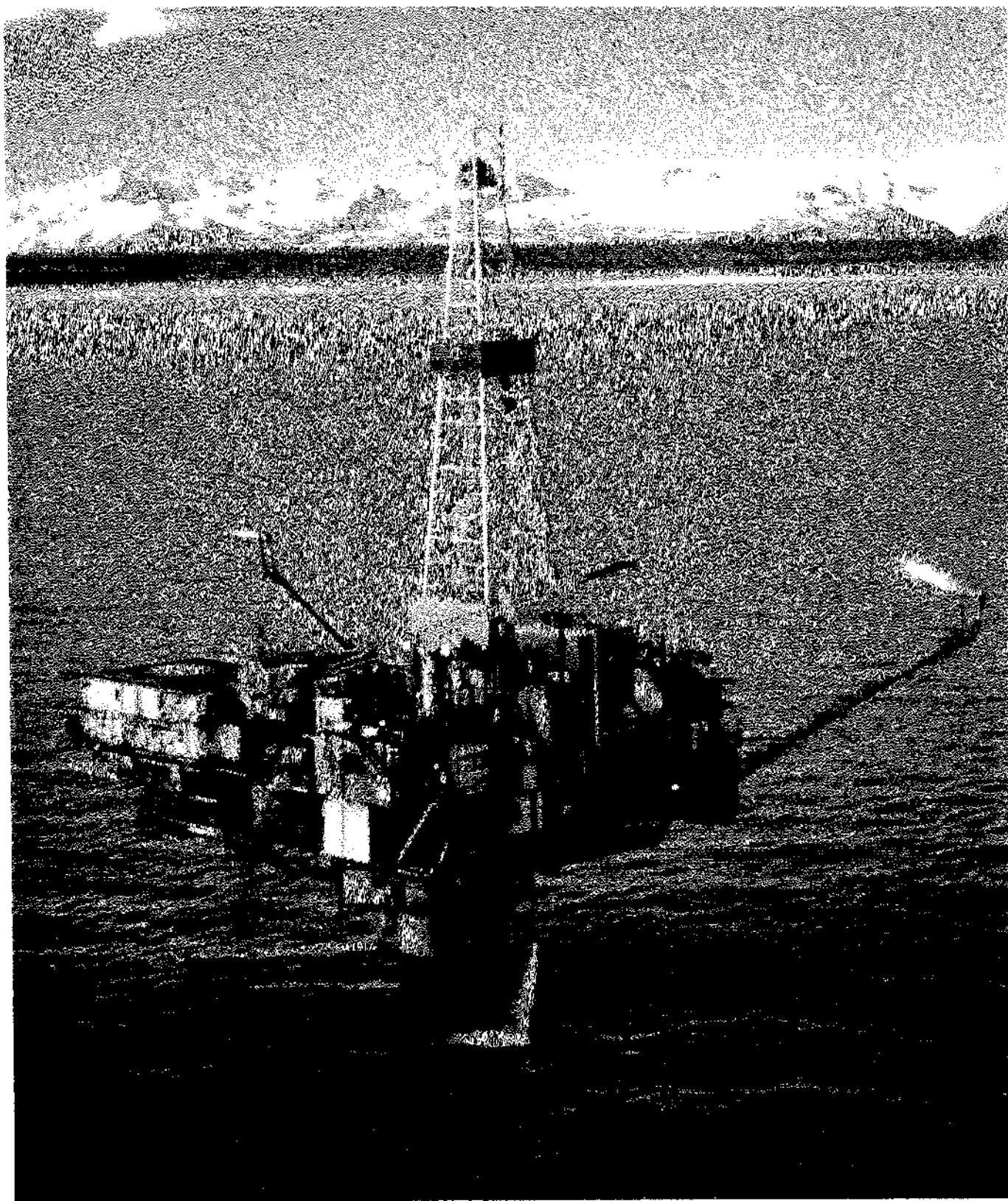


PLATFORM MONOPOD	
2014 UPDATED INFORMATION	
Field Name:	Trading Bay Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Unocal
Structural Design firm:	Brown & Root
Fabrication yard (structure):	American Pipe & Construction, Vancouver, Washington
Installation year and contractor:	1966; Brown & Root
Water depth (at MLLW):	66 feet
Number and diameter of legs:	One leg, 28.5 feet in diameter
Number, size and penetration of piling:	32 piles; 36 inch diameter with 101 feet penetration
Number, size and penetration of inner piling:	32 conductor piles; 20 inch diameter with 97 feet penetration
Method of installation (driven, drilled, combination):	Driven
Length of grouted interval in legs:	Center leg has 33 feet of grout
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	31 wells
Top girders storage tank liquid & capacity:	Potable Water (M-T-NA): 19,698 gal Drilling Mud (M-T-1000): 16,296 gal Diesel Storage (M-T-3000): 100,548 gal
Design criteria	
Ice thickness and strength:	Six feet; 300 psi (7300 kips)
Wave height and period:	28 feet with 8.5 second period
Wind:	100 mph
Earthquake:	0.1 g seismic ground motion
Current:	10 ft./sec
Other Considerations:	Single caisson
Unusual circumstances during installation:	None

Significant modification or damage to topsides:	Minor module additions. Addition of waterflood system. Damaged or removed structural members, non-typical configuration in Bingham room, incomplete welding, and extreme general and local corrosion on walkway leading to flare tip, all requiring engineering evaluation. Light to extreme general and local corrosion elsewhere. Last inspected: 10/12
Significant structural damage incidents:	South horizontal separated from the West pontoon at the SW weld. SE weld had heavy knife-corrosion but no crack (2011). NW weld had open crack (water flowing in and out, 2011).
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	A-537
Below water:	A-36
Steel corrosion allowance:	1/2 inch wear plate through tidal zone. 35' x 1/2"
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	September and October 2010, Global Offshore Divers carried out a scheduled API Level 2 and 3 inspection.

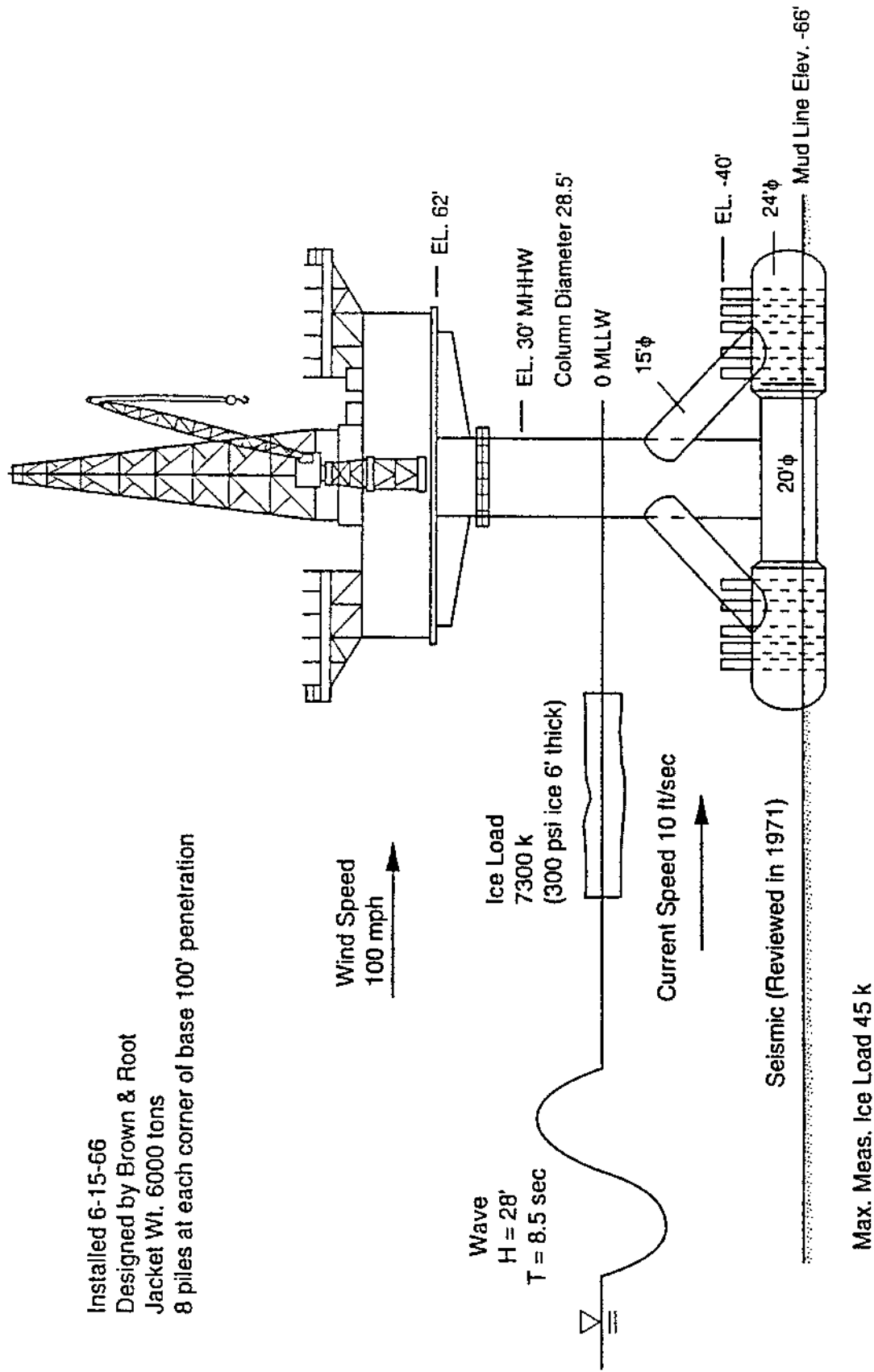
## Platform Monopod

1. Field name:.....Trading Bay field
  2. Platform operator:.....Unocal
  3. Platform owner(s):.....Unocal & Marathon
  4. Original operator:.....Unocal
  5. Structural design firm:.....Brown & Root
  6. Fabrication yard (structure):.....American Pipe & Construction, Vancouver, Washington
  7. Installation year and contractor:.....1966; Brown & Root
  8. Waterdepth (at MLLW):.....66 feet
  9. Number and diameter of legs:.....One leg, 28.5 feet in diameter
  10. Number, size and penetration of pontoon piling:.....32 piles; 36 inch diameter with 101 feet penetration
  11. Number, size and penetration of leg piling:.....32 conductor piles; 20 inch diameter with 97 feet penetration
  12. Method of installation (driven, drilled, combination):.....Driven
  13. Length of grouted interval in legs:.....Center leg has 33 feet of grout
  14. Design codes used (UBC, AISC, API RP 2A, etc):.....UBC, AISC
- 
15. Number of completed wells in each leg through piling:.....32
  16. Other completed wells in each leg:.....None
  17. Top girders used as storage tanks ?.....Yes
  18. If so, what type of liquid:.....Diesel fuel
- 
19. Design criteria used:
    - (1) Ice thickness and strength:.....Six feet; 300 psi (7300 kips)
    - (2) Wave height and period:.....28 feet with 8.5 second period
    - (3) Wind:.....100 mph
    - (4) Earthquake:.....0.1 g seismic ground motion
    - (5) Temperature:.....
    - (6) Other:.....
  20. Design considerations:.....Single caisson
- 
21. Unusual circumstances during installation ?.....None
  22. Significant modification or additions to topsides:.....Added waterflood system
  23. Any significant structural damage incidents ?.....None
  24. Has platform structural design been re-assessed ?.....Yes, 1971, 1991 and 1993
  25. If so, by whom and for what reason:.....Brown & Root (1971 and 1991), Bea (1993); lack of redundancy.
- 
26. Type of steel used; above water and below water:.....A-537 above water, A-36 below MLLW
  27. Steel corrosion allowance used:.....½ inch wear plate through tide zone.
  28. Type of cathodic protection:.....Impressed current anodes
- 
29. Dates and API RP 2A levels of underwater inspection:.....1991 - Internal column thickness survey; 1993 - Level III underwater inspection.
-



Monopod platform in the Trading Bay field.

Installed 6-15-66  
 Designed by Brown & Root  
 Jacket Wt. 6000 tons  
 8 piles at each corner of base 100' penetration



Elevation view and summary details of the Monopod platform.

PLATFORM ANNA

GRANITE POINT FIELD

INSTALLED 1966

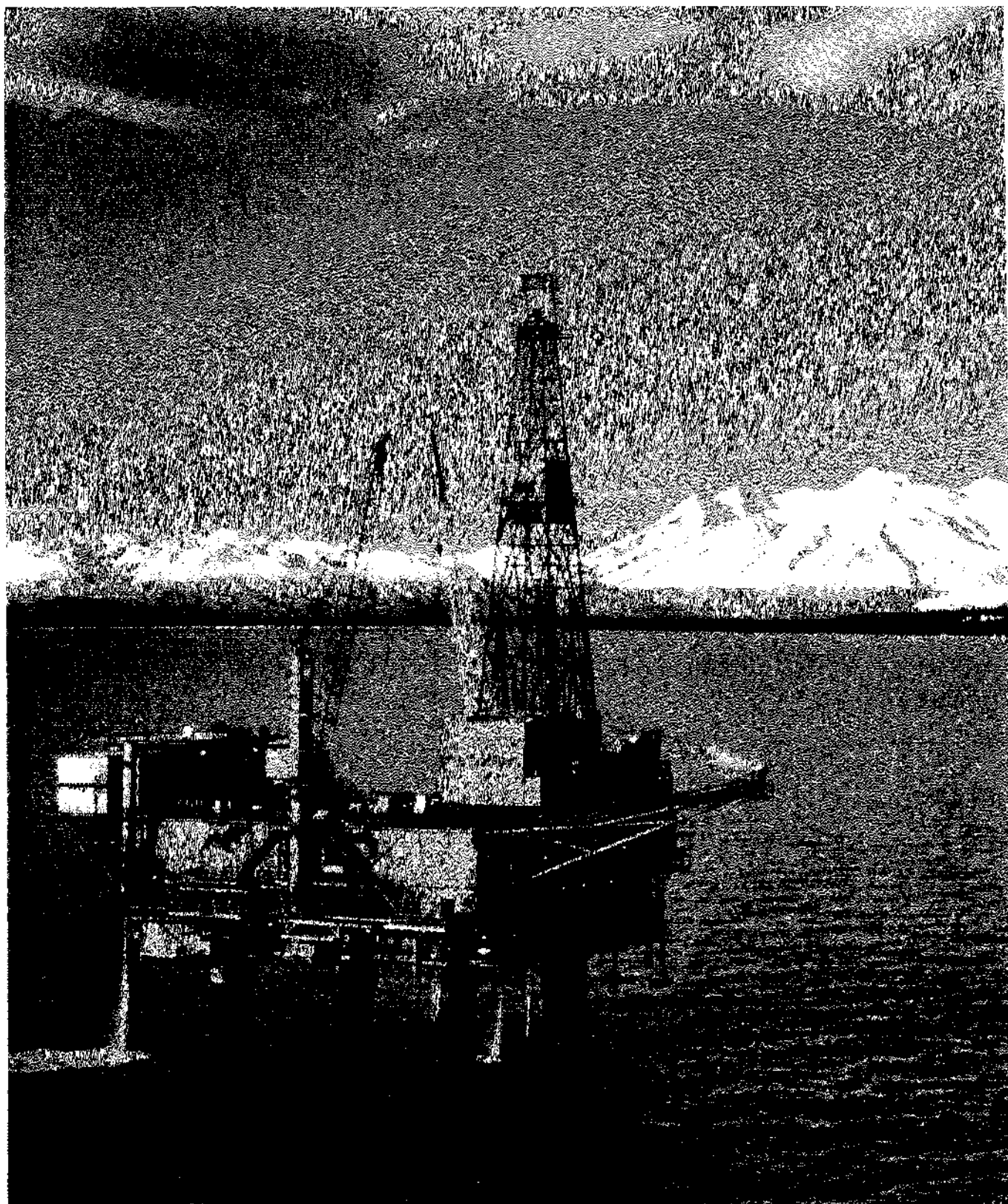
PLATFORM ANNA	
2014 UPDATED INFORMATION	
Field Name:	Granite Point Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Amoco
Structural Design firm:	Earl & Wright/McDermott
Fabrication yard (structure):	Kaiser Steel in Oakland, California
Installation year and contractor:	1965; McDermott
Water depth (at MLLW):	77 feet
Number and diameter of legs:	Four legs; 14 feet diameter
Number, size and penetration of piling:	Eight piles per leg; 30 inch diameter; 87 feet penetration
Number, size and penetration of inner piling:	None
Method of installation (driven, drilled, combination):	Combination
Length of grouted interval in legs:	137 feet
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	Leg 1: 8 wells Leg 2: 8 wells Leg 3: 7 wells Leg 4: 7 wells
Top girders storage tank liquid & capacity:	Crude Oil (A-T-0160, A-T-0170): 105,000 gal Power Oil (A-T-0220): 96,600 gal Produced Water (A-T-0310, A-T-0320): 25,200 gal Diesel Storage (A-T-0850): 105,000 gal Potable Water (A-T-3070): 50,4000 gal
Design criteria	
Ice thickness and strength:	Front legs 120 kips/ft. of diameter, back legs 50 kips/ft.
Wave height and period:	30 feet with 9 second period
Wind:	80 mph above elevation 25 feet
Earthquake:	0.1 seismic ground motion
Current:	3900 kips per leg impact load, seismic, ice and current loads applied simultaneously
Other Considerations:	Shadow effect
Unusual circumstances during installation:	None

Significant modification or damage to topsides:	Minor module additions. Damaged structural members requiring engineering evaluation, moderate general/local corrosion, extreme general corrosion on electrical connections and boxes, unsecured drums, valves, racks, chemical totes, ladders, piping and dunnage. Last inspected: 3/13
Significant structural damage incidents:	Crack in top portion of weld connecting the west end of the center horizontal to the west horizontal (spans 7" and total length of 10"). Inspected in 2008 and 2011 with no signs of change in it's condition.
Platform structural design reassessment company & year:	2001 – Hopper Elmore and Associates
Type of steel used	
Above water:	Low temp steel (50 ksi)
Below water:	50 MV steel (50 ksi)
Steel corrosion allowance:	A-36 Steel corrosion wrap through tidal zone: 40' x 1/2"
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	Summer 2008 & Summer 2011 (Combined), Global Diving and Salvage carried out a scheduled Level 2 and Level 3 inspection.



## Platform Anna

1. Field name: ..... Granite Point field
  2. Platform operator: ..... Unocal
  3. Platform owner(s): ..... Unocal
  4. Original operator: ..... Amoco
  5. Structural design firm: ..... Earl & Wright/McDermott
  6. Fabrication yard (structure): ..... Kaiser Steel in Oakland, California
  7. Installation year and contractor: ..... 1966; McDermott
  8. Waterdepth (at MLLW): ..... 77 feet
  9. Number and diameter of legs: ..... Four legs; 14 feet diameter
  10. Number, size and penetration of piling: ..... Eight piles per leg; 30 inch diameter; 87 feet penetration.
  11. Number, size and penetration of inner piling: ..... None
  12. Method of installation (driven, drilled, combination): ..... Combination
  13. Length of grouted interval in legs: ..... 137 feet
  14. Design codes used (UBC, AISC, API RP 2A, etc): ..... UBC, AISC
- 
15. Number of completed wells in each leg through piling: ..... Total of 26 wells, eight wells in three legs, two in one leg.
  16. Other completed wells in each leg: ..... None
  17. Top girders used as storage tanks? ..... Yes
  18. If so, what type of liquid: ..... Drill water, potable water, produced water, diesel oil, power oil, crude oil.
- 
19. Design criteria used:
    - (1) Ice thickness and strength: ..... Front legs 120 kips/ft of diameter, back legs 50 kips/ft
    - (2) Wave height and period: ..... 30 feet with 9 second period
    - (3) Wind: ..... 80 mph above elevation 25 feet
    - (4) Earthquake: ..... 0.1 g seismic ground motion
    - (5) Temperature: .....
    - (6) Other: ..... 3900 kips per leg impact load, seismic, ice and current loads applied simultaneously.
  20. Design considerations: ..... Shadow effect
- 
21. Unusual circumstances during installation? ..... None
  22. Significant modification or additions to topsides: ..... Sea King crane
  23. Any significant structural damage incidents? ..... Leg dents, ice damage due to a bad cement job. Grout replaced. Sixteen feet long sleeve installed in dented area all four legs. Sleeves grouted.
  24. Has platform structural design been re-assessed? ..... Yes, 1993, Global platform assessment, module support structure and quarters support frame.
  25. If so, by whom and for what reason: ..... Mc Dermott and ASCG; Chakachatna development (new rig) and evaluation of non-low temperature steel concerns.
- 
26. Type of steel used; above water and below water: ..... Low temperature steel above minus 8 feet; 50 MV steel below minus 8 feet.
  27. Steel corrosion allowance used: ..... 1/2 inch A-36 steel wear plate through tidal zone.
  28. Type of cathodic protection: ..... Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection: ..... 1993 - Level III; 1990 - Cathodic protection survey.
-



Platform Anna in the Granite Point field.

Installed 1966  
 Designed by Earl & Wright  
 Jacket Wt. 1515 tons  
 Deck Wt. 1200 tons

8 Piles per leg 30" dia.  
 Penetration 87'

Column & Beam Tank 14.0' dia.  
 Horizontal Brace 4' dia.  
 Vertical Diagonal Brace  
 4.5' dia. (85' slide)  
 4.0' dia. (70' slide)

Wave H = 30'  
 T = 9 sec

Seismic, Ice, and  
 Current Loads  
 Applied Simultaneously

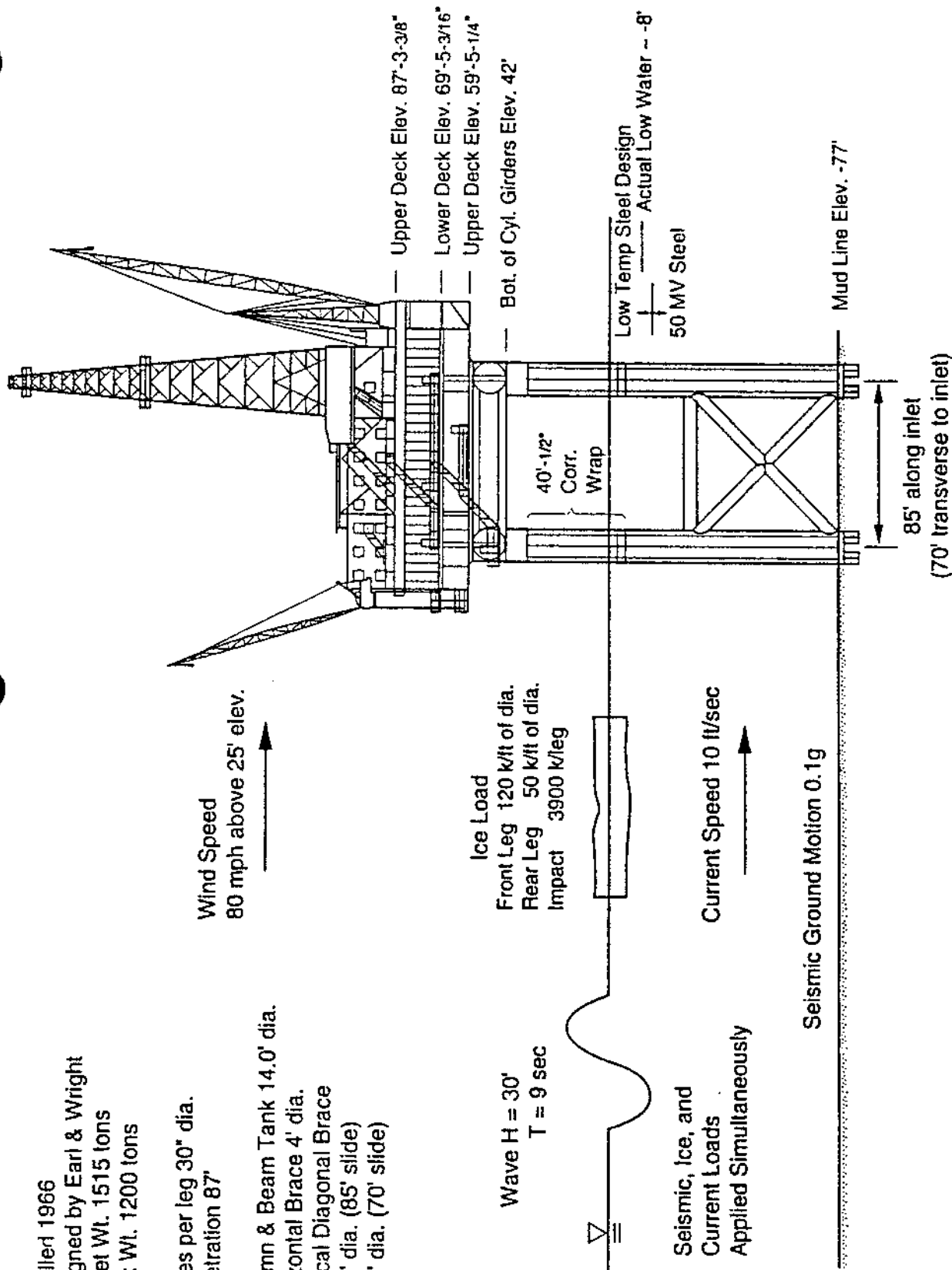
Wind Speed  
 80 mph above 25' elev.

Ice Load

Front Leg 120 k/ft of dia.  
 Rear Leg 50 k/ft of dia.  
 Impact 3900 k/leg

Current Speed 10 ft/sec

Seismic Ground Motion 0.1g



Elevation view and summary details of platform Anna.

# PLATFORM BRUCE

GRANITE POINT FIELD

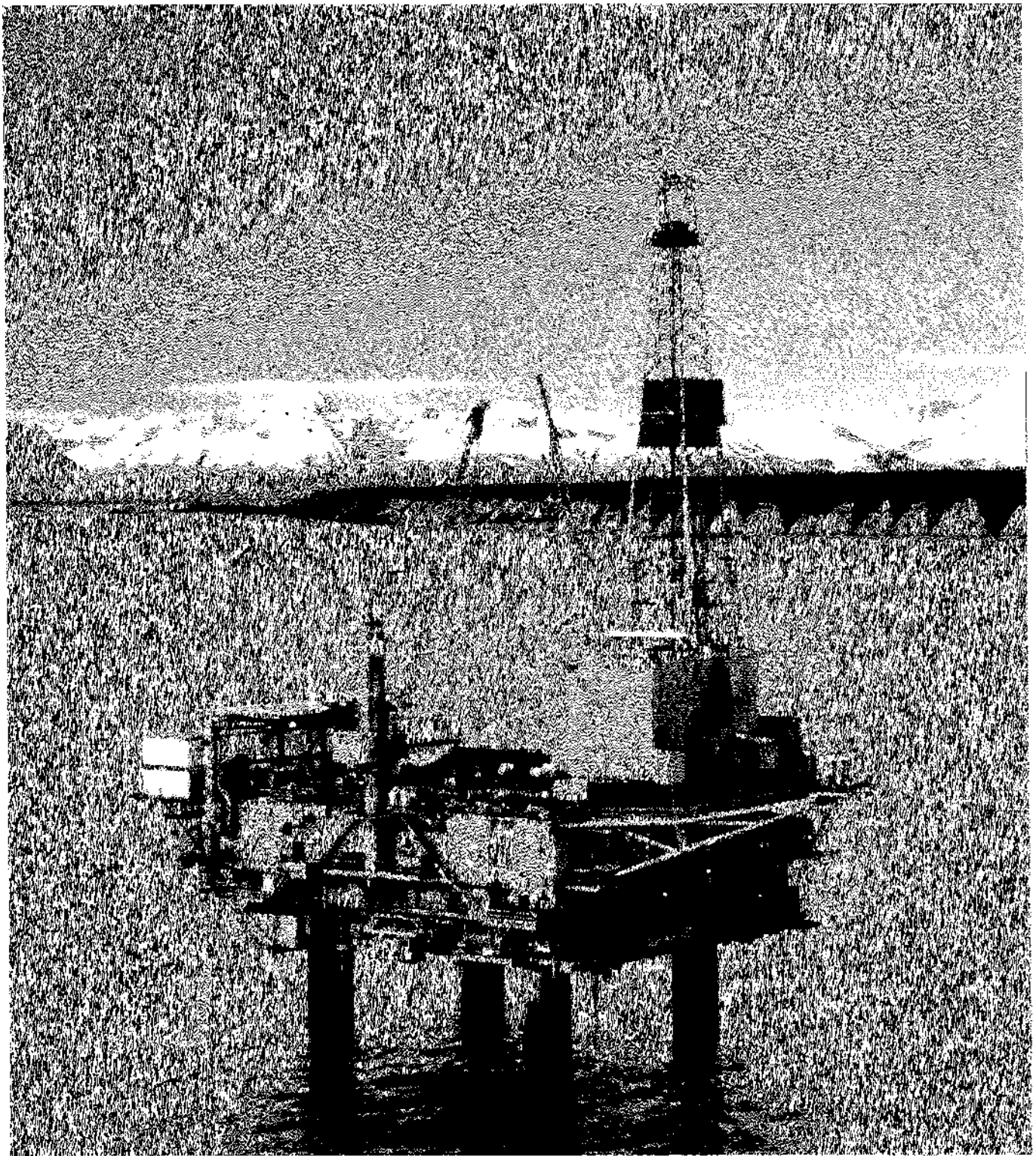
INSTALLED 1966

PLATFORM BRUCE	
2014 UPDATED INFORMATION	
Field Name:	Granite Point Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Amoco
Structural Design firm:	Earl & Wright/McDermott
Fabrication yard (structure):	Kaiser Steel in Oakland, California
Installation year and contractor:	1966; McDermott
Water depth (at MLLW):	62 feet
Number and diameter of legs:	Four legs; 14 feet diameter
Number, size and penetration of piling:	Eight piles per leg; 30 inch diameter; 65 feet penetration
Number, size and penetration of inner piling:	None
Method of installation (driven, drilled, combination):	Combination
Length of grouted interval in legs:	122 feet
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	Leg 1: 7 wells Leg 2: 1 well Leg 3: 7 wells Leg 4: 6 wells
Top girders storage tank liquid & capacity:	Crude Oil (U-T-0180, U-T-0190): 105,000 gal Produced Water (U-T-0240, U-T-0250): 26,250 gal Power Oil (U-T-0320): 184,800 gal Diesel Storage (U-T-0890): 105,000 gal
Design criteria	
Ice thickness and strength:	Front legs 120 k/ft. of diameter, back legs 50 k/ft.
Wave height and period:	30 feet with 9 second period
Wind:	80 mph above elevation 25 feet
Earthquake:	0.1 g seismic ground motion
Current:	3900 kips per leg impact load, seismic, ice and current load applied simultaneously
Other Considerations:	Shadow effect
Unusual circumstances during installation:	None

Significant modification or damage to topsides:	Minor module additions. Damaged structural members and removal of structural members, requiring engineering evaluation of structural integrity. Light to extreme local and general corrosion. Last inspected: 9/12
Significant structural damage incidents:	See above
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	A-537 Sheffield
Below water:	A-50
Steel corrosion allowance:	A-36 Steel corrosion wrap. 40' x 1/2"
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	July 2009, Global Offshore Divers carried out a scheduled Level 2 and 3 inspection.

## Platform Bruce

1. Field name: ..... Granite Point field
  2. Platform operator: ..... Unocal
  3. Platform owner(s): ..... Unocal
  4. Original operator: ..... Amoco
  5. Structural design firm: ..... Earl & Wright/McDermott
  6. Fabrication yard (structure): ..... Kaiser Steel in Oakland, California
  7. Installation year and contractor: ..... 1966; McDermott
  8. Waterdepth (at MLLW): ..... 62 feet
  9. Number and diameter of legs: ..... Four legs; 14 feet diameter
  10. Number, size and penetration of piling: ..... Eight piles per leg; 30 inch diameter; 65 feet penetration.
  11. Number, size and penetration of inner piling: ..... None
  12. Method of installation (driven, drilled, combination): ..... Combination
  13. Length of grouted interval in legs: ..... 122 feet
  14. Design codes used (UBC, AISC, API RP 2A, etc): ..... UBC, AISC
- 
15. Number of completed wells in each leg through piling: ..... Leg 1 - 5 wells; Leg 2 - 1 well;  
Leg 3 - 7 wells; Leg 4 - 5 wells.
  16. Other completed wells in each leg: ..... None
  17. Top girders used as storage tanks ? ..... Yes
  18. If so, what type of liquid: ..... Drill water, potable water, produced water, diesel oil,  
power oil, crude oil.
- 
19. Design criteria used:
    - (1) Ice thickness and strength: ..... Front legs 120 kips/ft of diameter, back legs 50 kips/ft
    - (2) Wave height and period: ..... 30 feet with 9 second period
    - (3) Wind: ..... 80 mph above elevation 25 feet
    - (4) Earthquake: ..... 0.1 g seismic ground motion
    - (5) Temperature: .....
    - (6) Other: ..... 3900 kips per leg impact load, seismic, ice and current  
loads applied simultaneously.
  20. Design considerations: ..... Shadow effect
- 
21. Unusual circumstances during installation ? ..... None
  22. Significant modification or additions to topsides: ..... Sea King crane
  23. Any significant structural damage incidents ? ..... None
  24. Has platform structural design been re-assessed ? ..... Yes, 1993; Quarters support frame.
  25. If so, by whom and for what reason: ..... McDermott; evaluation of non-low temperature steel  
concerns.
- 
26. Type of steel used; above water and below water: ..... A-537 Sheffield above water; A-50 below water.
  27. Steel corrosion allowance used: ..... 1/2 inch A-36 wear plate in tidal zone.
  28. Type of cathodic protection: ..... Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection: ..... Annual - Cathodic protection surveys; 1987 - scour and  
corrosion survey.
-



Platform Bruce in the Granite Point field.



Installed 1966  
 Designed by Earl & Wright  
 Jacket Wt. 1415 tons  
 Deck Wt. 1200 tons

8 Piles per leg 30" dia.  
 Penetration 65'

Column & Beam Tank 14.0' dia.  
 Horizontal Brace 4' dia.  
 Vertical Diagonal Brace  
 4.5' dia. (85' slide)  
 4.0' dia. (70' slide)

Wind Speed  
 80 mph above 25' elev.

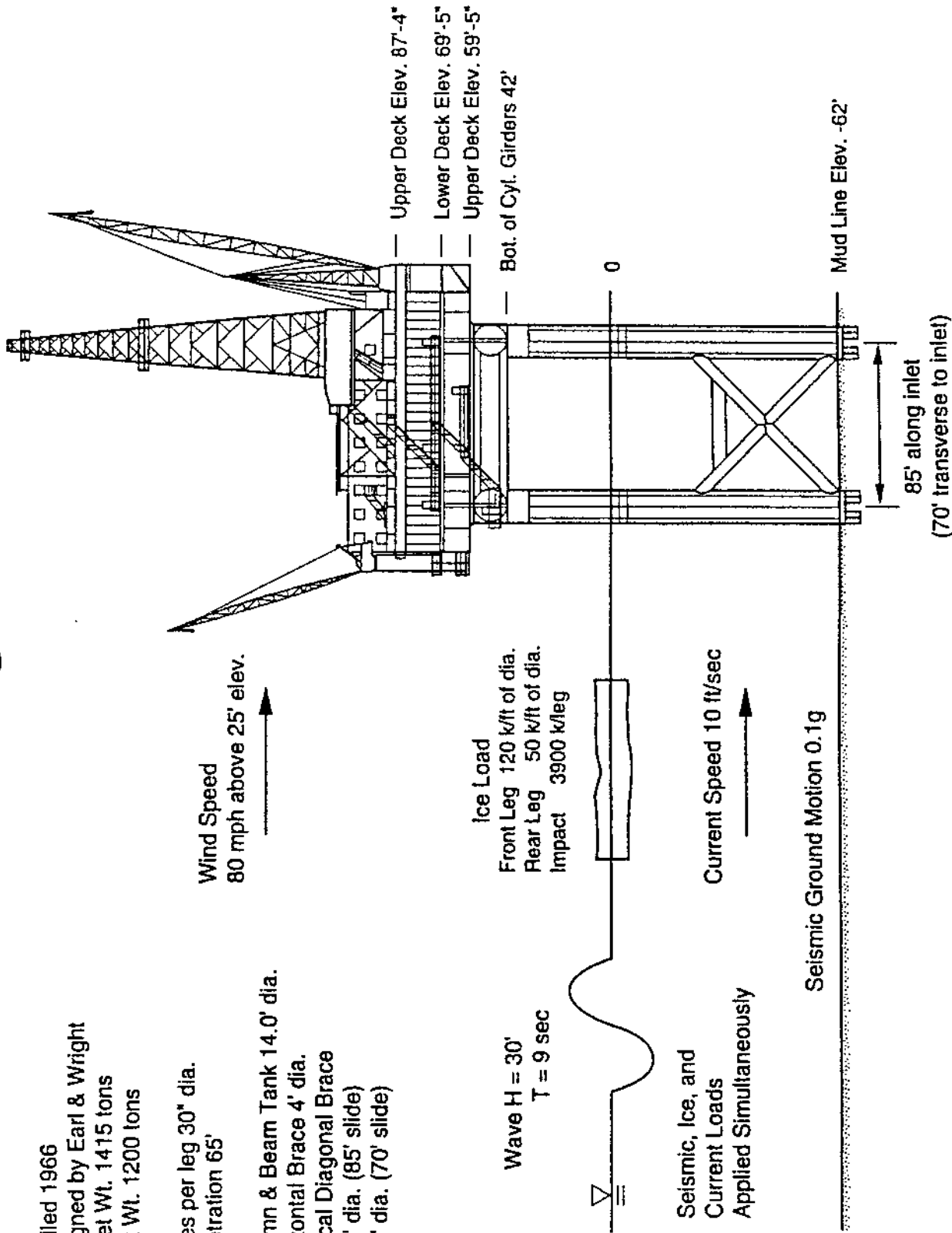
Wave H = 30'  
 T = 9 sec

Ice Load  
 Front Leg 120 k/ft of dia.  
 Rear Leg 50 k/ft of dia.  
 Impact 3900 k/leg

Seismic, Ice, and  
 Current Loads  
 Applied Simultaneously

Current Speed 10 ft/sec

Seismic Ground Motion 0.1g



Elevation view and summary details of platform Bruce.

# PLATFORM DILLON

MIDDLE GROUND SHOAL FIELD

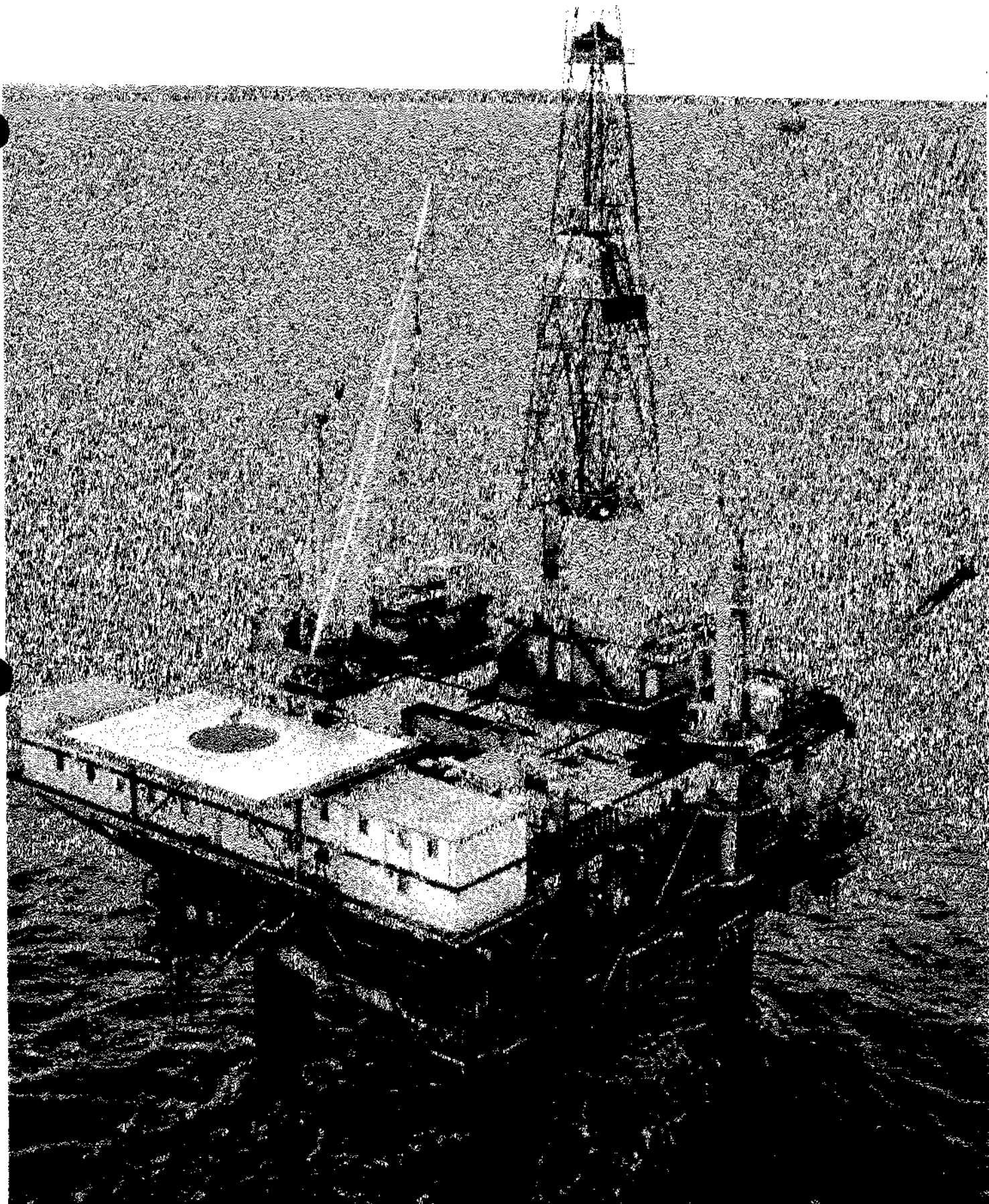
INSTALLED 1966

PLATFORM DILLON	
2014 UPDATED INFORMATION	
Field Name:	Middle Ground Shoal Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Amoco
Structural Design firm:	Earl & Wright/McDermott
Fabrication yard (structure):	Kaiser Steel in Oakland, California
Installation year and contractor:	1966; McDermott
Water depth (at MLLW):	92 feet
Number and diameter of legs:	Four legs; 14 feet diameter
Number, size and penetration of piling:	Eight piles per leg; 30 inch diameter; 88 feet penetration
Number, size and penetration of inner piling:	None
Method of installation (driven, drilled, combination):	Combination
Length of grouted interval in legs:	152 feet
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	Leg 1: 5 wells Leg 2: 7 wells Leg 3: 0 well Leg 4: 5 wells
Top girders storage tank liquid & capacity:	Diesel Storage (D-T-0140): 105,000 gal Power Oil (D-T-0160): 184,800 gal Crude Oil (D-T-0240, D-T-0250): 105,000 gal Produced Water (D-T-0600, D-T-0620): 25,200 gal
Design criteria	
Ice thickness and strength:	Front legs 120 kips/ft. of diameter, back legs 50 kips/ft.
Wave height and period:	30 feet with 9 second period
Wind:	80 mph above elevation 25 feet
Earthquake:	0.1 seismic ground motion
Current:	3900 kips per leg impact load, seismic, ice and current loads applied simultaneously
Other Considerations:	Shadow effect
Unusual circumstances during installation:	None

Significant modification or damage to topsides:	Minor module additions. Damaged structural members and removal of structural members, requiring engineering evaluation of structural integrity. Light to extreme general and localized corrosion. Loose bolts/studs, missing sections of grating. Last inspected: 9/12
Significant structural damage incidents:	See above
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	50 MV Steel (50 ksi)
Below water:	50 MV Steel (50 ksi)
Steel corrosion allowance:	A-36 Steel corrosion wrap. 40' x 1/2"
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	May 2006, Offshore Divers carried out a scheduled API Level 2 and 3 inspection.

## Platform Dillon

1. Field name: .....Middle Ground Shoal field
  2. Platform operator: .....Unocal
  3. Platform owner(s): .....Unocal
  4. Original operator: .....Amoco
  5. Structural design firm: .....Earl & Wright/McDermott
  6. Fabrication yard (structure): .....Kaiser Steel in Oakland, California
  7. Installation year and contractor: .....1966; McDermott
  8. Waterdepth (at MLLW): .....92 feet
  9. Number and diameter of legs: .....Four legs; 14 feet diameter
  10. Number, size and penetration of piling: .....Eight piles per leg; 30 inch diameter; 88 feet penetration.
  11. Number, size and penetration of inner piling: .....None
  12. Method of installation (driven, drilled, combination): .....Combination
  13. Length of grouted interval in legs: .....152 feet
  14. Design codes used (UBC, AISC, API RP 2A, etc): .....UBC, AISC
- 
15. Number of completed wells in each leg through piling: .....Eleven total wells in two legs
  16. Other completed wells in each leg: .....None
  17. Top girders used as storage tanks ? .....Yes
  18. If so, what type of liquid: .....Drill water, potable water, produced water, diesel oil, power oil, crude oil.
- 
19. Design criteria used:
    - (1) Ice thickness and strength: .....Front legs 120 kips/ft of diameter, back legs 50 kips/ft
    - (2) Wave height and period: .....30 feet with 9 second period
    - (3) Wind: .....80 mph above elevation 25 feet
    - (4) Earthquake: .....0.1 g seismic ground motion
    - (5) Temperature: .....
    - (6) Other: .....3900 kips per leg impact load, seismic, ice and current loads applied simultaneously.
  20. Design considerations: .....Shadow effect
- 
21. Unusual circumstances during installation ? .....Decks were lost en-route. Replaced following year
  22. Significant modification or additions to topsides: .....Sea King crane
  23. Any significant structural damage incidents ? .....One dent found; poor grout job which was corrected.
  24. Has platform structural design been re-assessed ? .....Yes, 1993; Quarters support frame.
  25. If so, by whom and for what reason: .....McDermott; evaluation of non-low temperature steel concerns.
- 
26. Type of steel used; above water and below water: .....A-537 Sheffield above water; 50 MV below water.
  27. Steel corrosion allowance used: .....An 1/2 inch thick A-36 wear plate in the tidal zone.
  28. Type of cathodic protection: .....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection: .....1993 - Level III; 1990 - Cathodic protection survey.
-



Platform Dillon in the Middle Ground Shoal field.

Installed 1967  
 Designed by Earl & Wright  
 Jacket Wt. 1585 tons  
 Deck Wt. 1200 tons

8 Piles per leg 30" dia.  
 Penetration 88'

Leg dia. 14.0'

Wind Speed  
 80 mph above 25' elev.

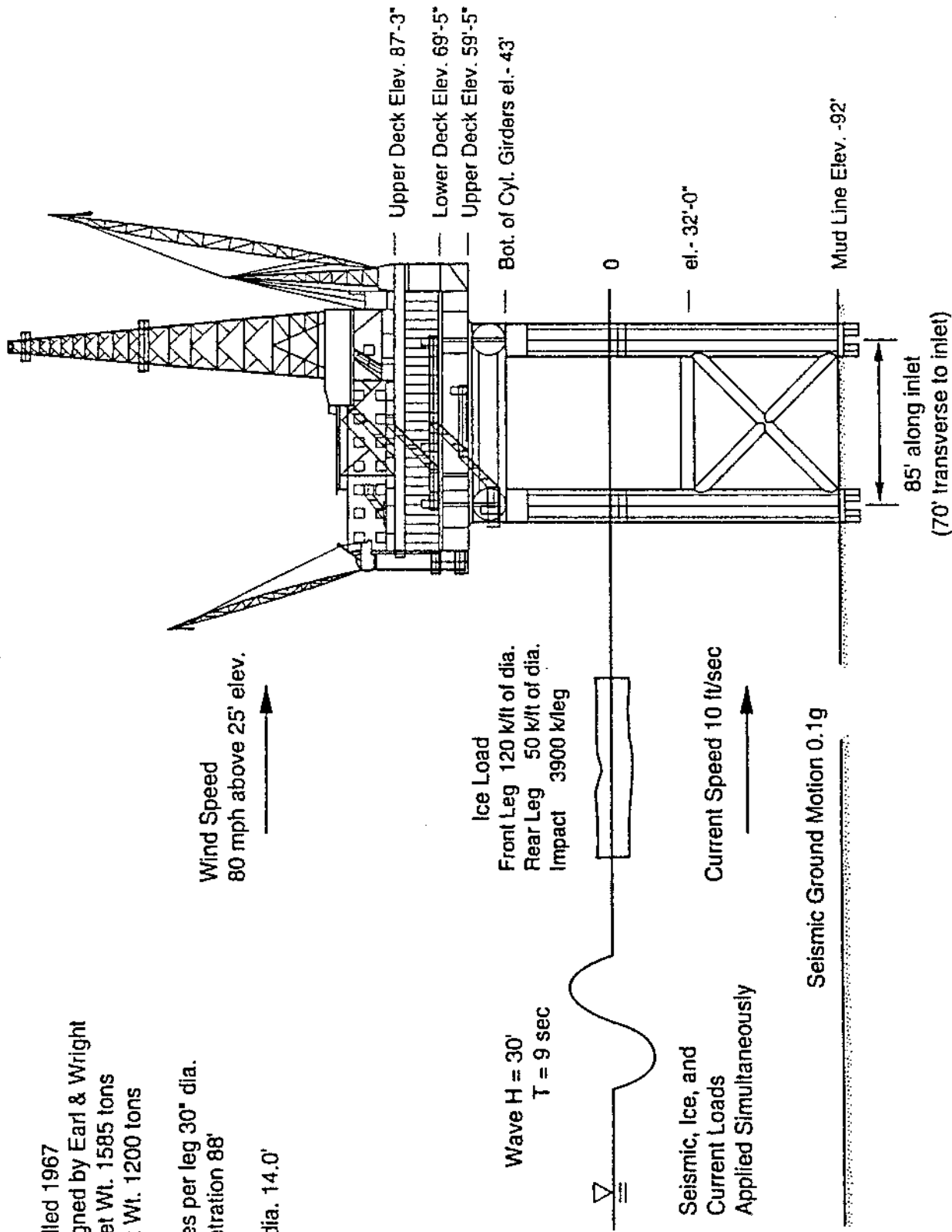
Ice Load  
 Front Leg 120 k/ft of dia.  
 Rear Leg 50 k/ft of dia.  
 Impact 3900 k/leg

Wave H = 30'  
 T = 9 sec

Seismic, Ice, and  
 Current Loads  
 Applied Simultaneously

Current Speed 10 ft/sec

Seismic Ground Motion 0.1g



Elevation view and summary details of platform Dillon.

# PLATFORM C

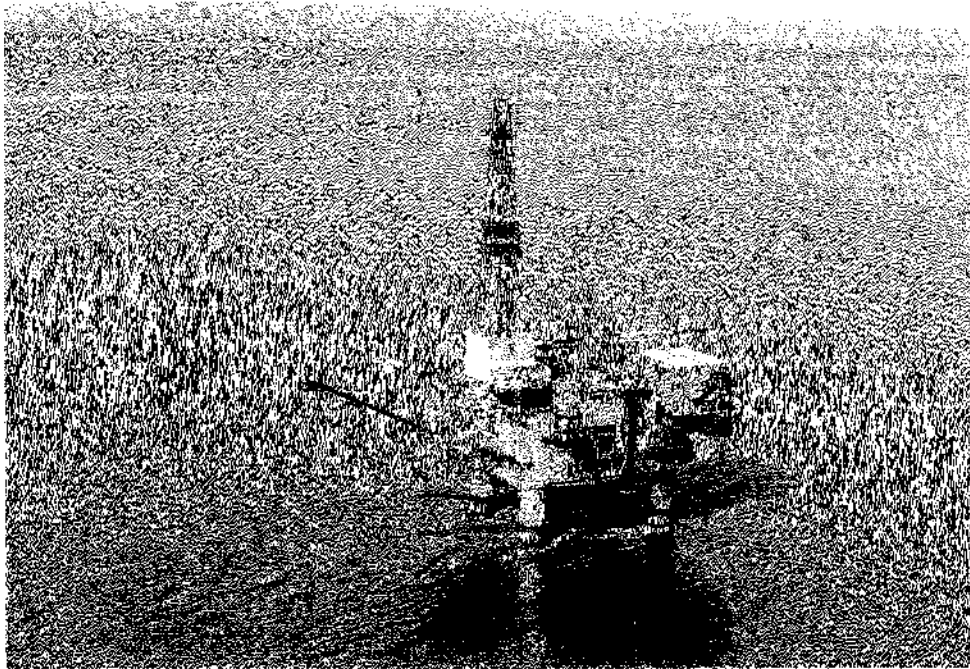
MIDDLE GROUND SHOAL FIELD

INSTALLED 1967

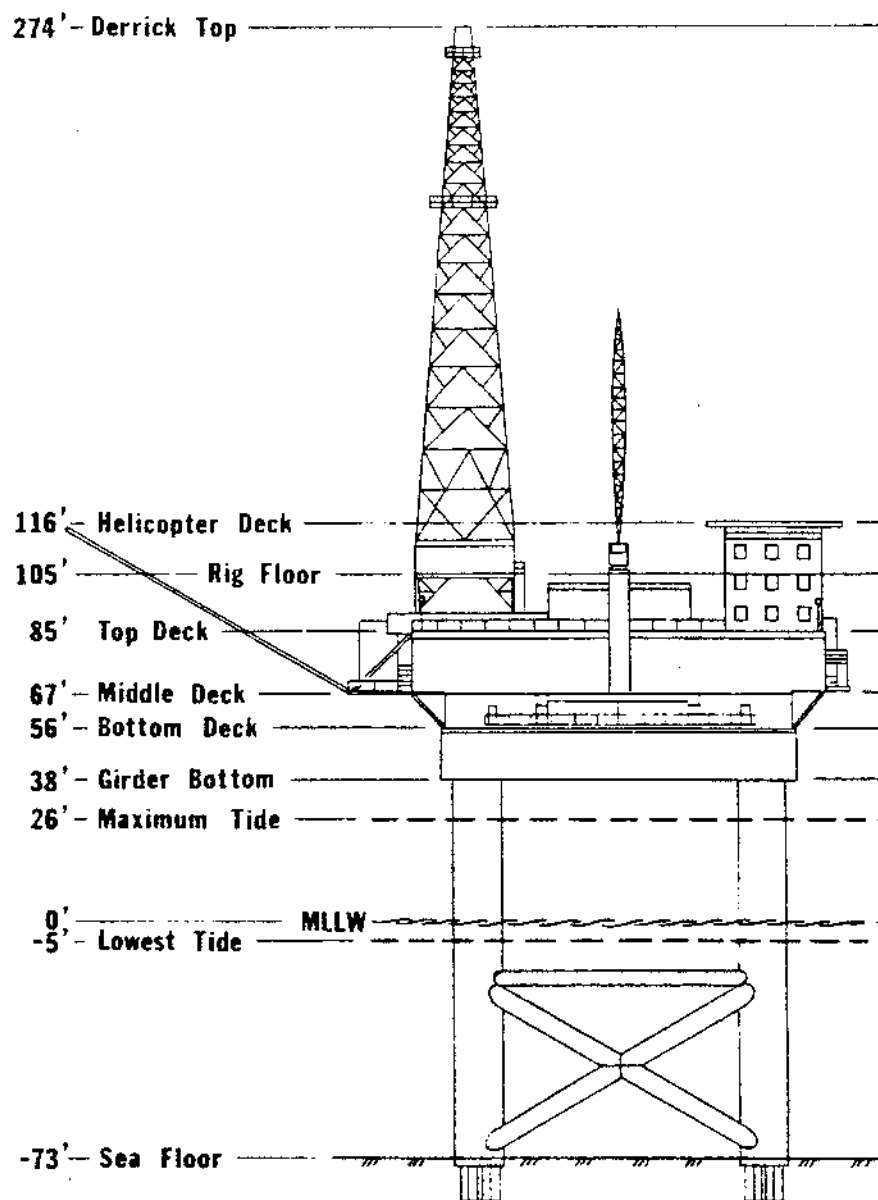


## MGS Platform C

1. Field name: .....Middle Ground Shoal field
  2. Platform operator: .....Shell Western E&P Inc.
  3. Platform owners: .....Shell Western E&P Inc.
  4. Original operator: .....Shell
  5. Structural design firm: .....Earl & Wright
  6. Fabrication yard (structure): .....Kaiser Steel in Oakland, CA
  7. Installation year and contractor: .....1967, McDermott
  8. Waterdepth (at MLLW): .....73 feet
  9. Number and diameter of legs: .....Four - 15.5 feet
  10. Number, size and penetration of piling: .....Thirty two 36-inch to minus 100 feet
  11. Number, size and penetration of inner piling: .....Thirty two 24-inch to minus 190 feet
  12. Method of installation (driven, drilled, combination): .....36-inch driven, 24-inch drilled
  13. Length of grouted interval in legs: .....Bottom to top
  14. Design codes used (UBC, AISC, API RP 2A, etc): .....AISC; Zone 3 UBC (1964)
- 
15. Number of completed wells in each leg through piling: .....Eight wells in each of legs 1, 2 and 3
  16. Other completed wells in each leg: .....None
  17. Top girders used as storage tanks? .....Yes
  18. If so, what type of liquid: .....Diesel fuel
- 
19. Design criteria used:
    - (1) Ice thickness and strength: .....42 inch; 300 psi
    - (2) Wave height and period: .....28 feet with 8.5 second period
    - (3) Wind: .....65 mph with 100 mph gusts
    - (4) Earthquake: .....0.06 g per UBC 1964
    - (5) Temperature: .....Minus 40° F above water, plus 28° F below water
    - (6) Current: .....12 feet per second
  20. Design considerations: .....20 year design life
- 
21. Unusual circumstances during installation? .....None
  22. Significant modification or additions to topsides: .....Installed 40 x 30 foot gas compressor cantilever and 8 x 20 radiator cantilever in early 1970's.
  23. Any significant structural damage incidents? .....None
  24. Has platform structural design been re-assessed? .....No
  25. If so, by whom and for what reason: .....
- 
26. Type of steel used; above water and below water: .....ASTM A-537 Grade A and B where low temperature steel required. A-36 and A-441 elsewhere.
  27. Steel corrosion allowance used: .....0.7 inch
  28. Type of cathodic protection: .....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection: .....Level II in 1978 and 1983; Level III in 1988
-



Platform "C" in the Middle Ground Shoal field.



Elevation view of MGS platform C.

# PLATFORM KING SALMON

McARTHUR RIVER FIELD

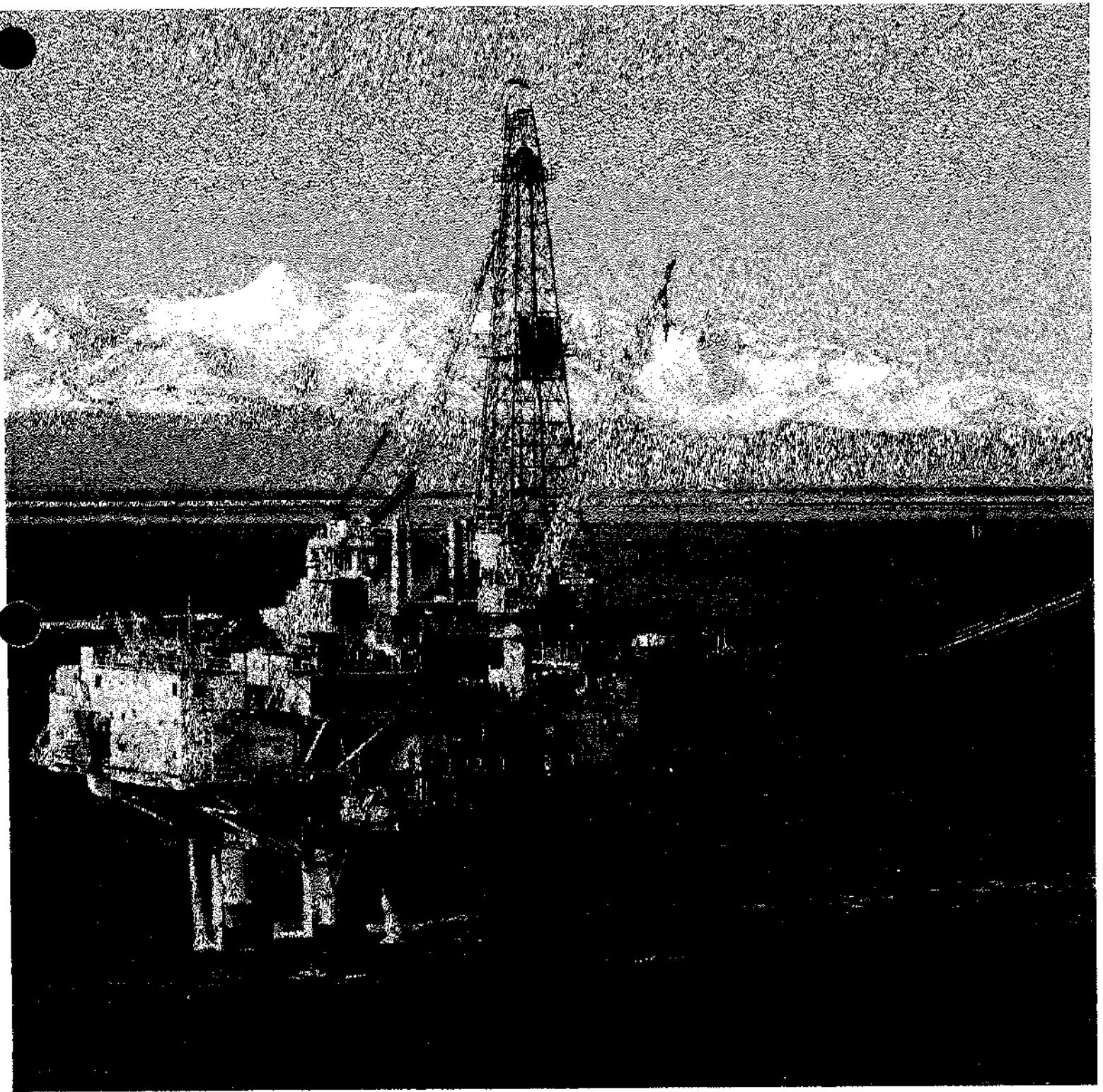
INSTALLED 1967

PLATFORM KING SALMON	
2014 UPDATED INFORMATION	
Field Name:	McArthur River Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Arco
Structural Design firm:	Earl & Wright
Fabrication yard (structure):	Kaiser Steel in Oakland, California
Installation year and contractor:	1967; McDermott
Water depth (at MLLW):	73 feet
Number and diameter of legs:	Four legs; 15.5 feet
Number, size and penetration of piling:	Eight piles per leg; 36 inch diameter; 100 feet penetration; 33 inch sleeves near mudline
Number, size and penetration of inner piling:	Eight per leg; 24 inch diameter; 260 feet penetration
Method of installation (driven, drilled, combination):	Combination
Length of grouted interval in legs:	128 feet
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	Leg 1: 8 wells Leg 2: 8 wells Leg 3: 0 wells Leg 4: 8 wells
Top girders storage tank liquid & capacity:	Produced Water (L-T-0160): 16,800 gal Crude Oil (L-T-0170): 29,400 gal Crude Oil (L-T-0180, L-T-0180A, L-T-0180B): 31,248 gal Waste Oil (L-T-0190): 15,540 gal Diesel (L-T-1750): 99,960 gal Diesel (L-T-1830): 3,192 gal Potable Water (L-T-2010, L-T-2020): 21,000 gal
Design criteria	
Ice thickness and strength:	42 inch; 300 psi
Wave height and period:	28 feet with 8.5 second period
Wind:	65 mph with 100 mph gusts
Earthquake:	0.06 g per UBC 1964
Temperature:	Minus 40° F above water, plus 28° F below water
Current:	12 feet per second

Other Considerations:	20 year design life
Unusual circumstances during installation:	None
Significant modification or damage to topsides:	Minor module additions. Damaged structural members, non-typical configuration and missing joints, and deflections in the plate girders, all requiring engineering evaluation of structural integrity. Light to extreme general and localized corrosion. Last inspected: 11/12
Significant structural damage incidents:	See above
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	A-537 Grade A (above Elev -25)
Below water:	A-537 Grade B (below Elev -25)
Steel corrosion allowance:	0.7" of extra wall thickness in the tidal zone. 40' x 1/2"
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	July, October and November 2007, Offshore Divers carried out a scheduled API Level 2 and 3 inspection.

## Platform King Salmon

1. Field name: .....McArthur River field
  2. Platform operator: .....Unocal
  3. Platform owner(s): .....Unocal & Marathon
  4. Original operator: .....Arco
  5. Structural design firm: .....Earl & Wright
  6. Fabrication yard (structure): .....Kaiser Steel in Oakland, CA
  7. Installation year and contractor: .....1967; McDermott
  8. Waterdepth (at MLLW): .....73 feet
  9. Number and diameter of legs: .....Four legs; 15.5 feet
  10. Number, size and penetration of piling: .....Eight piles per leg; 36 inch diameter; 100 feet penetration;  
33 inch sleeves near mudline.
  11. Number, size and penetration of inner piling: .....Eight per leg; 24 inch diameter; 260 feet penetration.
  12. Method of installation (driven, drilled, combination): .....Combination
  13. Length of grouted interval in legs: .....128 feet
  14. Design codes used (UBC, AISC, API RP 2A, etc): .....UBC, AISC
- 
15. Number of completed wells in each leg through piling: .....Eight wells each in Legs 1, 2 and 4. None in Leg 3.
  16. Other completed wells in each leg: .....None
  17. Top girders used as storage tanks ? .....Yes
  18. If so, what type of liquid: .....Drill water, diesel fuel, crude oil, drain water.
- 
19. Design criteria used:
    - (1) Ice thickness and strength: .....42 inch; 300 psi
    - (2) Wave height and period: .....28 feet with 8.5 second period
    - (3) Wind: .....65 mph with 100 mph gusts
    - (4) Earthquake: .....0.06 g per UBC 1964
    - (5) Temperature: .....Minus 40° F above water, plus 28° F below water
    - (6) Current: .....12 feet per second
  20. Design considerations: .....20 year design life
- 
21. Unusual circumstances during installation ? .....None
  22. Significant modification or additions to topsides: .....Added waterflood and compressors
  23. Any significant structural damage incidents ? .....Explosion on April 8, 1976 in sub-deck required floor  
replacement and plate girder repair.
  24. Has platform structural design been re-assessed ? .....No
  25. If so, by whom and for what reason: .....
- 
26. Type of steel used; above water and below water: .....ASTM A-537 Grade A and B where low temperature steel  
required. A-36 and A-441 elsewhere.
  27. Steel corrosion allowance used: .....0.7 inch
  28. Type of cathodic protection: .....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection: .....1985 - Cathodic protection survey; 1984 - Scour survey.
-



Platform King Salmon in the McArthur River field.



Designed by Earl & Wright in 1967

Jacket Wt. 1585 tons

Deck Wt. 1200 tons

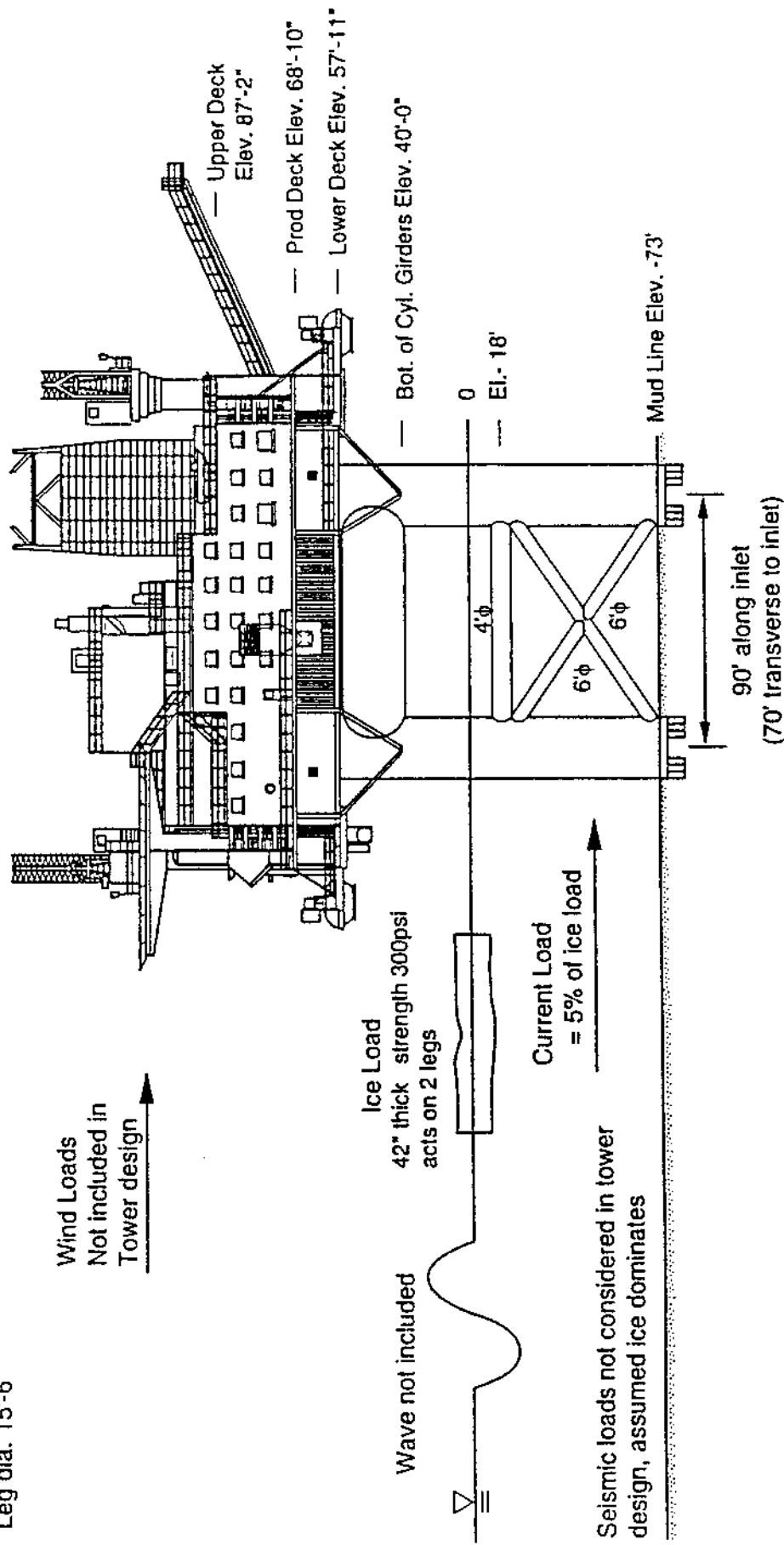
8 Piles per leg 36" dia.

Penetration 100'

33" x 30.5" sleeves (near mudline)

24" insert pile 260' penetration

Leg dia. 15'-6"



Elevation view and summary details of platform King Salmon.

# PLATFORM GRAYLING

McARTHUR RIVER FIELD

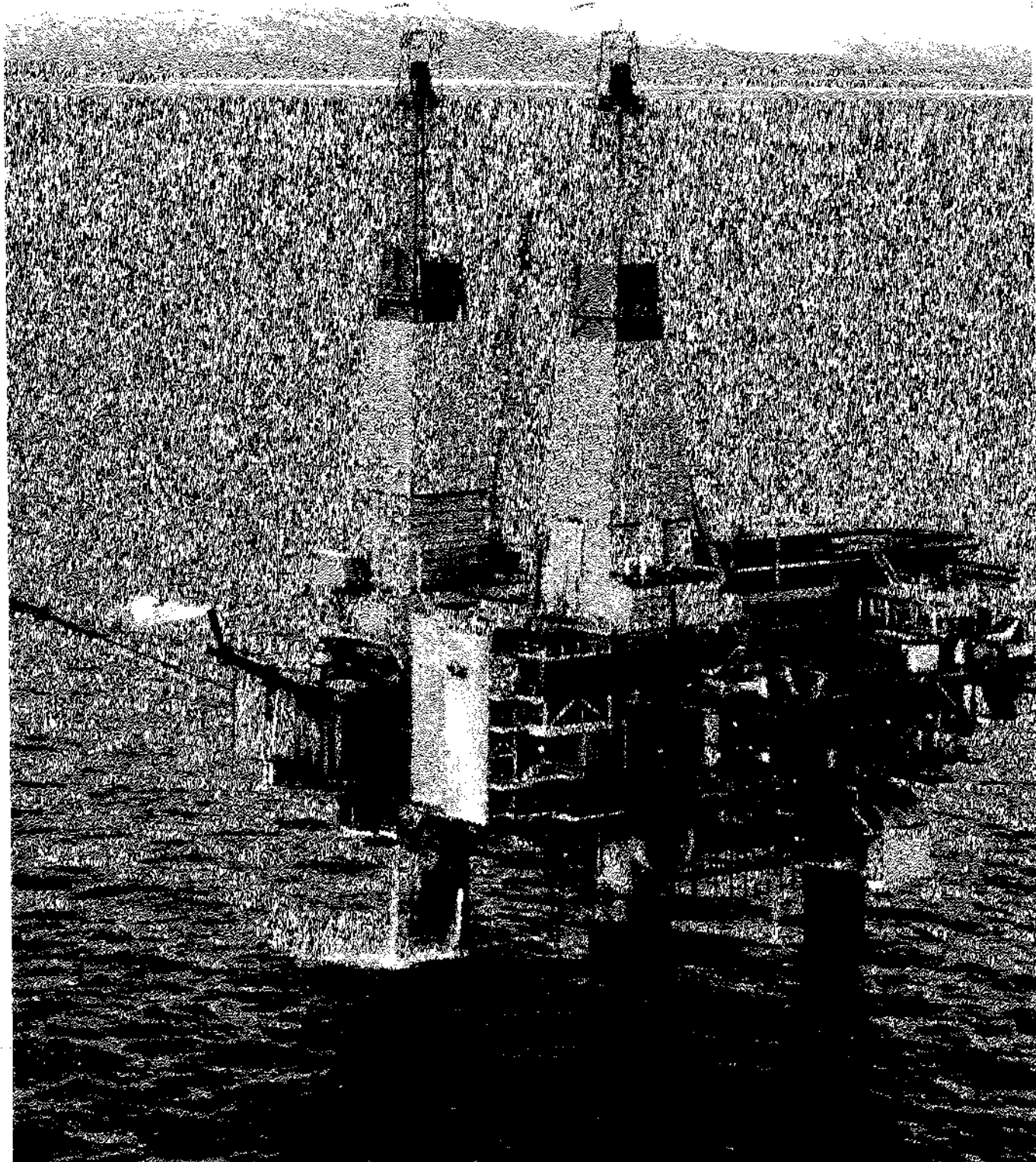
INSTALLED 1967

PLATFORM GRAYLING	
2014 UPDATED INFORMATION	
Field Name:	McArthur River Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Unocal
Structural Design firm:	Brown & Root
Fabrication yard (structure):	American Pipe & Construction, Vancouver, Washington
Installation year and contractor:	1967; Brown & Root
Water depth (at MLLW):	125 feet
Number and diameter of legs:	Four legs; 17 feet diameter
Number, size and penetration of piling:	Twelve piles per leg; 33 inch diameter; driven to 70 feet
Number, size and penetration of inner piling:	Twelve piles per leg; 26 inch diameter; driven to 130 feet. Leg 1 has 20 inch inner piles to 190 feet.
Method of installation (driven, drilled, combination):	Combination
Length of grouted interval in legs:	192 feet
Design codes used (UBC, AISC, API RP 2A, etc.)	UBC, AISC
Number of completed wells in each leg:	Leg 1: 1 well Leg 2: 12 wells Leg 3: 12 wells Leg 4: 12 wells
Top girders storage tank liquid & capacity:	Potable Water Crude Oil (G-T-0380A, G-T-0380B): 21,000 gal Waste Water (G-T-0720) Waste Oil (G-T-0760) Diesel Storage (G-T-3090): 106,974 gal
Design criteria	
Ice thickness and strength:	Front legs 260 kips/ft. of diameter, back legs 160 kips/ft.
Wave height and period:	28 feet with 8.5 second period
Wind:	100 mph
Earthquake:	0.1 g seismic ground motion
Temperature:	Minus 15° F to plus 70° F
Current:	
Other Considerations:	

Unusual circumstances during installation:	Yes, tower leak required to repair
Significant modification or damage to topsides:	Minor module additions. Damaged structural members and structural member removal, requiring engineering evaluation of structural integrity. Light to extreme general and local corrosion issues. Last inspected: 5/12
Significant structural damage incidents:	See above
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	A-537
Below water:	A-36
Steel corrosion allowance:	1/2 inch corrosion wrap through tidal zone. 40' x 1/2" + ice breakers
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	July and August 2008, Offshore Divers carried out a scheduled API Level 2 and 3 inspection.

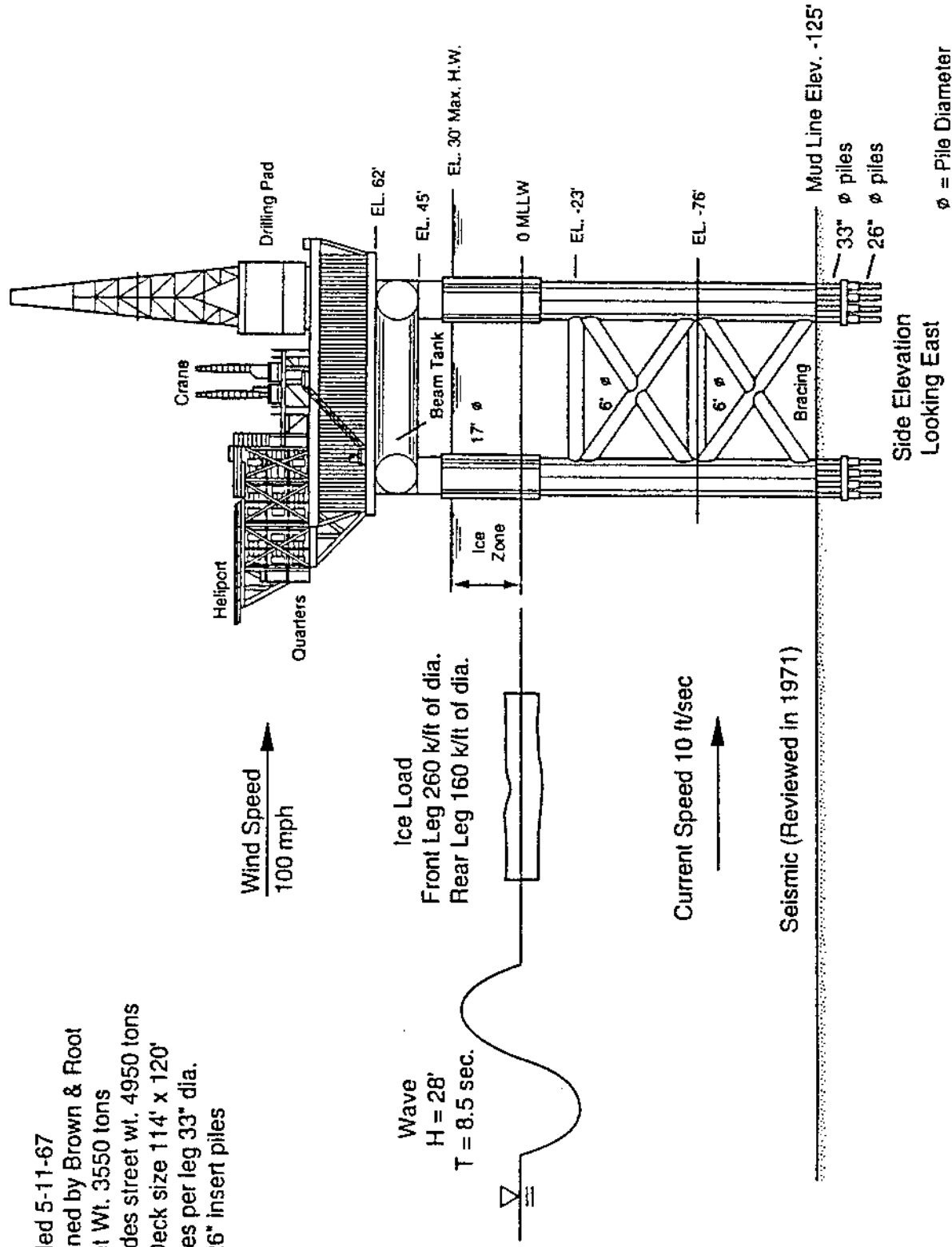
## Platform Grayling

1. Field name: .....McArthur River field
  2. Platform operator: .....Unocal
  3. Platform owner(s): .....Unocal & Marathon
  4. Original operator: .....Unocal
  5. Structural design firm: .....Brown & Root
  6. Fabrication yard (structure): .....American Pipe & Construction, Vancouver, Washington
  7. Installation year and contractor: .....1967; Brown & Root
  8. Waterdepth (at MLLW): .....125 feet
  9. Number and diameter of legs: .....Four legs; 17 feet diameter
  10. Number, size and penetration of piling: .....Twelve piles per leg; 33 inch diameter; driven to 70 feet
  11. Number, size and penetration of inner piling: .....Twelve piles per leg; 26 inch diameter; driven to 130 feet  
Leg 1 has 20 inch inner piles to 190 feet
  12. Method of installation (driven, drilled, combination): .....Combination
  13. Length of grouted interval in legs: .....192 feet
  14. Design codes used (UBC, AISC, API RP 2A, etc): .....UBC, AISC
- 
15. Number of completed wells in each leg through piling: .....Twelve wells in legs 2, 3 and 4. One well in leg 1.
  16. Other completed wells in each leg: .....None
  17. Top girders used as storage tanks ? .....Yes
  18. If so, what type of liquid: .....Potable water; drill water; Cook Inlet water; diesel fuel; crude oil.
- 
19. Design criteria used:
    - (1) Ice thickness and strength: .....Front legs 260 kips/ft of diameter, back legs 160 kips/ft
    - (2) Wave height and period: .....28 feet with 8.5 second period
    - (3) Wind: .....100 mph
    - (4) Earthquake: .....0.1 g seismic ground motion
    - (5) Temperature: .....Minus 15° F to plus 70° F.
    - (6) Other: .....
  20. Design considerations:
- 
21. Unusual circumstances during installation ? .....Yes, tower leak required repair prior to upending.
  22. Significant modification or additions to topsides: .....Four cantilevers increased deck space by one third.
  23. Any significant structural damage incidents ? .....Blowout underneath leg 1 in 1985.
  24. Has platform structural design been re-assessed ? .....Yes
  25. If so, by whom and for what reason: .....PMB, 1989; Bea, 1990; Requalification, confirm blowout repair adequacy.  
Reference: 1992 OTC paper 6935
- 
26. Type of steel used; above water and below water: .....Above water A-537; below water A-36
  27. Steel corrosion allowance used: .....½ inch corrosion wrap through tidal zone
  28. Type of cathodic protection: .....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection: .....1990 - Level II and III.
-



Platform Grayling in the McArthur River field.

Installed 5-11-67  
 Designed by Brown & Root  
 Jacket Wt. 3550 tons  
 Topsides street wt. 4950 tons  
 Drill Deck size 114' x 120'  
 12 Piles per leg 33" dia.  
 with 26" insert piles



Elevation view and summary details of platform Grayling.

# PLATFORM DOLLY VARDEN

McARTHUR RIVER FIELD

INSTALLED 1967

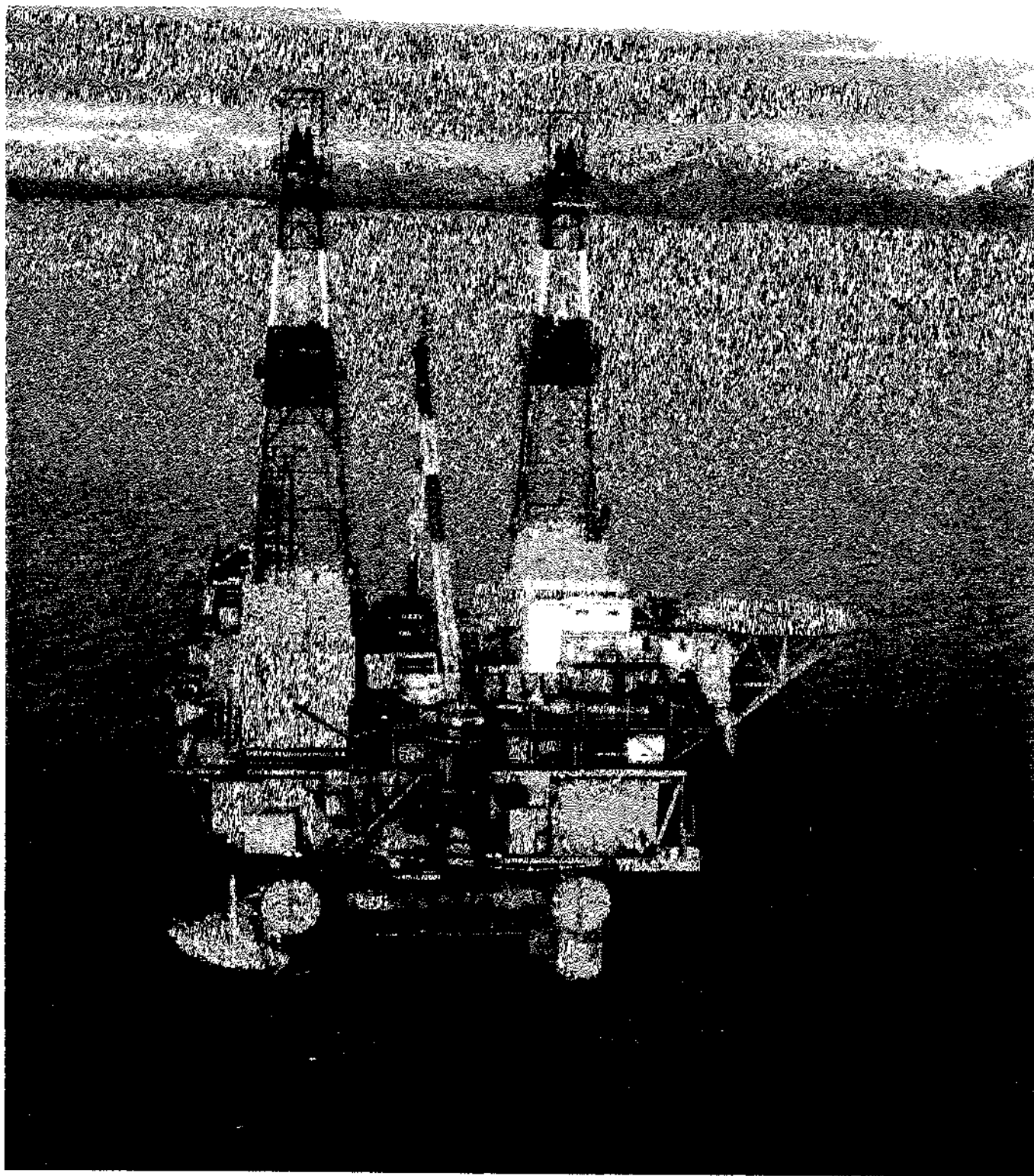


PLATFORM DOLLY VARDEN	
2014 UPDATED INFORMATION	
Field Name:	McArthur River Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Marathon
Structural Design firm:	McDermott
Fabrication yard (structure):	American Pipe & Construction, Vancouver, Washington
Installation year and contractor:	1967; McDermott
Water depth (at MLLW):	112 feet
Number and diameter of legs:	Four; 17 feet diameter
Number, size and penetration of piling:	Twelve per leg; 34.5 inch diameter; 180 feet penetration
Number, size and penetration of inner piling:	None
Method of installation (driven, drilled, combination):	Combination
Length of grouted interval in legs:	Bottom to top in annulus. Bottom to minus 12 feet inside inner sleeve.
Design codes used (UBC, AISC, API RP 2A, etc.)	AISC, UBC
Number of completed wells in each leg:	Leg A-1: 12 wells Leg B-1: 12 wells Leg B-2: 0 wells Leg A-2: 12 wells
Top girders storage tank liquid & capacity:	Waste Oil (V-T-0001): 18,480 gal Waste Water (V-T-0002, V-T-0004): 24,780 gal Diesel Storage (V-T-0005): 49,980 gal
Design criteria	
Ice thickness and strength:	6 ft. on two front legs, 3 ft. on two back legs; 300 psi
Wave height and period:	28 feet, 8.5 second period
Wind:	60 mph with 80 mph gusts
Earthquake:	0.1 g per 1967 UBC
Temperature:	Minus 40° F above water, plus 20° F below water
Current:	10 feet per second
Other Considerations:	Twenty year design life
Unusual circumstances during installation:	None

Significant modification or damage to topsides:	Minor module additions. Non-typical configurations of beam flanges, damage to structural members and metal deformation on production deck, all requiring engineering evaluation of structural integrity. Light to extreme corrosion (general and local). Last inspected: 4/12 & 5/12
Significant structural damage incidents:	See above
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	A-537
Below water:	A-36 Steel
Steel corrosion allowance:	1/2 inch through tidal zone. 40' x 1/2" + ice breaker
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	September and October 2011, Global Diving and Salvage carried out a scheduled API Level 2 and 3 inspection.

## Platform Dolly Varden

1. Field name: .....McArthur River field
  2. Platform operator: .....Marathon
  3. Platform owner(s): .....Marathon and Unocal
  4. Original operator: .....Marathon
  5. Structural design firm: .....McDermott
  6. Fabrication yard (structure): .....American Pipe & Construction, Vancouver, Washington
  7. Installation year and contractor: .....1967; McDermott
  8. Waterdepth (at MLLW): .....112 feet
  9. Number and diameter of legs: .....Four; 17 feet diameter
  10. Number, size and penetration of piling: .....Twelve per leg; 34.5 inch diameter; 180 feet penetration
  11. Number, size and penetration of inner piling: .....None
  12. Method of installation (driven, drilled, combination): .....Combination
  13. Length of grouted interval in legs: .....Bottom to top in annulus,  
bottom to -12 feet inside inner sleeve
  14. Design codes used (UBC, AISC, API RP 2A, etc): .....AISC, UBC
- 
15. Number of completed wells through piling: .....22 oil wells; 2 gas wells; 11 waterflood injectors
  16. Other completed wells in each leg: .....None
  17. Top girders used as storage tanks ? .....Yes
  18. If so, what type of liquid: .....Water, diesel oil
- 
19. Design criteria used:
    - (1) Ice thickness and strength: .....6 ft on two front legs, 3 ft on two back legs; 300 psi
    - (2) Wave height and period: .....28 feet, 8.5 sec period
    - (3) Wind: .....60 mph with 80 mph gusts
    - (4) Earthquake: .....0.1 g per 1967 UBC
    - (5) Temperature: .....Minus 40° F above water, plus 20° F below water
    - (6) Current: .....10 feet per second
  20. Design considerations: .....Twenty year design life
- 
21. Unusual circumstances during installation ? .....No
  22. Significant modification or additions to topsides: .....Yes, to accommodate waterflood equipment and gas compressors cantilevered decks and a mezzanine deck were added in the 1969 to 1971 time period.
  23. Any significant structural damage incidents ? .....A minor dent without structural implications was found on a horizontal member in 1991. A strength analysis was performed by PMB
  24. Has platform structural design been re-assessed ? .....Yes, in 1992 on the tower only
  25. If so, by whom and for what reason: .....By PMB (Houston). Extended platform life.
- 
26. Type of steel used; above water and below water: .....A 537
  27. Steel corrosion allowance used: .....½ inch through tidal zone
  28. Type of cathodic protection: .....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection: .....Level II and III in 1991; Level II in 1988, 1983, 1981 and 1980.
-



Platform Dolly Varden in the McArthur River field.

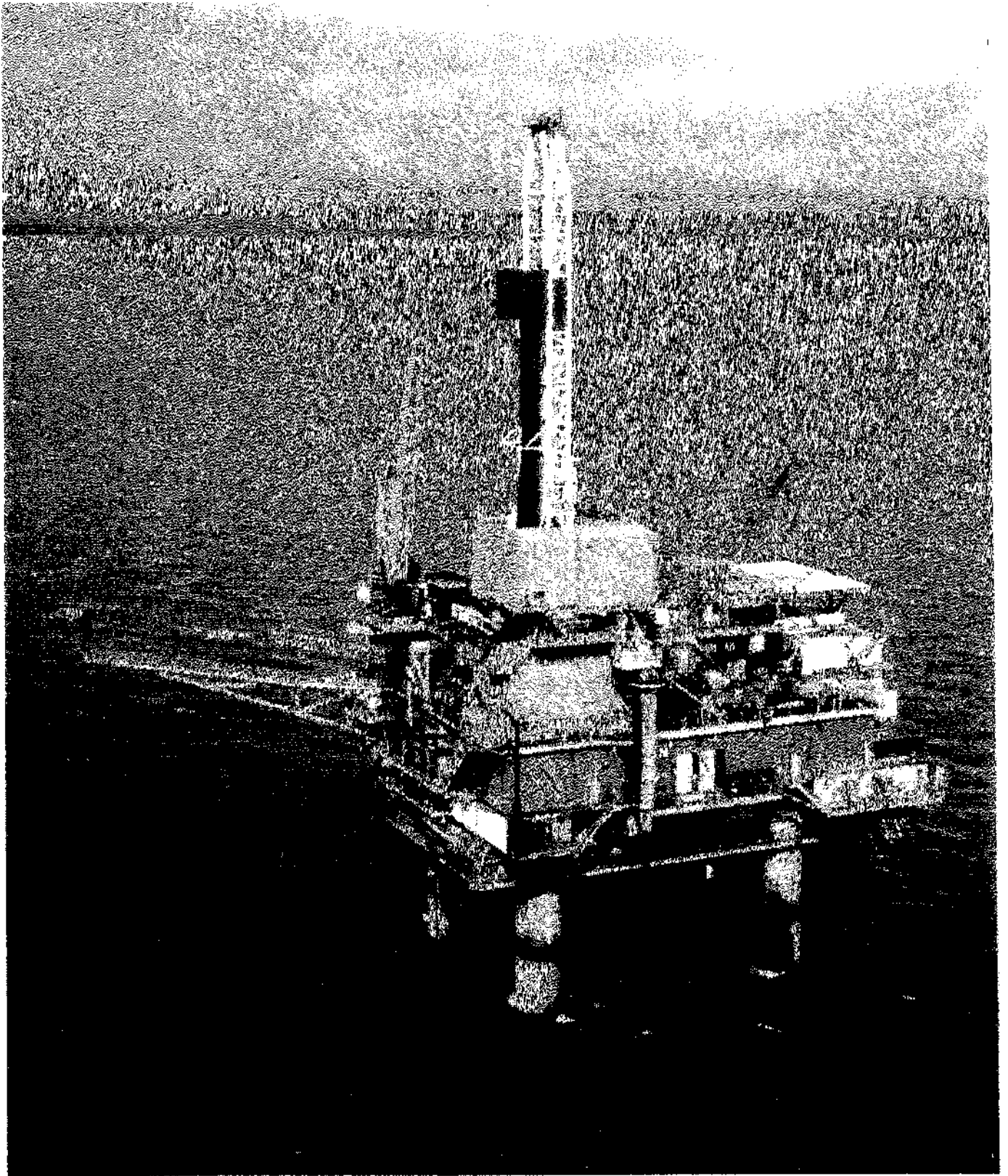
# PLATFORM TYONEK

NORTH COOK INLET FIELD

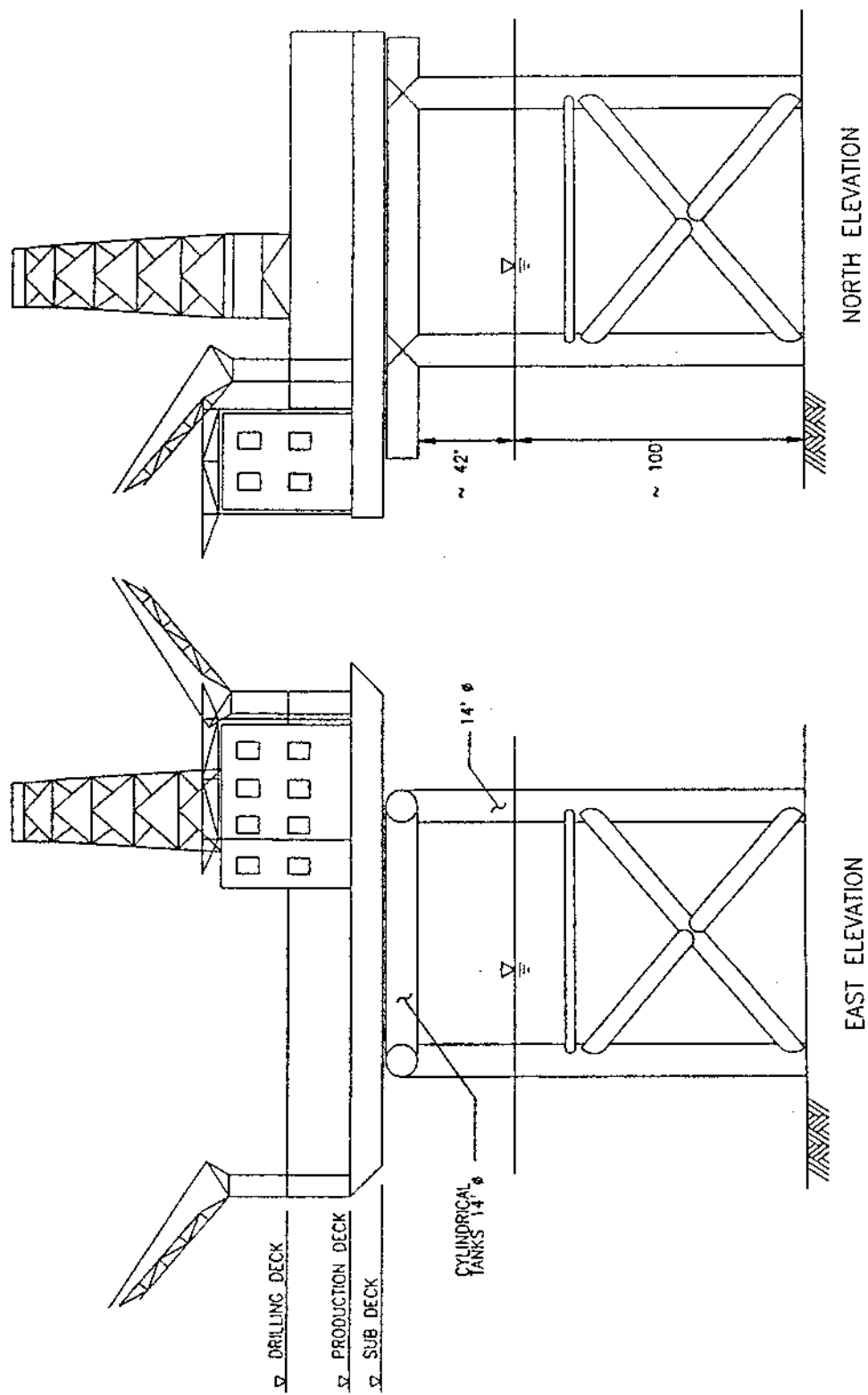
INSTALLED 1968

## Platform Tyonek

1. Field name:.....North Cook Inlet field
  2. Platform operator:.....Phillips Petroleum
  3. Platform owner(s):.....Phillips Petroleum (100%)
  4. Original operator:.....Phillips Petroleum
  5. Structural design firm:.....McDermott
  6. Fabrication yard (structure):.....Mitsubishi Heavy Industries, Hiroshima, Japan
  7. Installation year and contractor:.....1968; McDermott
  8. Waterdepth (at MLLW):.....100 ft
  9. Number and diameter of legs:.....Four; 14 ft diameter
  10. Number, size and penetration of piling:.....Eight per leg; 30 inch diameter; 175 ft penetration
  11. Number, size and penetration of inner piling:.....None
  12. Method of installation (driven, drilled, combination):.....Driven
  13. Length of grouted interval in legs:.....Annulus grouted from bottom to top of leg
  14. Design codes used (UBC, AISC, API RP 2A, etc):.....AISC; UBC, edition current in 1967
- 
15. Number of completed wells in each leg through piling:.....Leg 1 - one well plus one well drilling; Leg 2 - three wells; Leg 3 - eight wells; Leg 4 - none
  16. Other completed wells in each leg:.....None
  17. Top girders used as storage tanks?.....Yes
  18. If so, what type of liquid:.....Water, diesel, oily water, well test crude
- 
19. Design criteria used:
    - (1) Ice thickness and strength:.....Used 120 kips/ft of leg diameter for front legs; 50 kips/ft for back legs; Impact load of 1500 ton ice at 10 fps (3900k)
    - (2) Wave height and period:.....27.5 ft, 8.5 sec period (per A.H. Glenn)
    - (3) Wind:.....80 mph
    - (4) Earthquake:.....0.1 g lateral load per 1967 UBC
    - (5) Temperature:.....Steel -40° F; piping -50° F
    - (6) Current:.....Current 10.14 fps full depth
  20. Design considerations:.....Twenty year design life
- 
21. Unusual circumstances during installation?.....None
  22. Significant modification or additions to topsides:.....Heavier drilling rig
  23. Any significant structural damage incidents?.....None
  24. Has platform structural design been re-assessed?.....Yes
  25. If so, by whom and for what reason:.....Hopper and Associates; Addition of a larger drilling rig and anticipated long service life (40 years)
- 
26. Type of steel used; above water and below water:.....Above and below water A-516 Grade 70 Mod A.
  27. Steel corrosion allowance used:.....½ inch from minus 12 to plus 31 feet
  28. Type of cathodic protection:.....Ten seabed impressed current anode sleds; Impressed current anodes in each inner leg.
- 
29. Dates and API RP 2A levels of underwater inspection:.....Level II and III surveys in 1983, 1986 and 1990. Additional survey scheduled for 1993.  
Level III inspection performed on selected joints until all critical joints were inspected.
-



Platform Tyonek in the North Cook Inlet field.



Elevation views of platform Tyonek



# PLATFORM SPURR

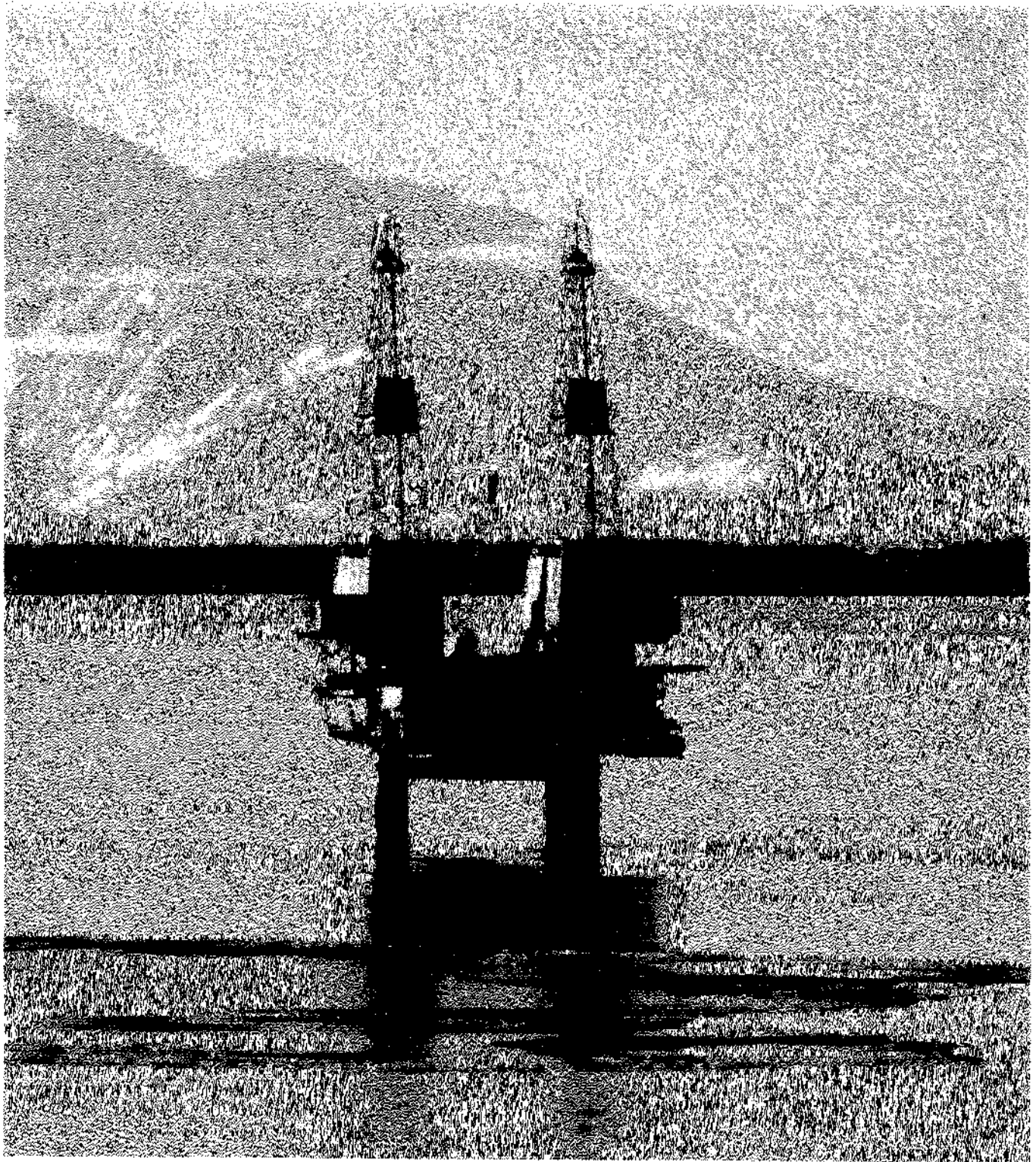
TRADING BAY FIELD

INSTALLED 1968

## Platform Spurr

1. Field name:.....Trading Bay field
  2. Platform operator:.....Marathon
  3. Platform owner(s):.....Marathon and Unocal
  4. Original operator:.....Texaco
  5. Structural design firm:.....McDermott
  6. Fabrication yard (structure):.....Japan
  7. Installation year and contractor:.....1968;
  8. Waterdepth (at MLLW):.....67 feet
  9. Number and diameter of legs:.....Three; 13 feet diameter
  10. Number, size and penetration of piling:.....Six per leg; 36 inch diameter; 190 feet penetration
  11. Number, size and penetration of inner piling:.....None
  12. Method of installation (driven, drilled, combination):.....Combination
  13. Length of grouted interval in legs:.....
  14. Design codes used (UBC, AISC, API RP 2A, etc):.....
- 
15. Number of completed wells in each leg through piling:.....Six oil wells, one gas well and two water injection wells.  
All wells are T&A
  16. Other completed wells in each leg:.....None
  17. Top girders used as storage tanks?.....
  18. If so, what type of liquid:.....
- 
19. Design criteria used:
    - (1) Ice thickness and strength:.....3.5 feet
    - (2) Wave height and period:.....28 feet with 8.5 second period
    - (3) Wind:.....60 mph with 80 mph gusts
    - (4) Earthquake:.....UBC
    - (5) Temperature:.....Minus 40° F above water, plus 20° F below water
    - (6) Current:.....10 feet per second
  20. Design considerations:.....Twenty year design life
- 
21. Unusual circumstances during installation?.....
  22. Significant modification or additions to topsides:.....
  23. Any significant structural damage incidents?.....
  24. Has platform structural design been re-assessed?.....
  25. If so, by whom and for what reason:.....
- 
26. Type of steel used; above water and below water:.....A 537-A
  27. Steel corrosion allowance used:.....½ inch
  28. Type of cathodic protection:.....Impressed current
- 
29. Dates and API RP 2A levels of underwater inspection:.....Level II and III in 1993
- 

Note: Platform not in operation



Platform Spurr in the Trading Bay field.

# PLATFORM SPARK

TRADING BAY FIELD

INSTALLED 1968

## Platform Spark

1. Field name: .....Trading Bay field
  2. Platform operator: .....Marathon
  3. Platform owner(s): .....Marathon
  4. Original operator: .....Arco
  5. Structural design firm: .....McDermott
  6. Fabrication yard (structure): .....Japan
  7. Installation year and contractor: .....1968; McDermott
  8. Waterdepth (at MLLW): .....62 feet
  9. Number and diameter of legs: .....Three; 13 feet diameter
  10. Number, size and penetration of piling: .....Six per leg; 24 inch diameter; 250 feet penetration
  11. Number, size and penetration of inner piling: .....None
  12. Method of installation (driven, drilled, combination): .....Combination
  13. Length of grouted interval in legs: .....
  14. Design codes used (UBC, AISC, API RP 2A, etc): .....UBC, AISC
- 
15. Number of completed wells through piling: .....Six oil wells and two water injection wells. All wells are plugged.
  16. Other completed wells in each leg: .....None
  17. Top girders used as storage tanks ? .....
  18. If so, what type of liquid: .....
- 
19. Design criteria used:
    - (1) Ice thickness and strength: .....3.5 feet
    - (2) Wave height and period: .....28 feet with 8.5 second period
    - (3) Wind: .....60 mph with 80 mph gusts
    - (4) Earthquake: .....UBC
    - (5) Temperature: .....Minus 40° F above water, plus 20° F below water
    - (6) Current: .....10 feet per second
  20. Design considerations: .....Twenty year design life
- 
21. Unusual circumstances during installation ? .....
  22. Significant modification or additions to topsides: .....
  23. Any significant structural damage incidents ? .....
  24. Has platform structural design been re-assessed ? .....
  25. If so, by whom and for what reason: .....
- 
26. Type of steel used; above water and below water: .....A 516
  27. Steel corrosion allowance used: .....½ inch
  28. Type of cathodic protection: .....
- 
29. Dates and API RP 2A levels of underwater inspection: .....Level II and III in 1993
- 

Note: Platform not in operation

# PLATFORM STEELHEAD

McARTHUR RIVER FIELD

INSTALLED 1986

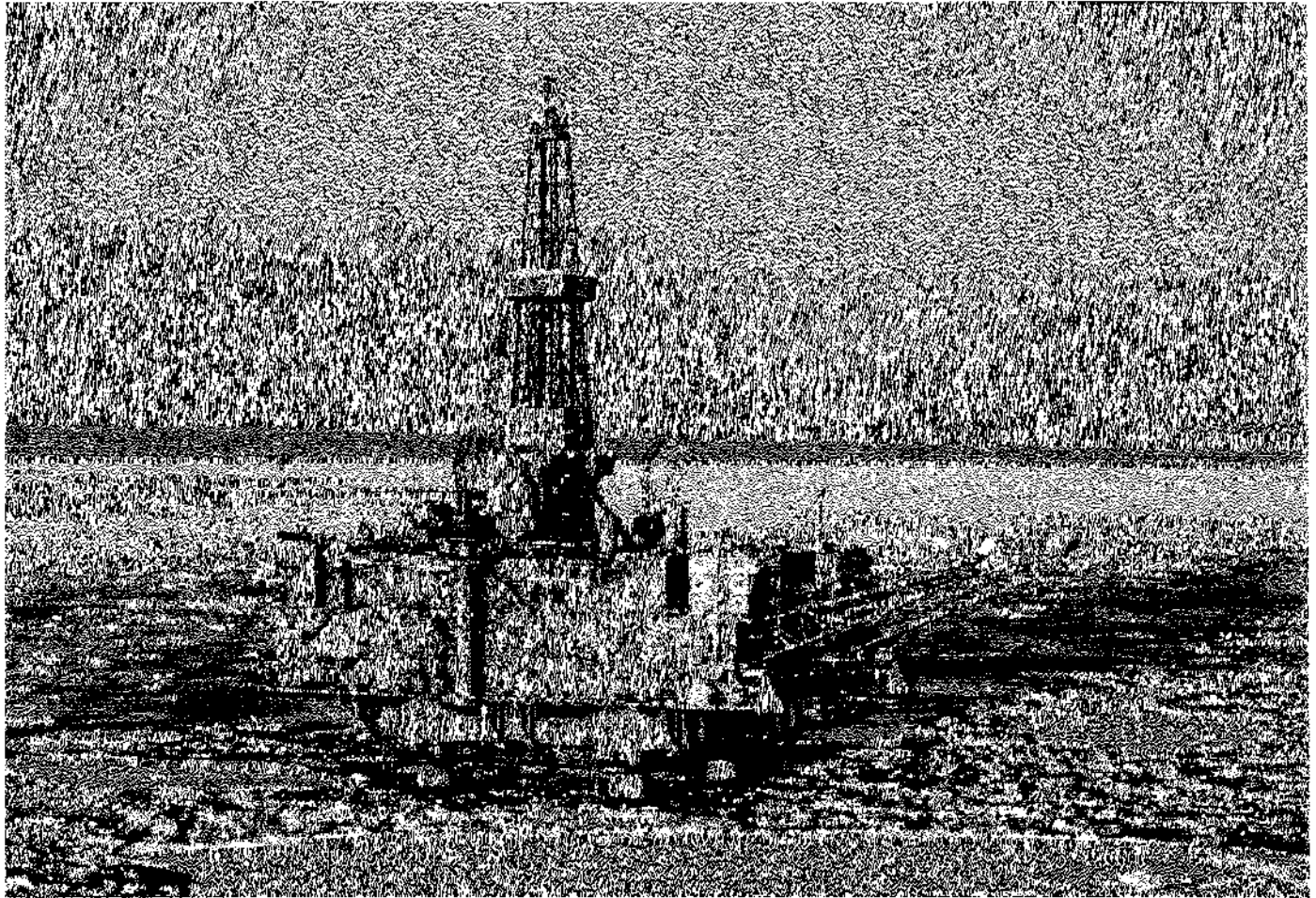
PLATFORM STEELHEAD	
2014 UPDATED INFORMATION	
Field Name:	McArthur River Field
Platform Operator:	Hilcorp
Platform Owner(s):	Hilcorp
Original operator:	Marathon
Structural Design firm:	McDermott
Fabrication yard (structure):	NKK, Japan
Installation year and contractor:	1986; Brown & Root
Water depth (at MLLW):	183 feet
Number and diameter of legs:	Four; 18 feet diameter
Number, size and penetration of piling:	Twelve per leg; 34 inch diameter; 135 feet penetration
Number, size and penetration of inner piling:	Ten 26 inch drilled inner piling installed to 650 feet in Leg B1 following blowout
Method of installation (driven, drilled, combination):	24 driven, 24 combination with drilled pilot hole
Length of grouted interval in legs:	Annulus grouted from bottom to top of leg
Design codes used (UBC, AISC, API RP 2A, etc.)	API RP 2A
Number of completed wells in each leg:	Leg A-1: 10 wells Leg A-2: 0 wells Leg B-1: 8 wells Leg B-2: 10 wells
Top girders storage tank liquid & capacity:	Diesel Storage (H-T-0032A): 71,400 gal Diesel Storage (H-T-0032B): 35,700 gal Diesel Storage (H-T-0032C): 42,480 gal Waste Water (H-T-0037): 42,000 gal
Design criteria	
Ice thickness and strength:	50 inch thick; 300 psi
Wave height and period:	28 feet with 8.5 second period
Wind:	80 mph with 107 mph gusts
Earthquake:	Site specific, Ertec, C.B. Krause
Temperature:	Minus 20° F above water, plus 28.6° F below water
Current:	12.65 feet per second
Other Considerations:	Twenty year design life
Unusual circumstances during installation:	None

Significant modification or damage to topsides:	Minor module additions. Damaged or removed/missing structural members, damaged insulation and non-typical configuration on deck beams, requiring engineering evaluation of structural integrity and replacement potential. Light to extreme general and local corrosion. Last inspected: 11/12
Significant structural damage incidents:	See above
Platform structural design reassessment company & year:	2001 - Hopper Elmore and Associates
Type of steel used	
Above water:	A-633 Gr. C
Below water:	A-633 Gr. C
Steel corrosion allowance:	40' x 1/2"
Type of cathodic protection:	Impressed current cathodic protection system
Dates and API RP 2A levels of underwater inspection:	September and October of 2008, Offshore Divers carried out a scheduled API Level 2 and 3 inspection.

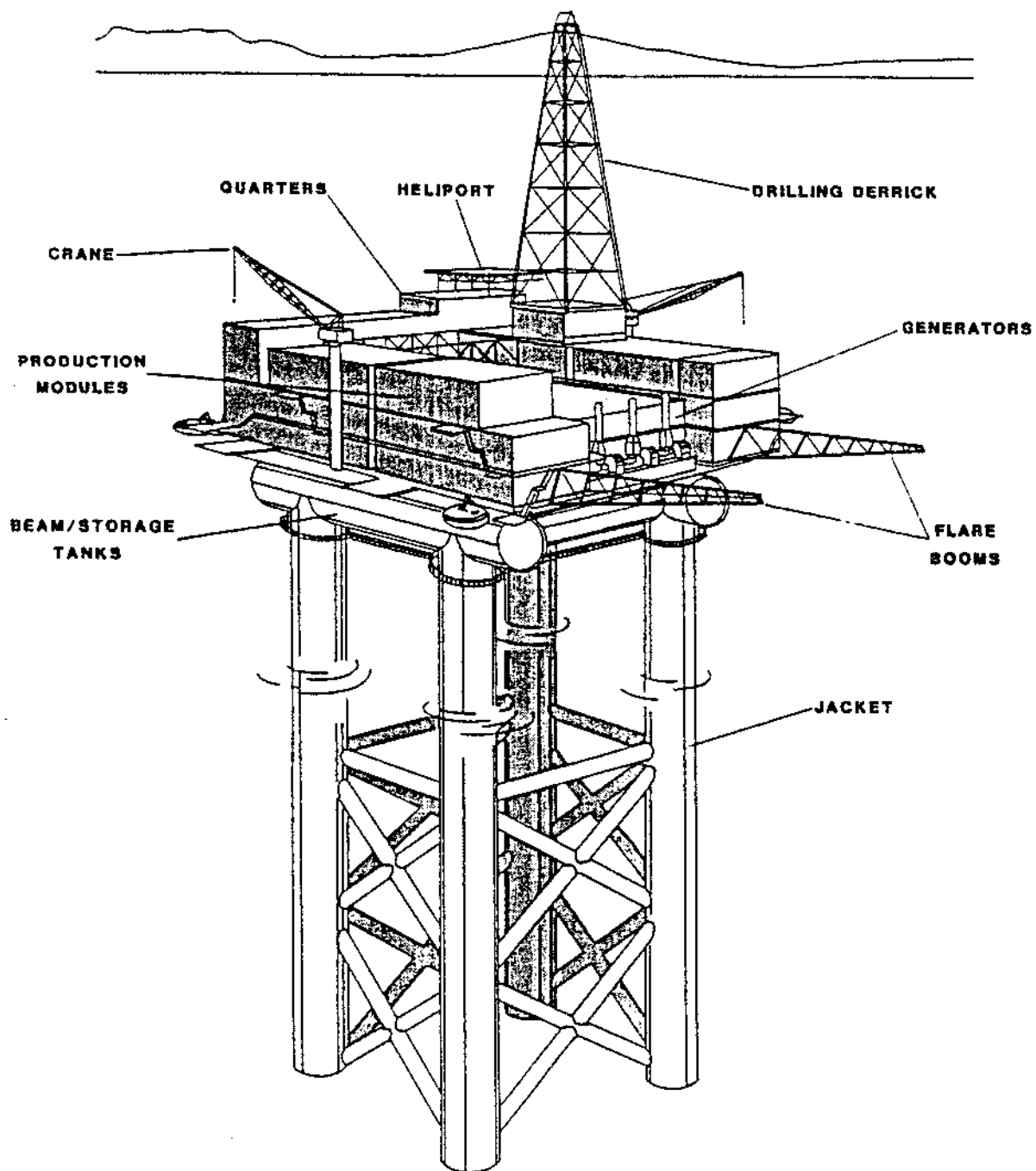


## Platform Steelhead

1. Field name:.....McArthur River field
  2. Platform operator:.....Marathon
  3. Platform owner(s):.....Marathon & Unocal
  4. Original operator:.....Marathon
  5. Structural design firm:.....McDermott
  6. Fabrication yard (structure):.....NKK, Japan
  7. Installation year and contractor:.....1986; Brown & Root
  8. Waterdepth (at MLLW):.....183
  9. Number and diameter of legs:.....Four; 18 feet diameter
  10. Number, size and penetration of piling:.....Twelve per leg; 34 inch diameter; 135 feet penetration
  11. Number, size and penetration of inner piling:.....Ten 26 inch drilled inner piling installed to 650 feet in leg  
B1 following 1989 blowout
  12. Method of installation (driven, drilled, combination):.....24 driven, 24 combination with drilled pilot hole
  13. Length of grouted interval in legs:.....Annulus grouted from bottom to top of leg
  14. Design codes used (UBC, AISC, API RP 2A, etc):.....API RP 2A
- 
15. Number of completed wells in each leg through piling:.....Three oil wells, eight gas wells and two waterflood injection wells
  16. Other completed wells in each leg:.....None
  17. Top girders used as storage tanks?.....Yes
  18. If so, what type of liquid:.....Water, diesel oil
- 
19. Design criteria used:
    - (1) Ice thickness and strength:.....50 inch thick; 300 psi
    - (2) Wave height and period:.....28 feet with 8.5 second period
    - (3) Wind:.....80 mph with 107 mph gusts
    - (4) Earthquake:.....Site specific, Ertex, C.B. Krause
    - (5) Temperature:.....Minus 20° F above water, plus 28.6° F below water
    - (6) Current:.....12.65 feet per second
  20. Design considerations:.....Twenty year design life
- 
21. Unusual circumstances during installation?.....Yes, derrick barge crane collapse. No structural damage
  22. Significant modification or additions to topsides:.....Waterflood and gas transmission module added (part of original design)
  23. Any significant structural damage incidents?.....Blowout under leg B1 in 1989; dumped 60,000 ton of gravel and added ten 26 inch diameter insert piling.
  24. Has platform structural design been re-assessed?.....Yes
  25. If so, by whom and for what reason:.....By PMB following 1989 blowout
- 
26. Type of steel used; above water and below water:.....A-633-C
  27. Steel corrosion allowance used:.....½ inch
  28. Type of cathodic protection:.....Impressed current plus sacrificial anodes.
- 
29. Dates and API RP 2A levels of underwater inspection:.....Level II inspections in 1986 (boom collapse) and 1989 (blowout)
-



Platform Steelhead in the McArthur River field.



Isometric view of platform Steelhead

# **PLATFORM OSPREY**

## **REDOUBT SHOAL FIELD**

**INSTALLED 2000**

### **LOCATION**

Geographic, NAD27:  
Latitude: 60° 41' 44.2", Longitude: 151° 40' 14.5"

XY coordinates, ASP, Zone 4, NAD27, in feet:  
2,449,990 Northing/Y, 200,627 Easting/X

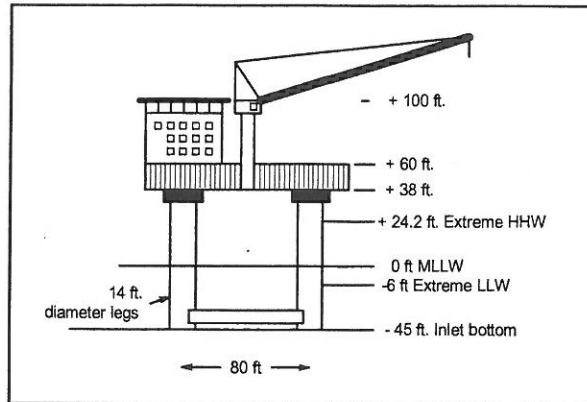
Database prepared by:  
Belmar Engineering  
Torrance, CA

May 2009

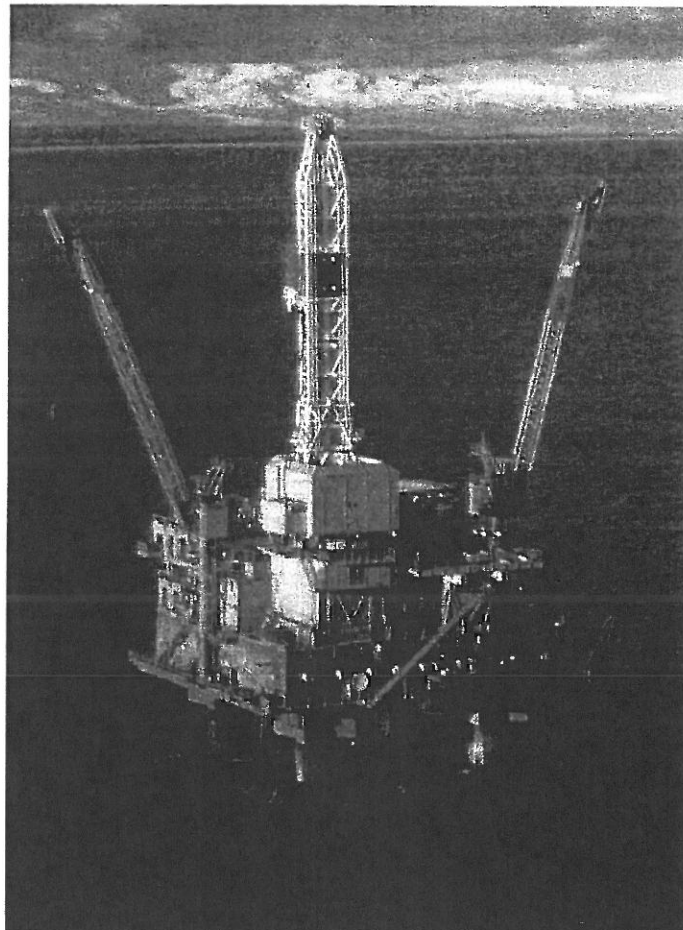
## Platform Osprey

1. *Field name:*..... Redoubt Shoal Field
  2. *Platform operator:*..... Pacific Energy Resources Ltd.
  3. *Platform owner(s):*..... Pacific Energy Resources Ltd.
  4. *Original operator:*..... Forest Oil Corporation
  5. *Structural design firm:*..... Winzler & Kelly and Ideas
  6. *Fabrication yard (structure):*..... Hyundai Heavy Industries, Ulsan, Korea
  7. *Installation year and contractor:*..... 2000 Stolt Offshore / Crowley
  8. *Waterdepth (at MLLW):*..... 45 feet MLLW
  9. *Number and diameter of legs:*..... four legs, 14-foot diameter
  10. *Number, size and penetration of piling:*..... 4-30" and 3-36" each leg; 70' penetration.
  11. *Number, size and penetration of inner piling:*..... NA
  12. *Method of installation (driven, drilled, combination):*..... Driven
  13. *Length of grouted interval in legs:*..... 135 feet
  14. *Design codes used (UBC, AISC, API RP 2A, etc):*..... API RP 2A
- 
15. *Number of completed wells in each leg through piling:*..... Seven wells in Leg 3, One well in Leg 2
  16. *Other completed wells in each leg:*..... None
  17. *Top girders used as storage tanks ?*..... No
  18. *If so, what type of liquid:*..... NA
- 
19. *Design criteria used:*
    - (1) *Ice thickness and strength:*..... 3.5 feet, 300 psi
    - (2) *Wave height and period:*..... 28.0 feet, 8.5 seconds
    - (3) *Wind:*..... 80 mph, 100 mph gusts
    - (4) *Earthquake:*..... API RP 2A Seismic Zone 4
    - (5) *Temperature:*..... - 40 degrees F
    - (6) *Other:*..... Bottom scour: - 5 feet
  20. *Design considerations:* .....
- 
21. *Unusual circumstances during installation?*..... Platform raised to proper elevation using eight 850-ton capacity hydraulic jacks.
  22. *Significant modification or additions to topsides:*..... Cantilevers were added in 2001 and 2003.
  23. *Any significant structural damage incidents?:*..... None
  24. *Has platform structural design been re-assessed?:*..... Yes
  25. *If so, for what reason and by whom:*..... Re-assessed by Winzler & Kelly for cantilever addition.
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26. *Type of steel used; above water and below water:*..... API Spec 2H
  27. *Steel corrosion allowance used:*..... 0.625" through splash zone from -18' to + 26' (MLLW)
  28. *Type of cathodic protection:*..... Impressed current
  29. *Dates and API RP 2A levels of underwater inspection:*..... 2003, 2007
  30. *Background information:*..... Visser, R.C. & Carlson, G.E.: "Osprey Project: Design and Installation of a Novel Platform in Cook Inlet, Alaska," OTC 14221, 2002.

## Platform Osprey



Schematic of platform Osprey



Osprey platform in 2002