TASK 3

COMPARISON OF CODES FOR TEMPORARY MOORING SYSTEMS
PRESENTATION OUTLINE

1. Design Weather Criteria

2. Design Premises: Drilling Rigs and Mooring Systems

3. Sensitivity Study on Low-Frequency Motions and Mean Wave Drift Forces

4. Quasi-Static Mooring Analysis Results:

    a. Per Site for All Rigs and Codes
    b. Per Rig and Code for All sites

5. Effects of Line Dynamics (Frequency-Domain)

6. Conclusions and Recommendations

(TABLE 3.1)

DETERMINISTIC COMPARISON OF MOORING DESIGN CODES
STUDY MATRIX FOR MOBILE MOORING SYSTEM

Study Matrix	ABS MODU	API RP-2P	API NEW(5yr)	API NEW(10yr)	DnV/NMD (Env 1)	DnV/NMD (Env 2)	IMO
MODU's							
1 Jack Bates (4th Gen. Semi)	√	•	•	•	•	•	√
2 Sedco 704 (2nd Gen. Semi)	√	•	•	•	•	•	√
3 Deepsea Duchess (Drillship)	√	•	•	•	•	•	√
4 Zapata Yorktown (2nd Gen. Semi)		•	•	•	•	•	
5 Ocean Epoch (2nd Gen. Semi)		•	•	•	•	•	
6 Benreoch (3rd Gen. Semi)		•	•	•	•	•	
GEOGRAPHIC AREAS							
• North Sea	√	√	•	•	•	•	√
• Gulf of Mexico	√	•	•	•	•	•	√
• South China Sea			•	•	•	•	
• Australia			•	•	•	•	
• Canada			•	•	•	•	
WATER DEPTH							
• 300 ft.		•	•	•	•	•	
• 1500 ft.	√	•	•	•	•	•	√
• 3000 ft.		•	•	•	•	•	
ENVIRONMENTAL CRITERIA							
• Operating Condition			√	√	√	√	
• Survival Condition	√	•	•	•	•	•	√
SCOPE OF ANALYSIS							
• Intact	√	•	•	•	•	•	√
• Damaged	√		√	√	√	√	√
• Transient	√		√	√	√	√	√
ASSUMPTIONS							
• Colinear Environment	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Quasi-static Catenary	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Thruster Assistance	No	No	No	No	No	No	No

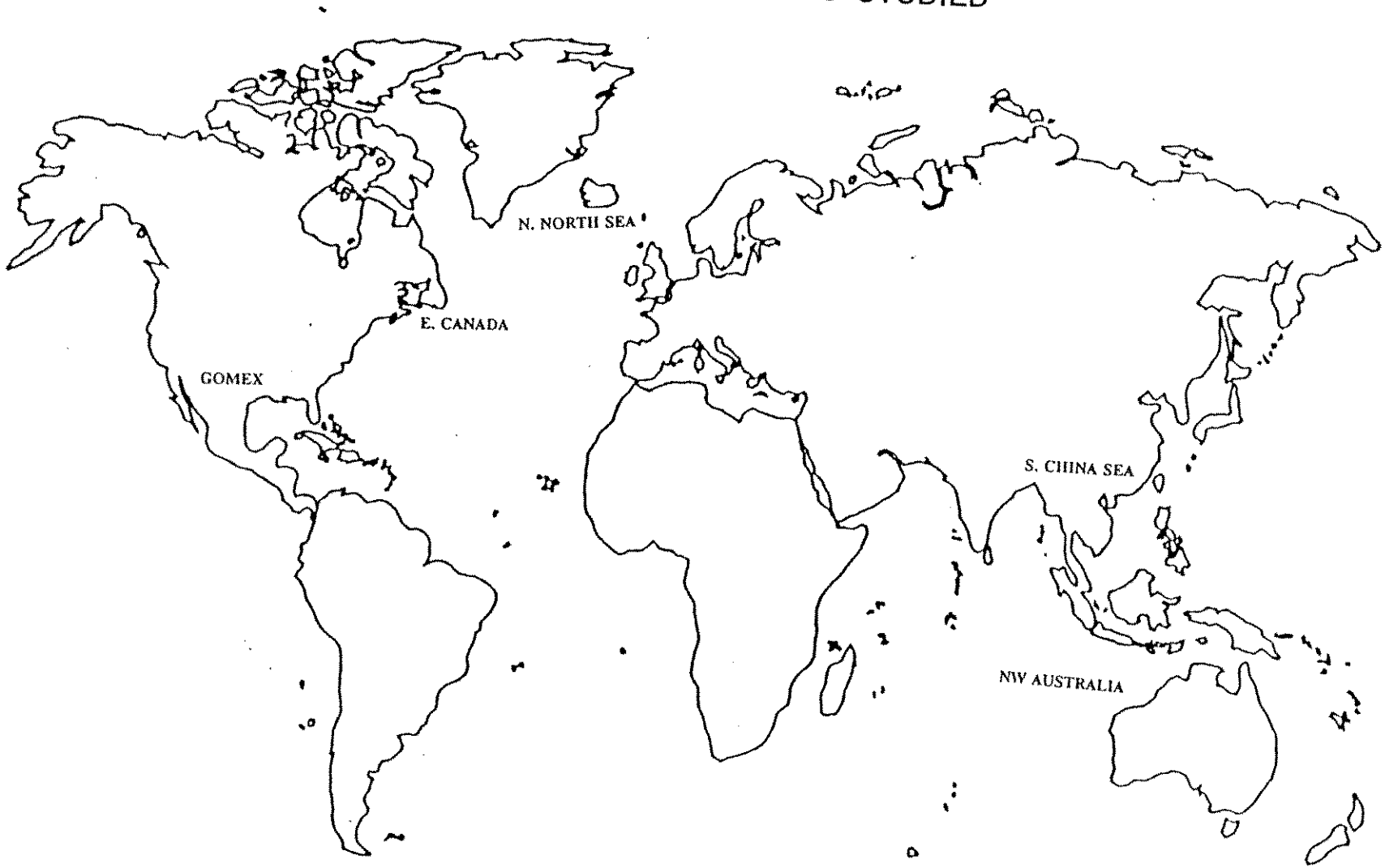
Note: Dnv/NMD (Env 1) = 100-yr wind and wave + 10-yr current,
Dnv/NMD (Env 2) = 100-yr wave and current + 10-yr wind.

1. DESIGN WEATHER CRITERIA

- 5 Geographic Areas
- 4 Weather Criteria Per
  - API New Code
  - DnV/NMD
- Significant Wave Height, H_S
- Peak Spectral Period, T_P

  $\sqrt{13\ H_S} < T_P < \sqrt{30\ H_S}$ (H_S in meters)
- Spectrum Type - ISSC
- Wind and Current Speeds
  - 1-Min. Mean
  - 10-Min. Mean

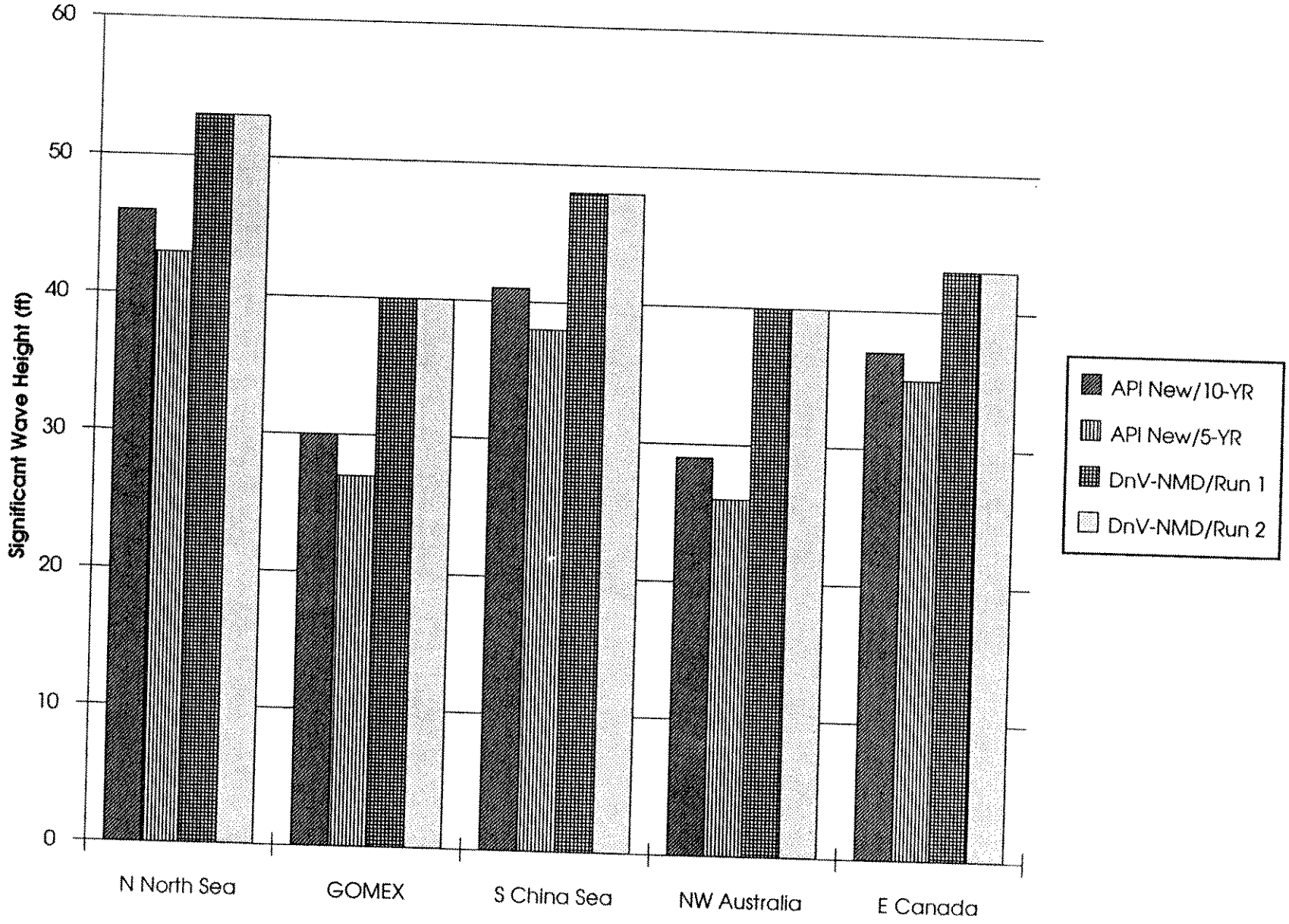
GEOGRAPHIC AREAS STUDIED

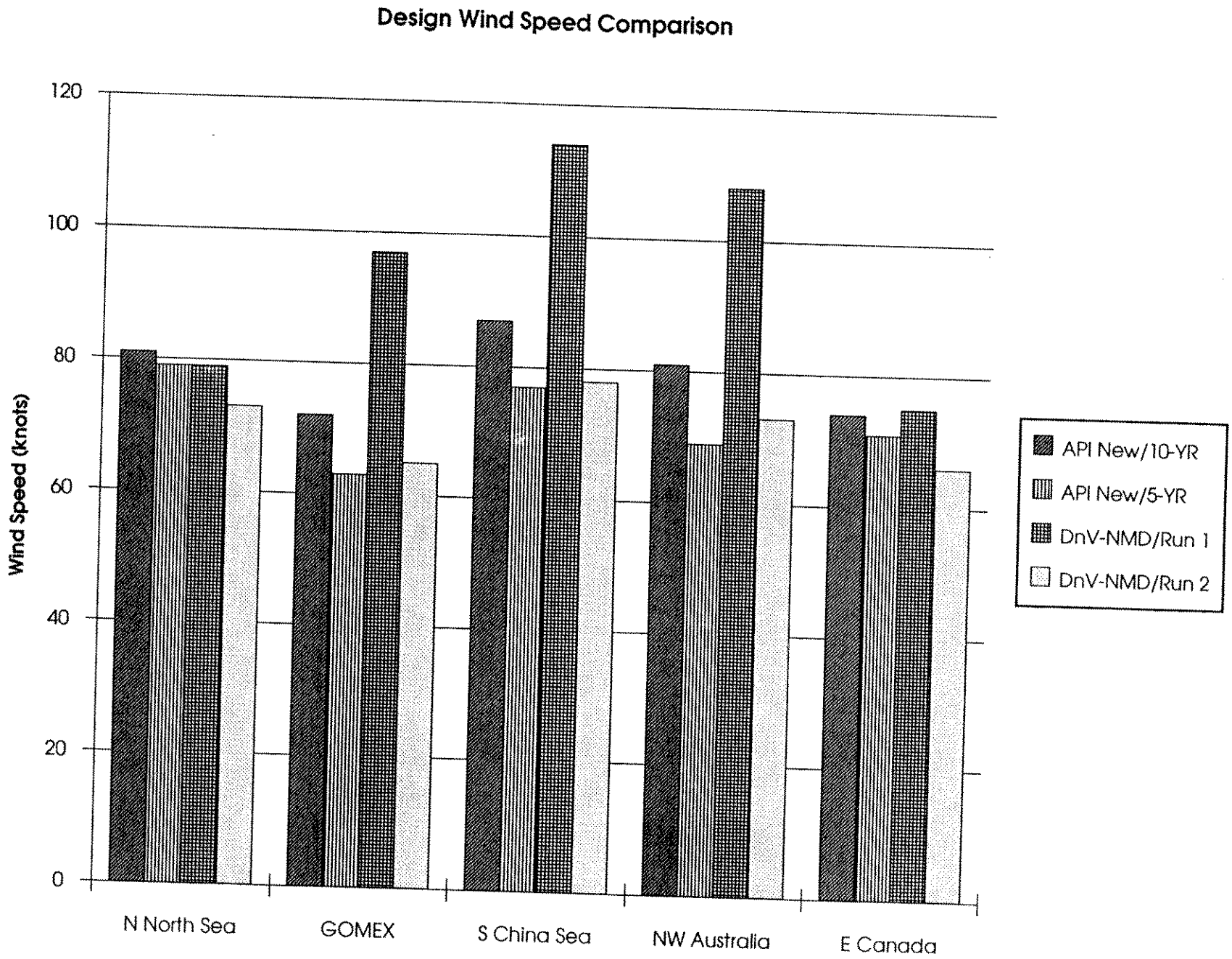


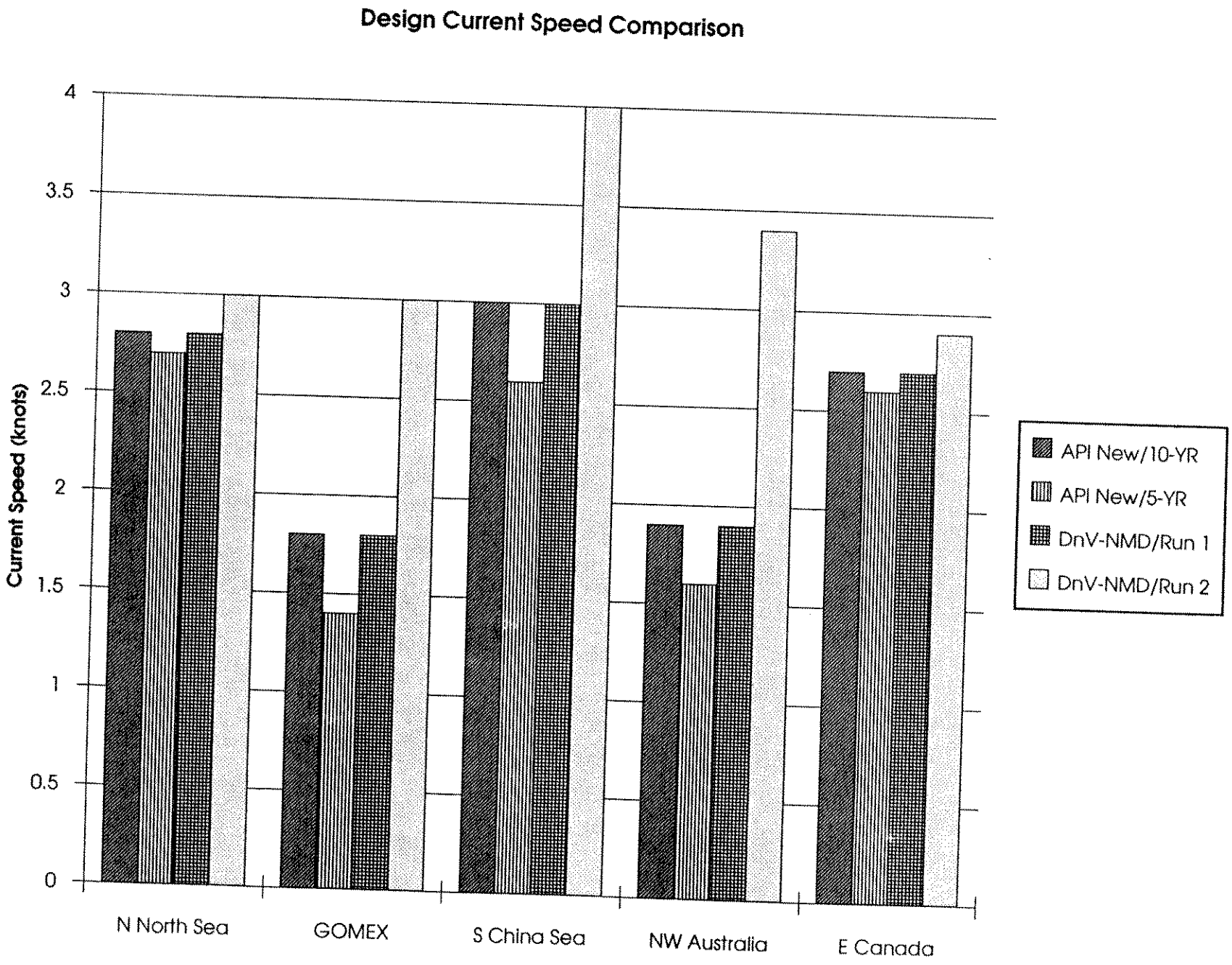
WEATHER CRITERIA SUMMARY

	GOMEX	N. NORTH SEA	S. CHINA SEA	NW AUSTRALIA	E. CANADA
API New - Near Others					
Wave, 10 yr (H_s)	30 ft	46 ft	41 ft	29 ft	37 ft
Wind, 10 yr, 1-min. mean	72 kts	81 kts	87 kts	81 kts	74 kts
Current, 10 yr	1.8 kts	2.8 kts	3.0 kts	1.9 kts	2.7 kts
API New - No Others					
Wave, 5 yr (H_s)	27 ft	43 ft	38 ft	26 ft	35 ft
Wind, 5 yr, 1-min. mean	63 kts	79 kts	77 kts	69 kts	71 kts
Current, 5 yr	1.4 kts	2.7 kts	2.6 kts	1.6 kts	2.6 kts
DnV/NMD (run 1)					
Wave, 100 yr (H_s)	40 ft	53 ft	48 ft	40 ft	43 ft
Wind, 100 yr, 10-min. mean	97 kts	79 kts	114 kts	108 kts	75 kts
Current, 10 yr	1.8 kts	2.8 kts	3.0 kts	1.9 kts	2.7 kts
DnV/NMD (run 2)					
Wave, 100 yr (H_s)	40 ft	53 ft	48 ft	40 ft	43 ft
Wind, 10 yr, 10-min. mean	65 kts	73 kts	78 kts	73 kts	66 kts
Current, 100 yr	3.0 kts	3.0 kts	4.0 kts	3.4 kts	2.9 kts

Design Significant Wave Height Comparison




Design Wind Speed Comparison
Wind Speed (knots)
120
100
80
60
40
20
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
API New/10-YR
API New/5-YR
DnV-NMD/Run 1
DnV-NMD/Run 2


Design Current Speed Comparison
Current Speed (knots)
4
3.5
3
2.5
2
1.5
1
0.5
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
API New/10-YR
API New/5-YR
DnV-NMD/Run 1
DnV-NMD/Run 2

2. DESIGN PREMISES: DRILLING RIGS AND MOORING SYSTEMS

- 6 Drilling Rigs
  - 5 Semisubmersibles
  - 1 Drillship

- Mooring Systems
  - 3 All Chain Systems
  - 3 Chain/Wire Combinations

- Selection of Pretension and Payout Length

- Mooring Patterns

DRILLING RIGS AND MOORING SYSTEMS SUMMARY

RIG NAME (DISPLACEMENT AT SURVIVAL DRAFT)	TYPE	DESIGN	CHAIN		WIRE		MINIUM BREAKING LOAD (kips)	COMMENT
			DIA. (in.)	LENGTH (ft.)	DIA. (in.)	LENGTH (ft)		
1. JACK BATES (102,902 kips)	Semi	Trendsetter	3-9/16 ORQ	2000	3-3/4	9900	1410	Strong
2. SEDCO 704 (45,970 kips)	Semi	Sedco 700 Series	3 ORQ	4000	N/A	N/A	1044	Medium
3. DEEPSEA DUCHESS (48,931 kips)	Drillship	Tanker Converted	2-3/4 ORQ	1000	2-7/8	6000	764	Weak
4. ZAPATA YORKTOWN (34,110 kips)	Semi	SS-2000	2-3/4 ORQ	2500	2-3/4	4500	695	Weak
5. OCEAN EPOCH (32,864 kips)	Semi	Diamond M New Era	2-3/4 ORQ	4800	N/A	N/A	889	Weak
6. BENREOCH (42,740 kips)	Semi	Enhanced Pacesetter	3 K4	6000	N/A	N/A	1357	Strong

NOTES:

(1) A 8-point symmetric mooring pattern with 45° between any two adjacent lines is assumed for all semisubmersibles. For the drillship, Deepsea Duchess, the 60°/45°/30° unsymmetric mooring pattern is used in this study.

(2) The chain and wire lengths shown above are the maximum available, and the actual payout lengths will vary at different operating water depths.

PAYOUTS, PRETENSIONS AND MEAN OFFSETS

Drilling Operation Weather Conditions:
(98.0% Non-exceedance in GOMEX)

Significant Wave Height = 8.0 ft.
1-Min. Mean Wind Speed = 27.1 kts.
Surface Current Speed = 1.0 kts.

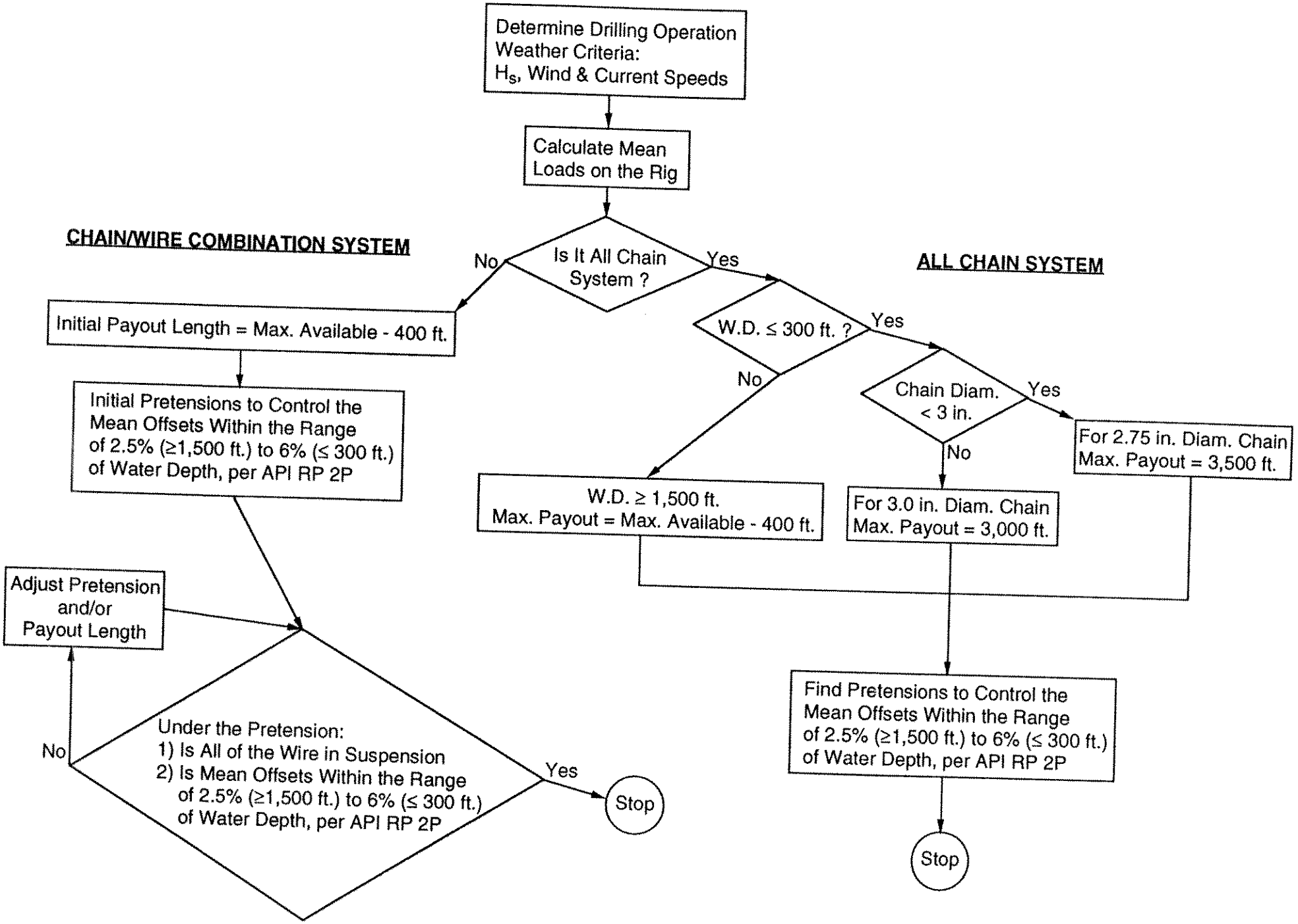
RIG NAME	300 FT. W.D.			1500 FT. W.D.			3000 FT. W.D.		
	PAYOUT (ft.)	PRETENSION (kips)	MEAN OFFSET (ft.) (% of W.D.)	PAYOUT (ft.)	PRETENSION (kips)	MEAN OFFSET (ft.) (% of W.D.)	PAYOUT (ft.)	PRETENSION (kips)	MEAN OFFSET (ft.) (% of W.D.)
1. JACK BATES	2400 (1)	200	4.5 (1.5%)	4498	200	29.3 (2.0%)	6998	250	64.6 (2.2%)
2. SEDCO 704	3000 (2)	100	12.2 (4.1%)	3600	280	35.7 (2.4%)	N/A	N/A	N/A
3. DEEPSEA DUCHESS	3200 (1)	200	3.8 (1.3%)	5600	150	32.2 (2.2%)	N/A	N/A	N/A
4. ZAPATA YORKTOWN	2000 (1)	150	2.7 (0.9%)	4100	100	33.1 (2.2%)	4100	150	59.5 (2.0%)
5. OCEAN EPOCH	3500 (2)	100	12.3 (4.1%)	4400	260	36.0 (2.4%)	N/A	N/A	N/A
6. BENREOCH	3000 (2)	100	13.1 (4.4%)	5600	300	33.4 (2.2%)	N/A	N/A	N/A

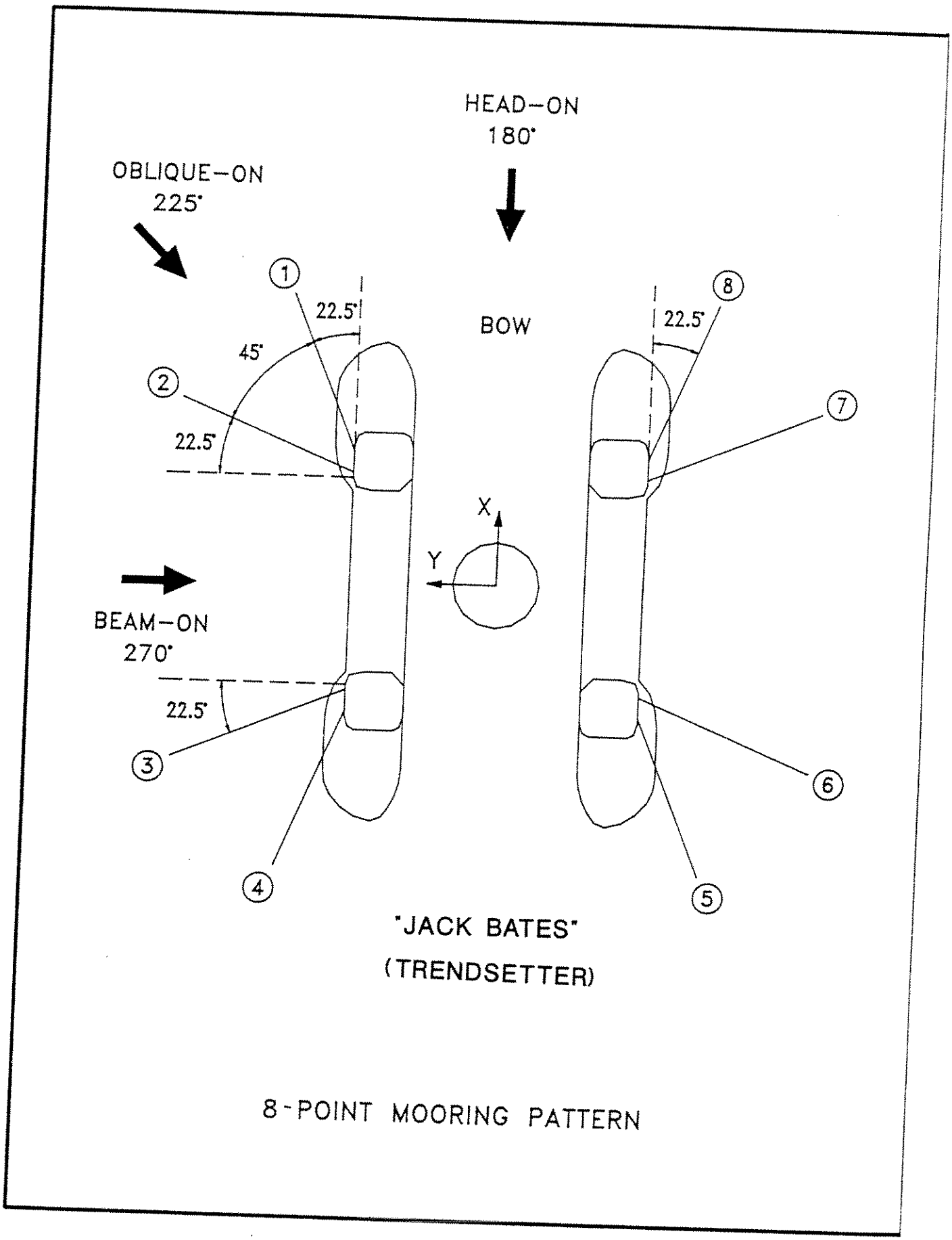
NOTES: (1) For chain/wire combinations the payout lengths are referring to the wire lengths, which are in suspension under the design pretensions. The design pretensions are selected to control the mean offsets within the range of 2.5% to 6% of water depth under the drilling operation weather conditions.

(2) In 300 ft. water depth (shallow water) the chain lengths deployed are based on the winching capacity of the rig for tensioning the anchor:
3000 ft. for 3 inch diameter chains, and
3500 ft. for 2-3/4 inch diameter chain

(3) The last segment length of 400 feet is assumed in reserve.

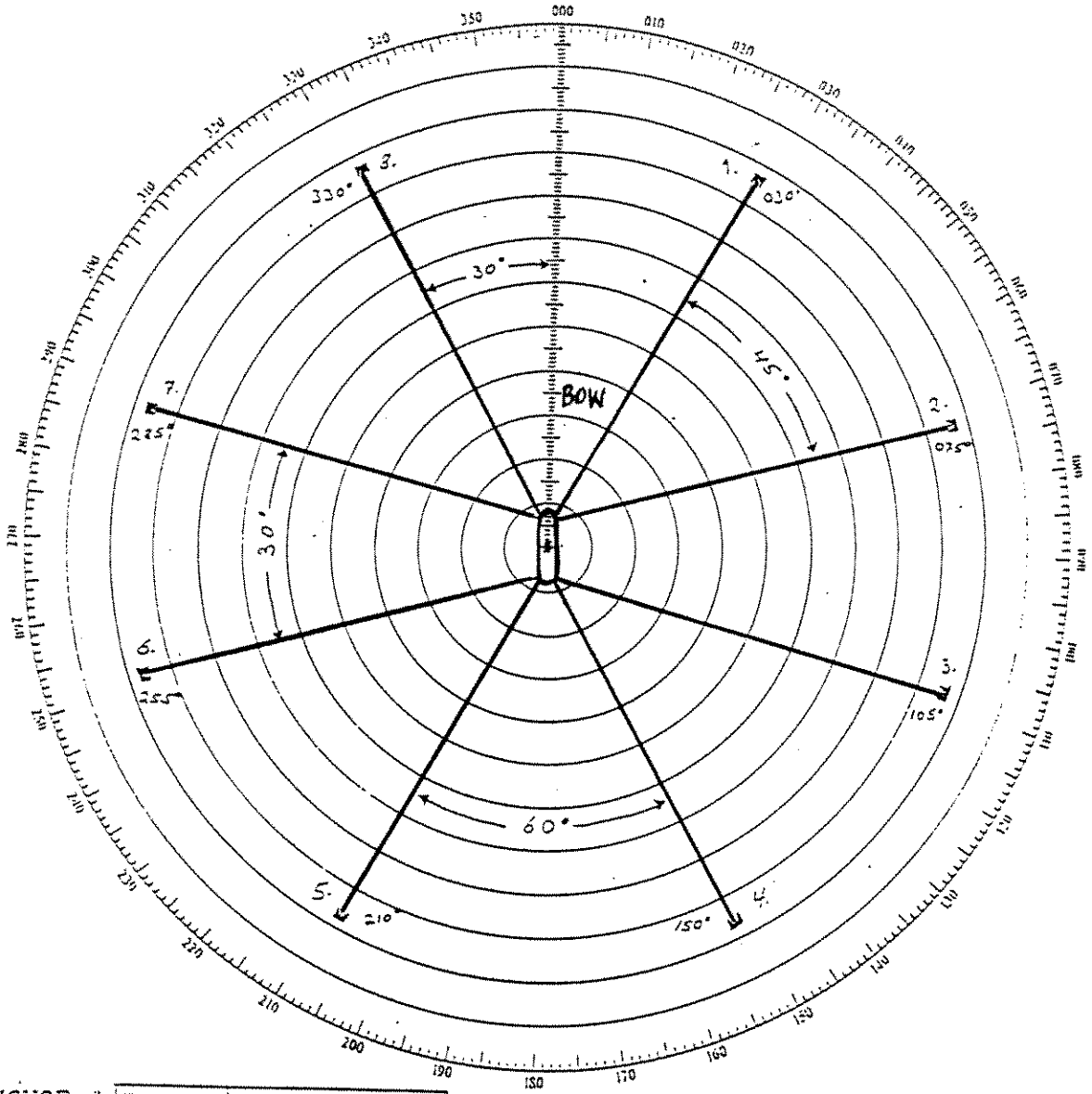
SELECTION OF PRETENSION AND PAYOUT LENGTH





8-POINT MOORING PATTERN

(DRILLSHIP)



ANCHOR #	TIME	BEARING	RANGE
1	—	030°	915M
2	—	075°	915M
3	—	105°	915M
4	—	150°	915M
5	—	210°	915M
6	—	255°	915M
7	—	285°	915M
8	—	330°	915M
P/BF	—	NIL	—
P/BF	—	NIL	—
P/BF	—	NIL	—
P/BF	—	NIL	—

RIG HADING : 000° Degr.

WATERDEPTH : 300 M LAT/~~LONG~~

LOCATION: EXAMPLE Nº. 3.

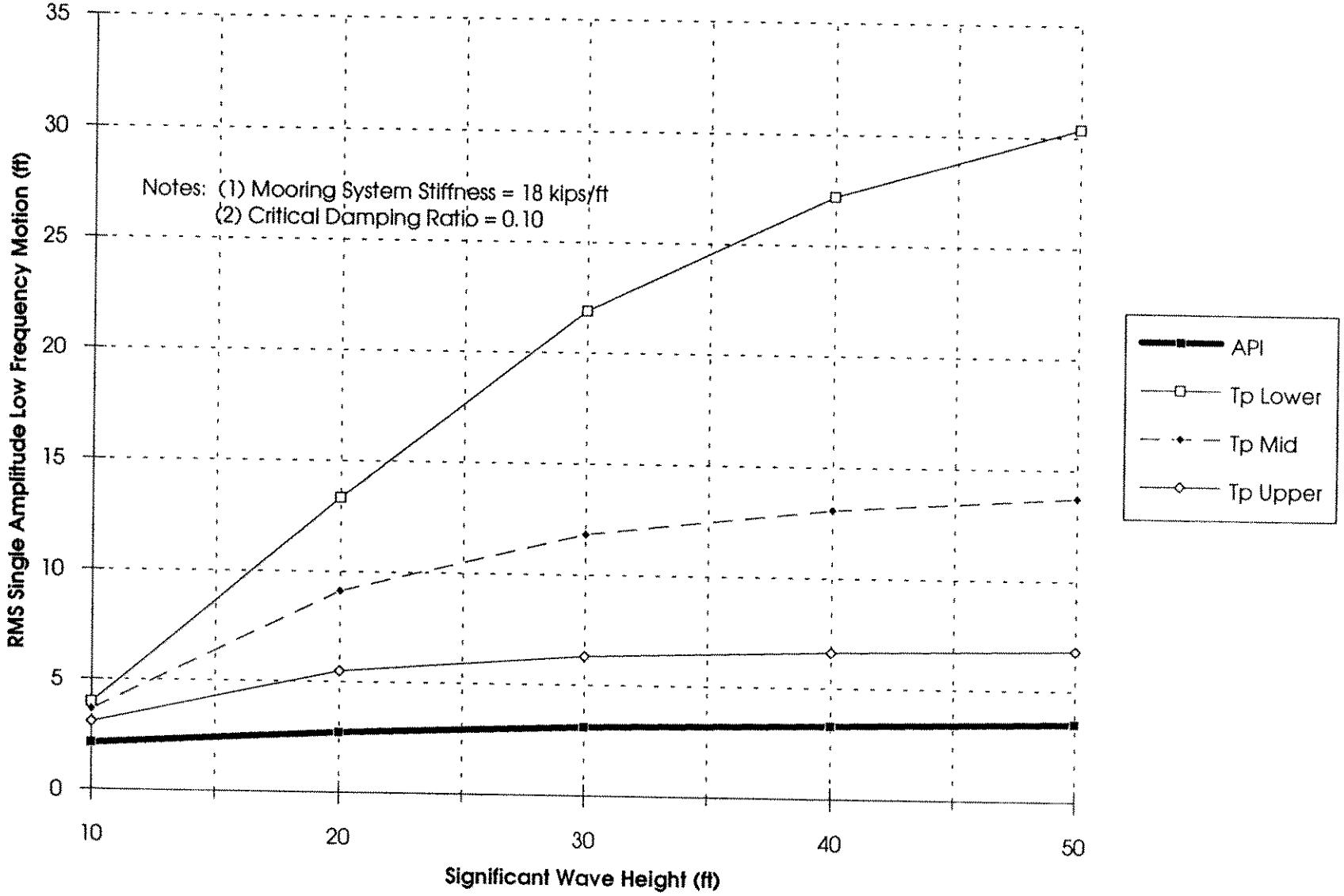
POSITION: N/A N/S

N/A E/W

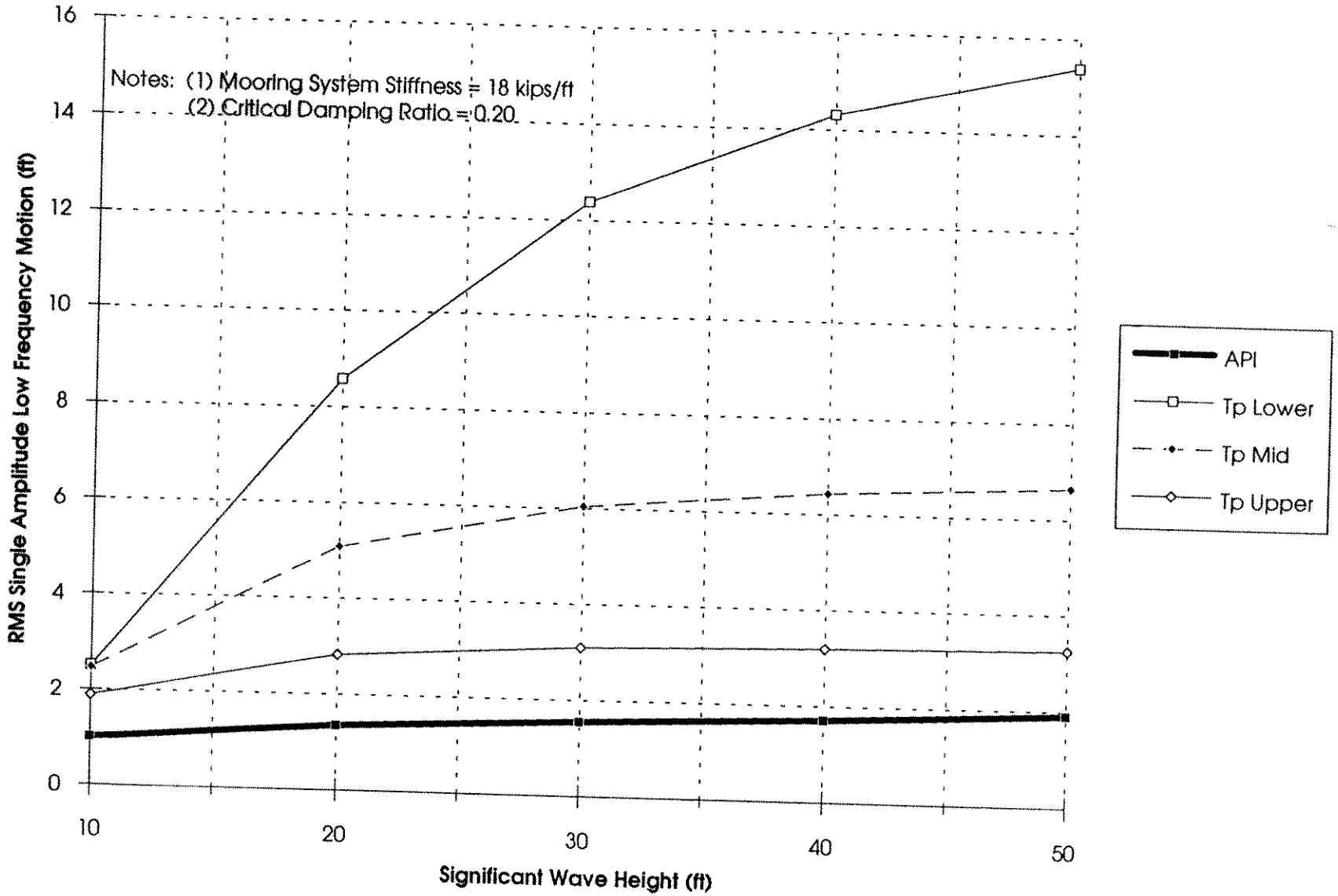
3. SENSITIVITY STUDY ON LOW-FREQUENCY MOTIONS and MEAN WAVE DRIFT FORCES

- DMOOR Results vs API RP 2P Curves
- 3 Drilling Rigs
  - "JACK BATES" and "SEDCO 704" Semis
  - "DEEPSEA DUCHESS" Drillship
- 3 Headings
  - Bow, Quartering and Beam Seas
- H_S Ranging From 10 Ft. to 50 Ft.
- T_P Ranging From $\sqrt{13H_S}$ to $\sqrt{30\ H_S}$ (H_S in meters)

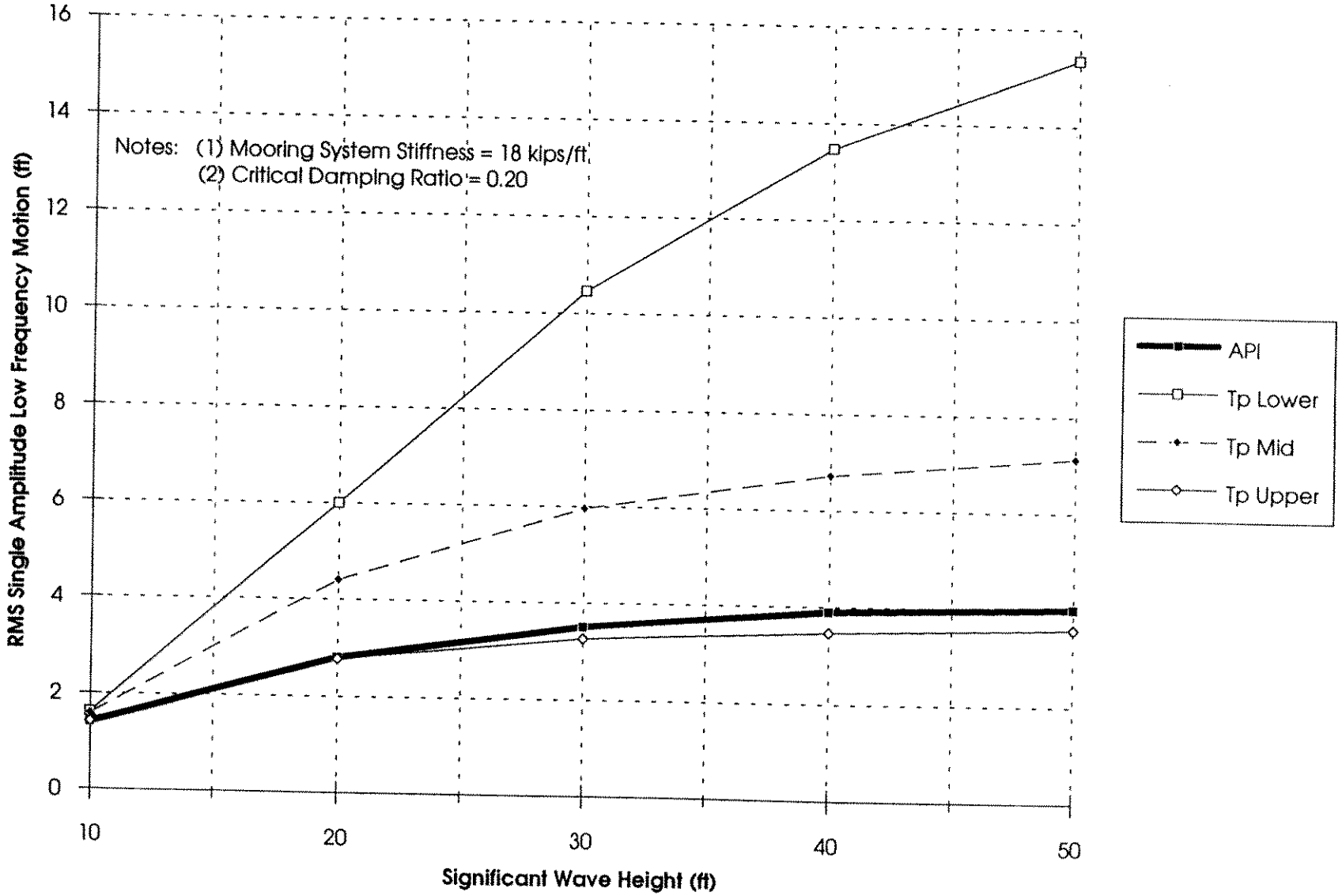
Jack Bates at 60 ft Survival Draft
Bow Seas



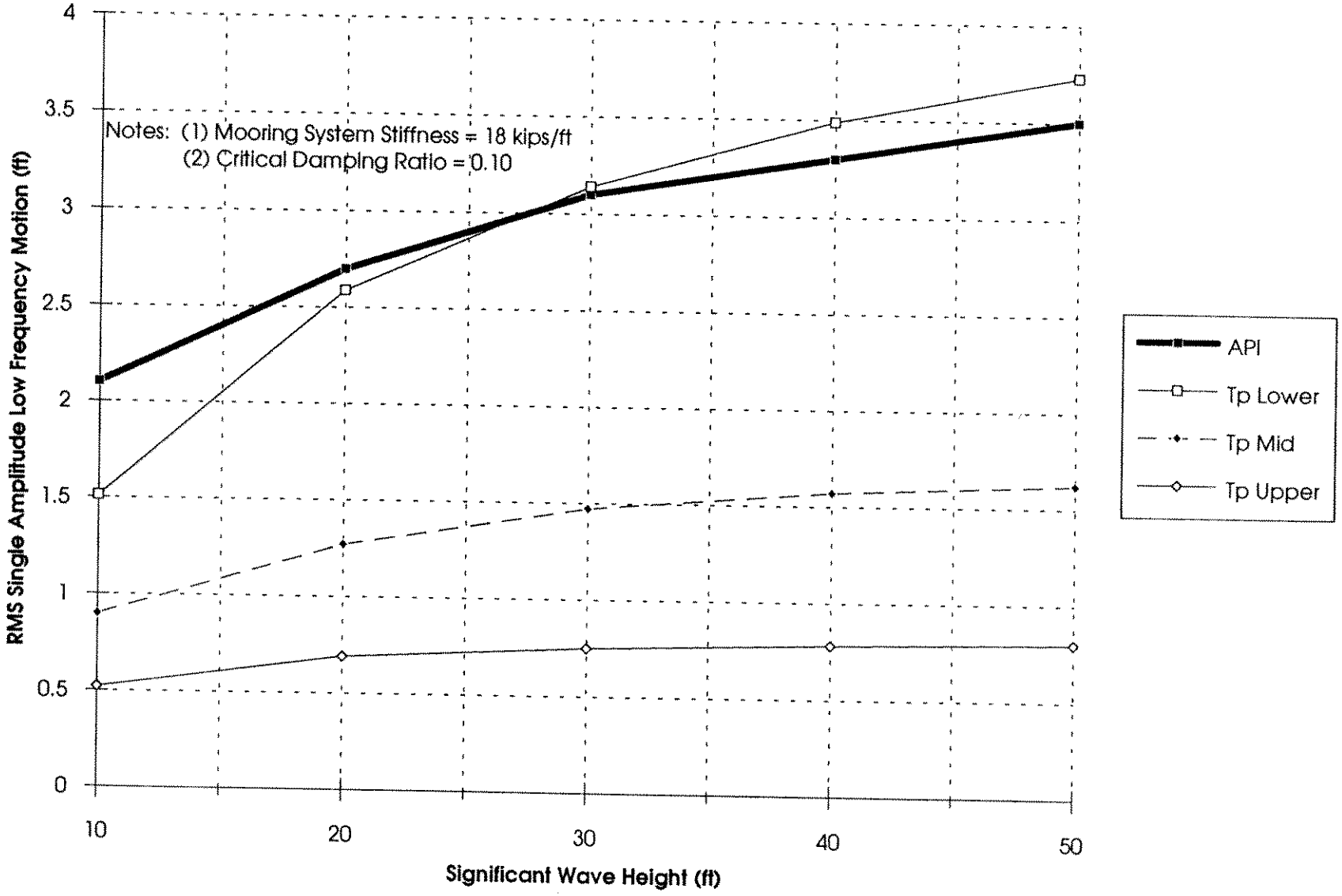
Jack Bates at 60 ft Survival Draft
Quartering Seas



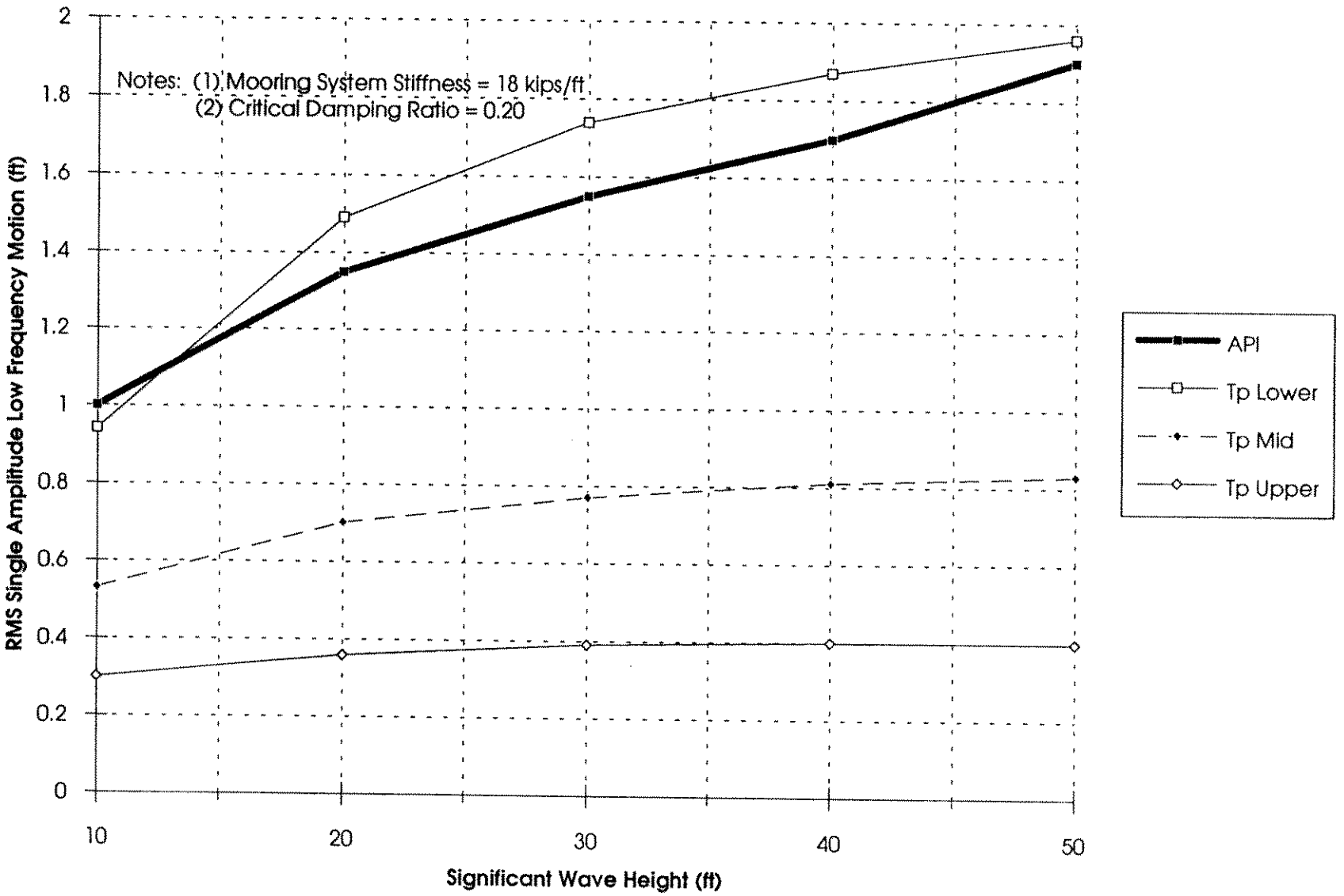
Jack Bates at 60 ft Survival Draft
Beam Seas



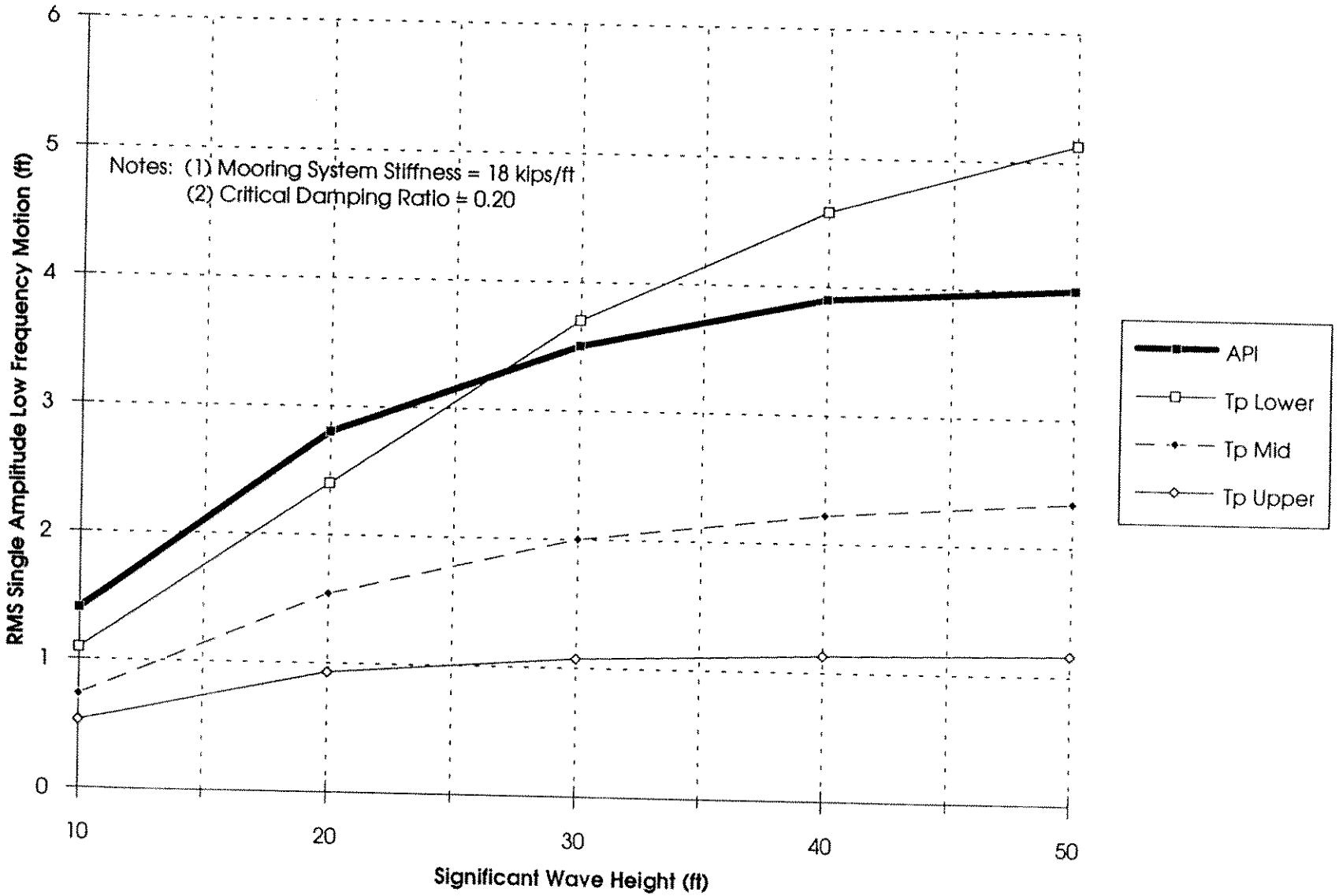
SEDCO 704 at 60 ft Survival Draft
Bow Seas



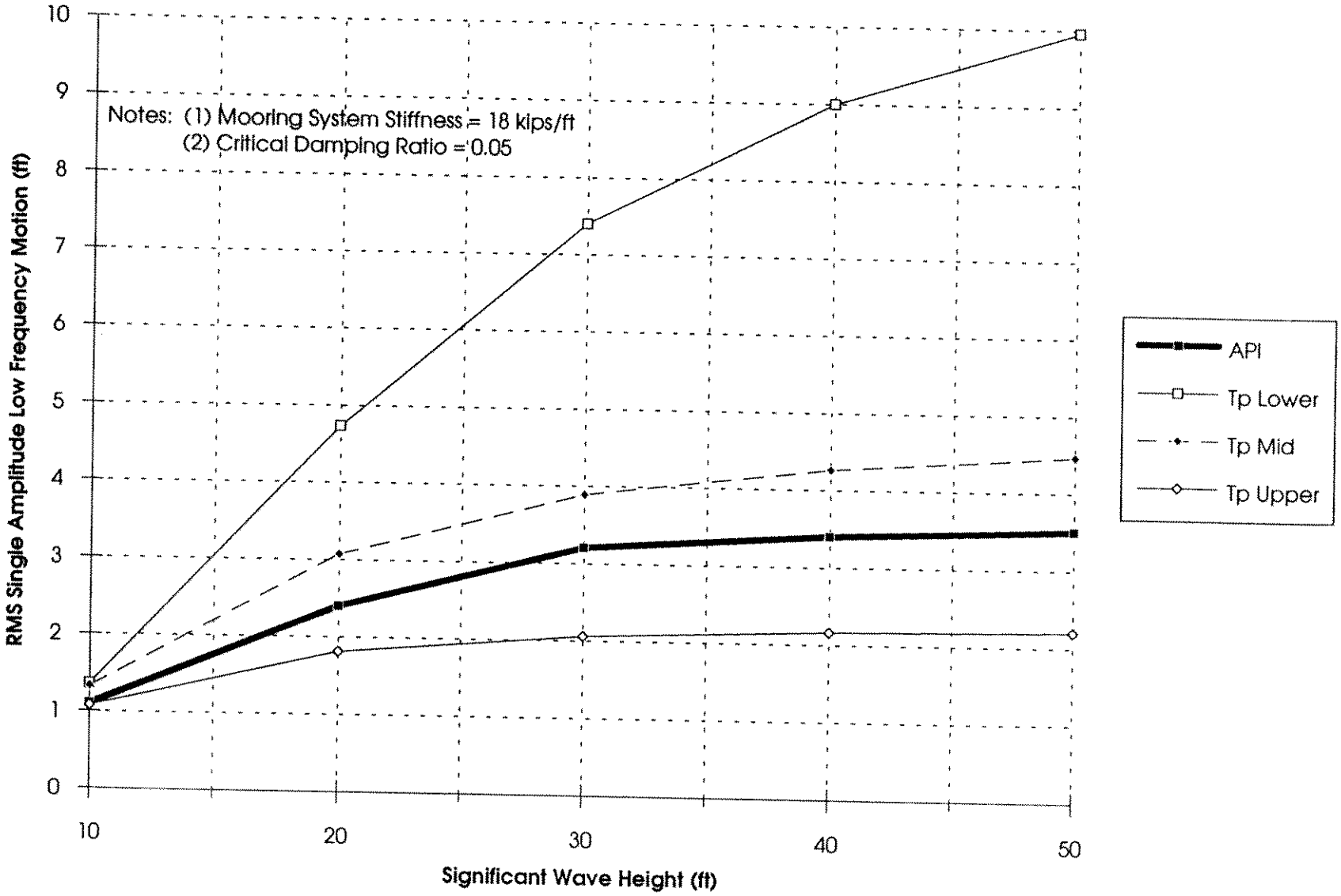
SEDCO 704 at 60 ft Survival Draft
Quartering Seas



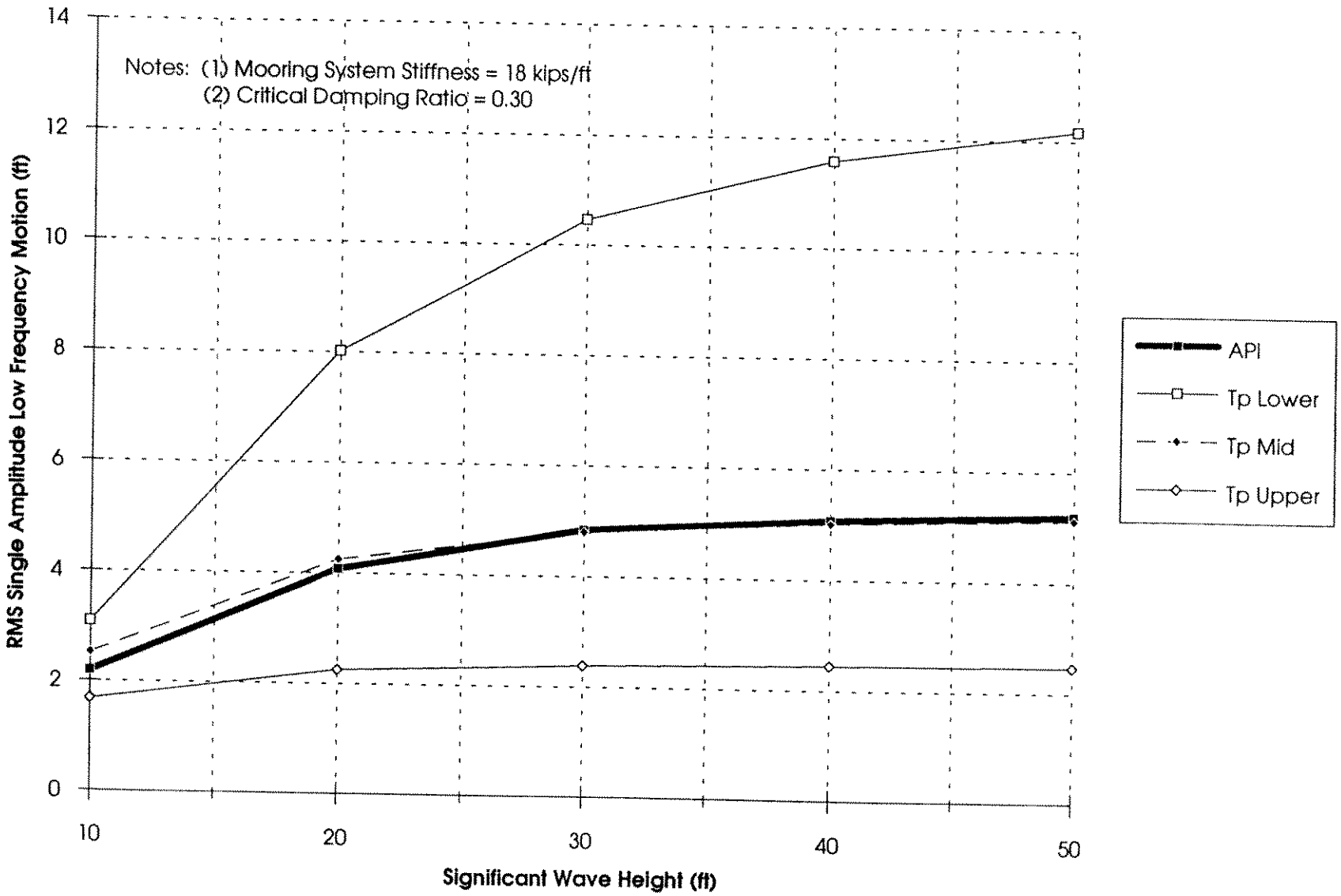
SEDCO 704 at 60 ft Survival Draft
Beam Seas



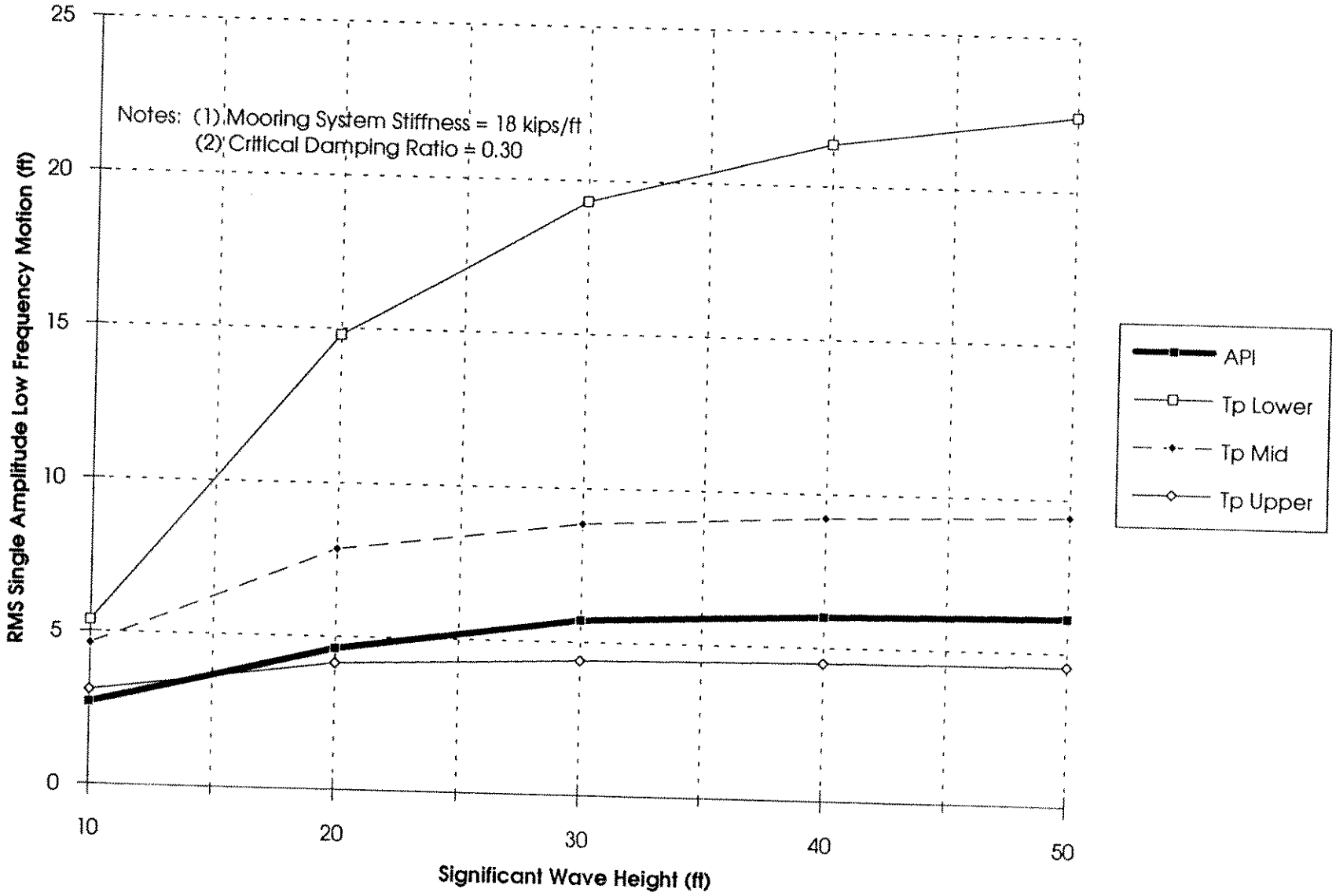
Deepsea Duchess at 24 ft Op/Surv Draft
Bow Seas



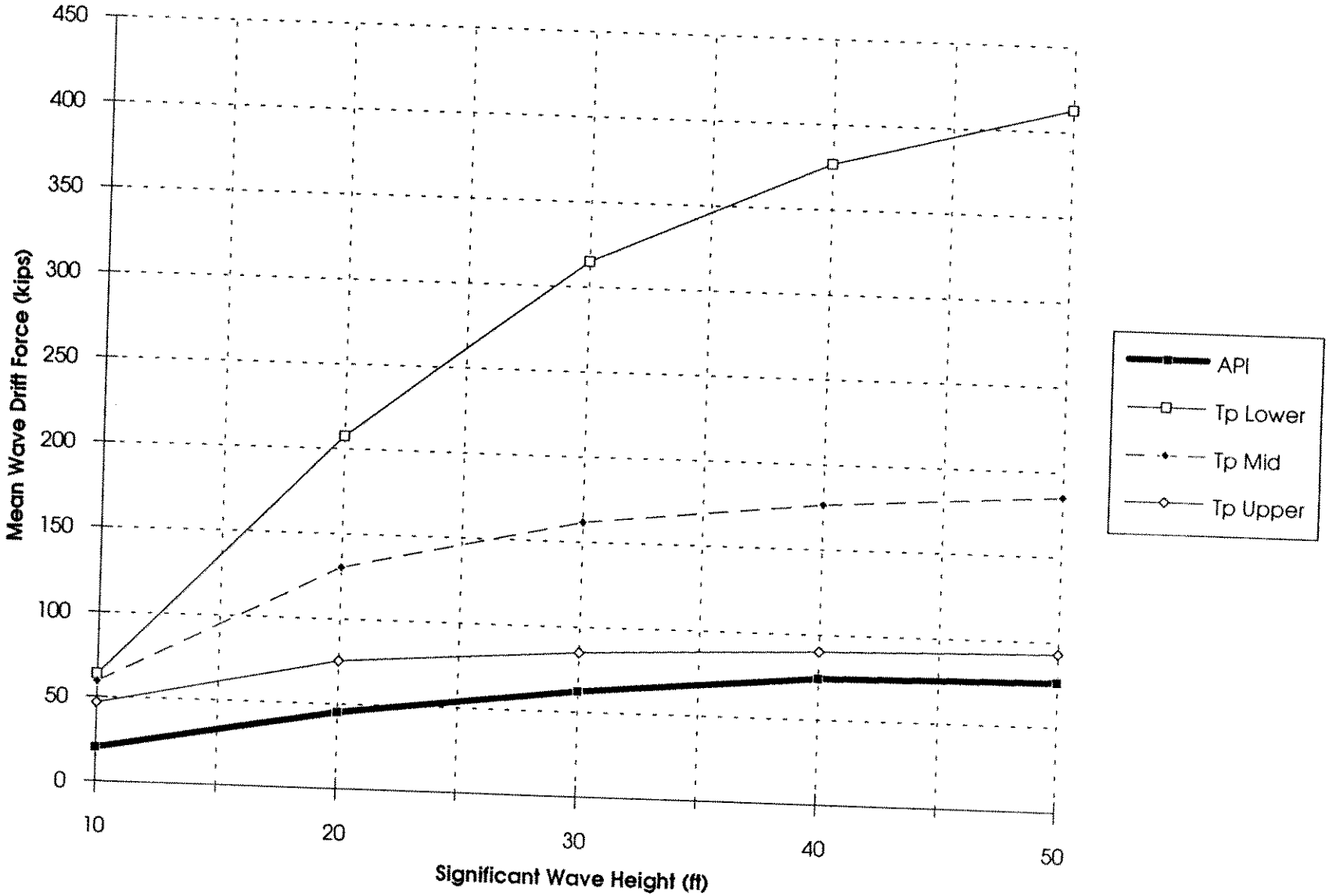
Deepsea Duchess at 24 ft Op/Surv Draft
Quartering Seas



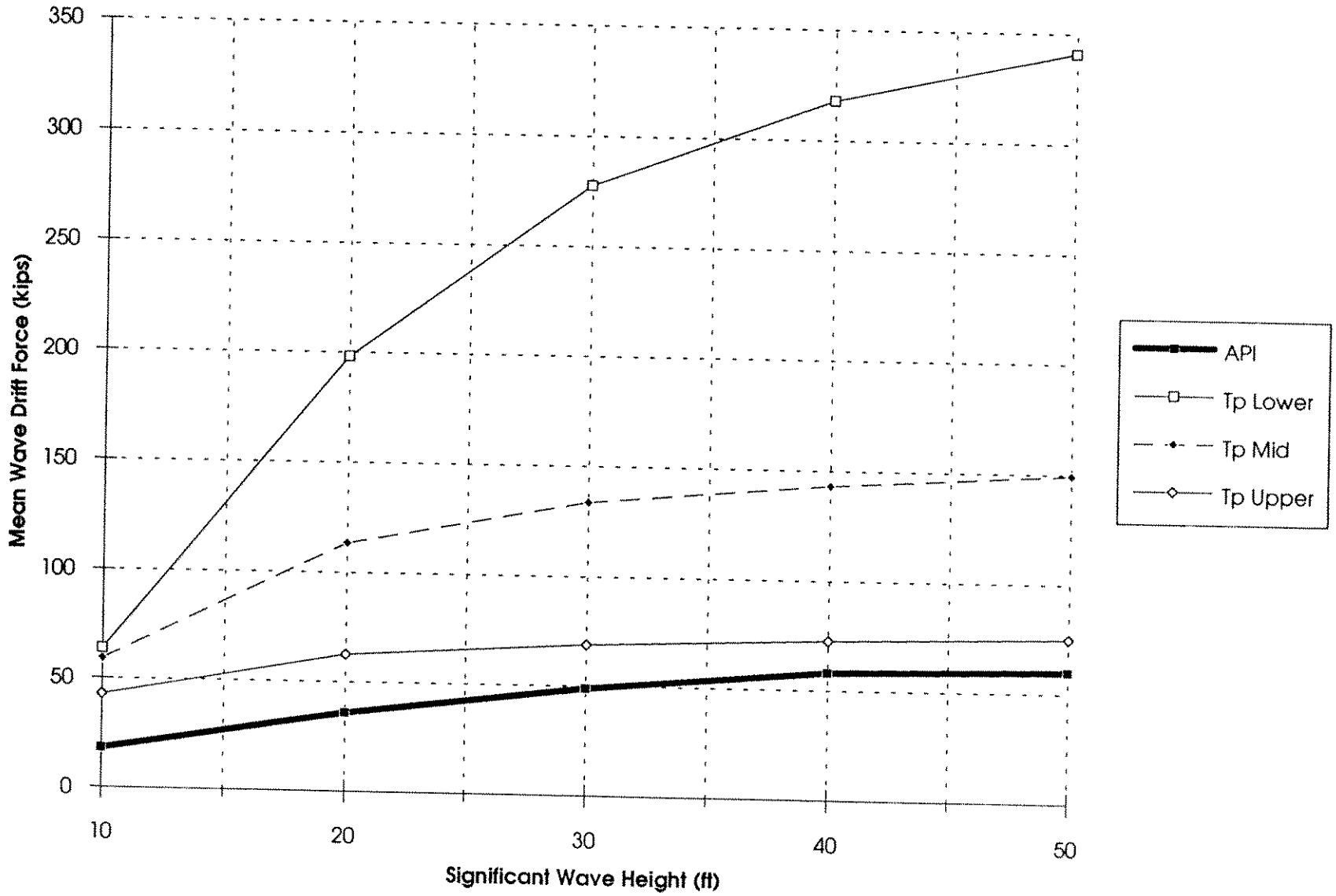
Deepsea Duchess at 24 ft Op/Surv Draft
Beam Seas



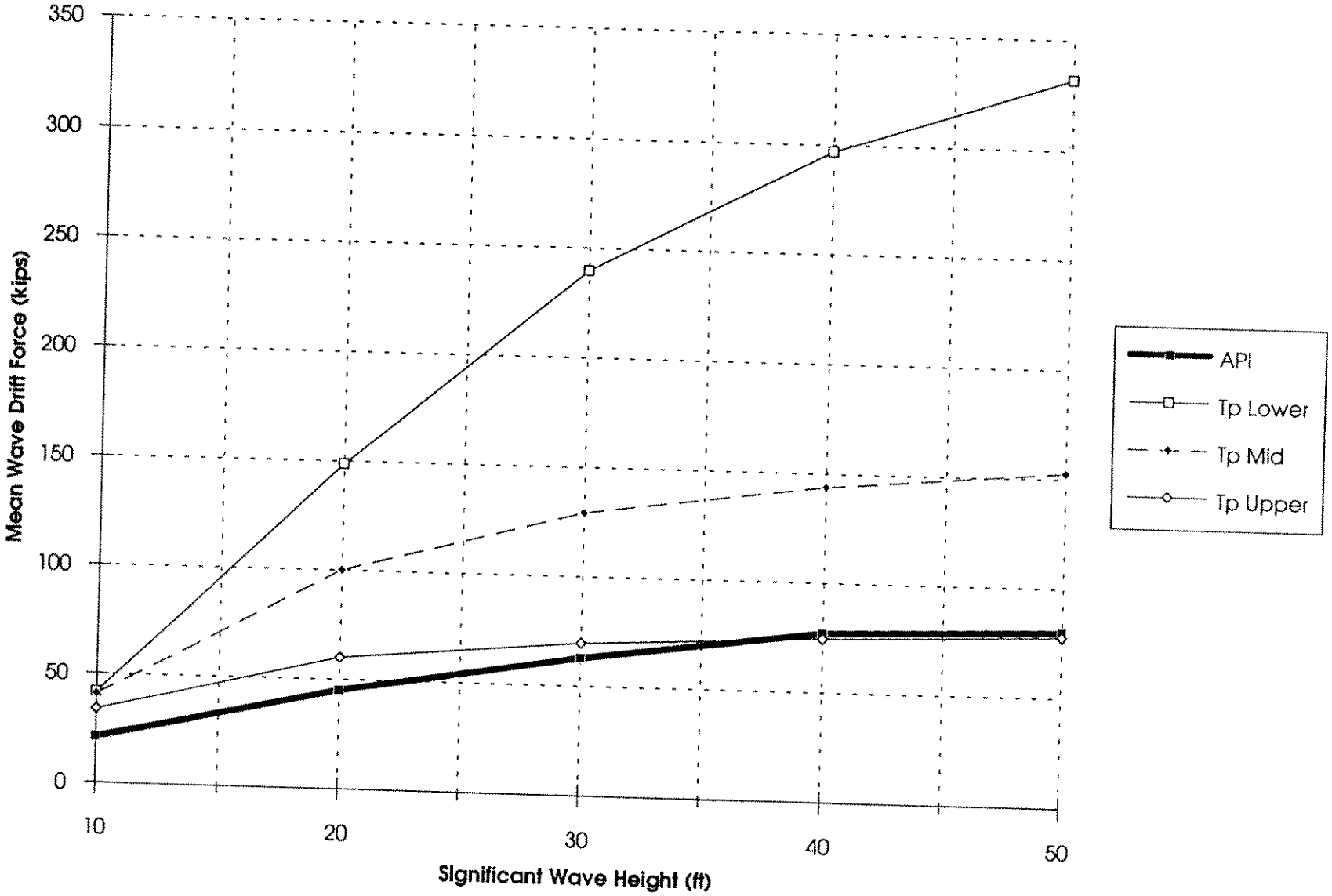
Jack Bates at 60 ft Survival Draft
Bow Seas



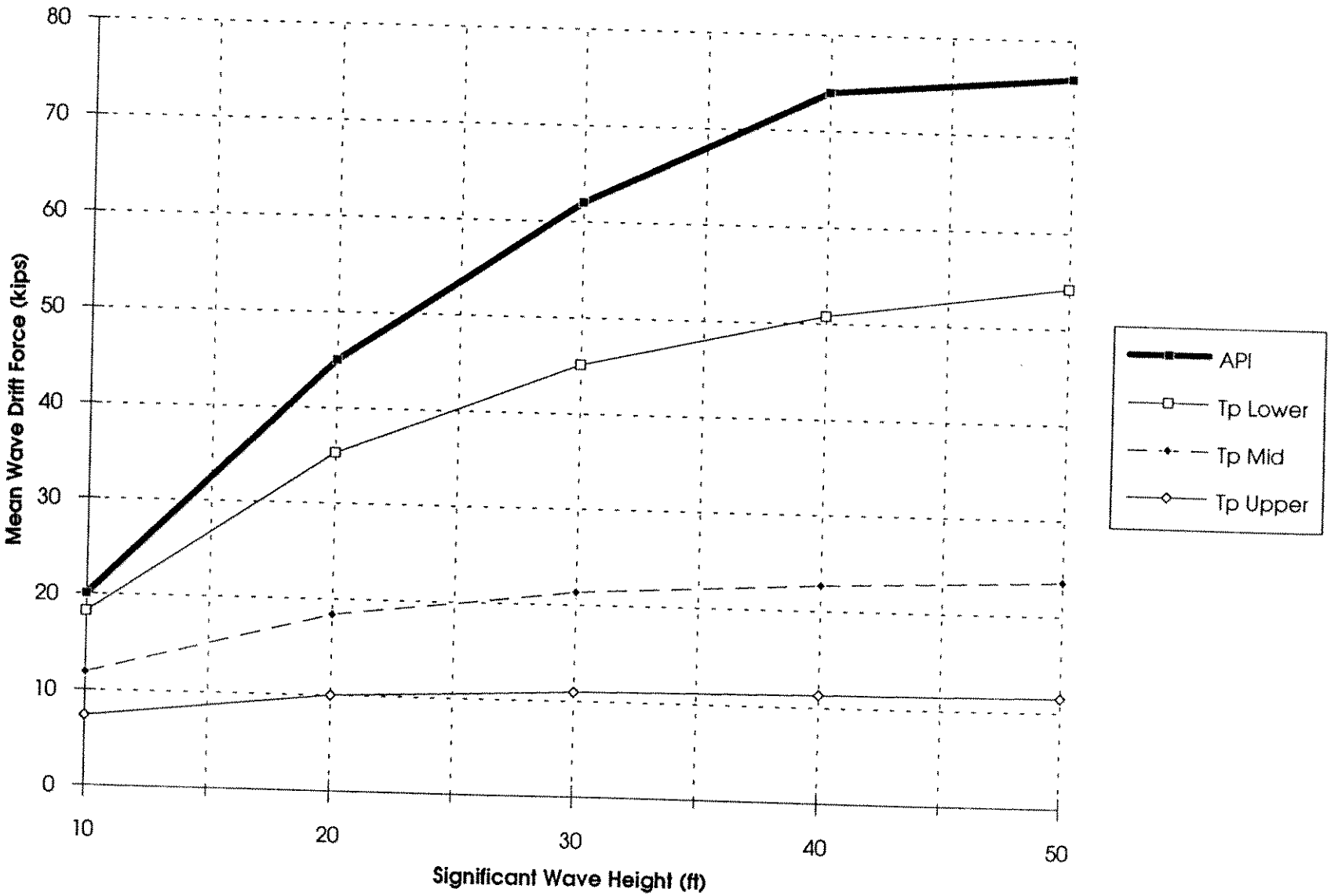
Jack Bates at 60 ft Survival Draft
Quartering Seas



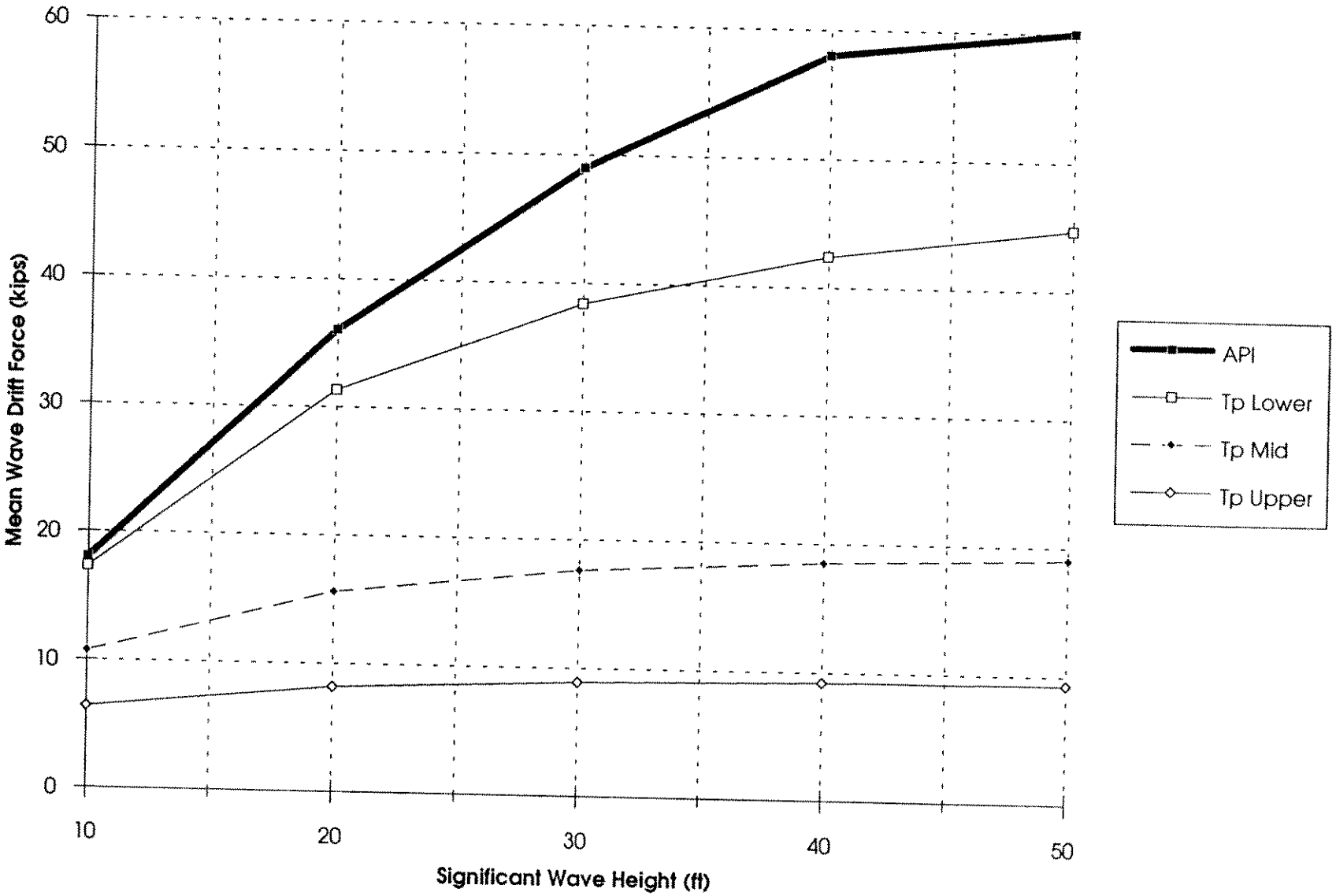
Jack Bates at 60 ft Survival Draft
Beam Seas



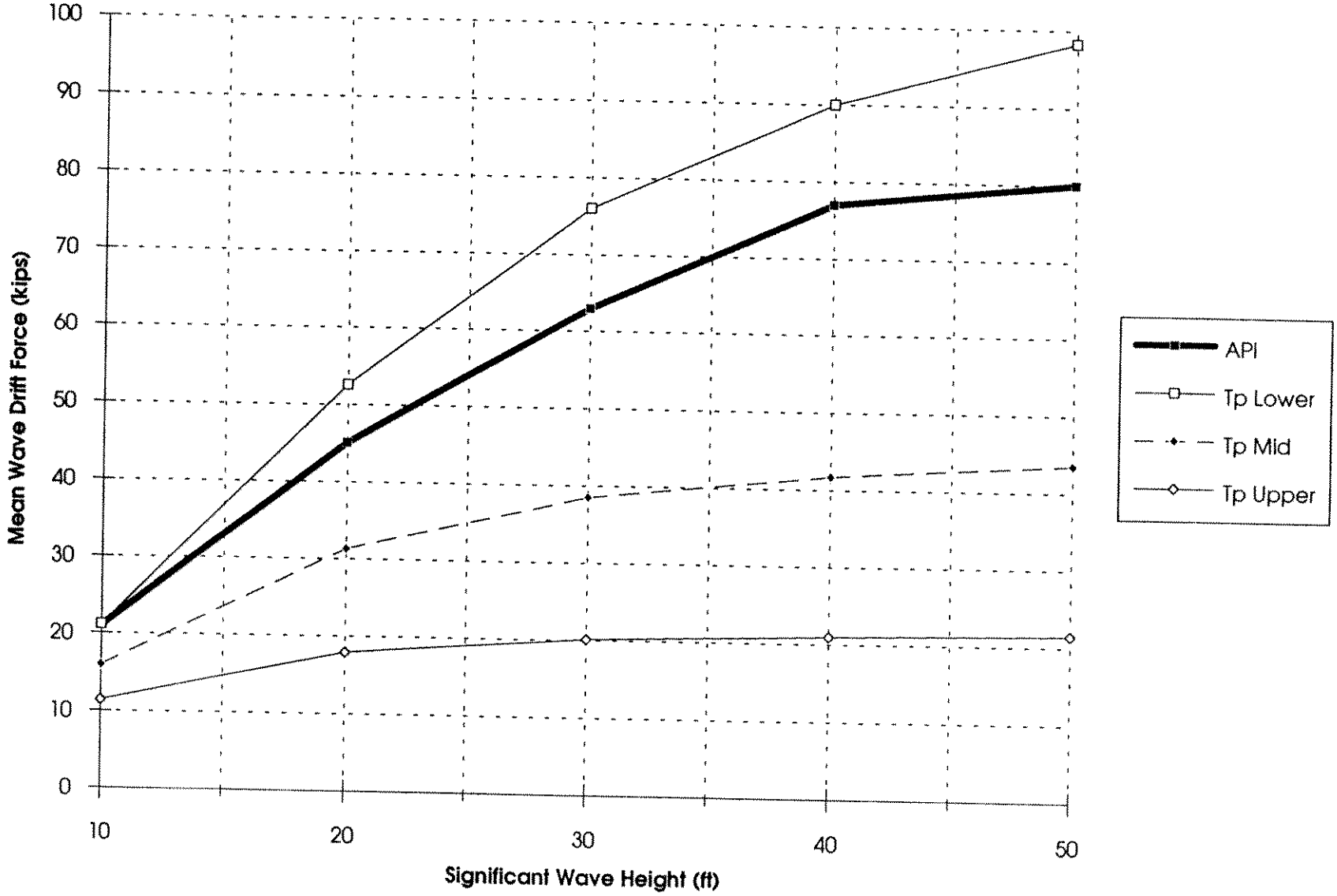
SEDCO 704 at 60 ft Survival Draft
Bow Seas



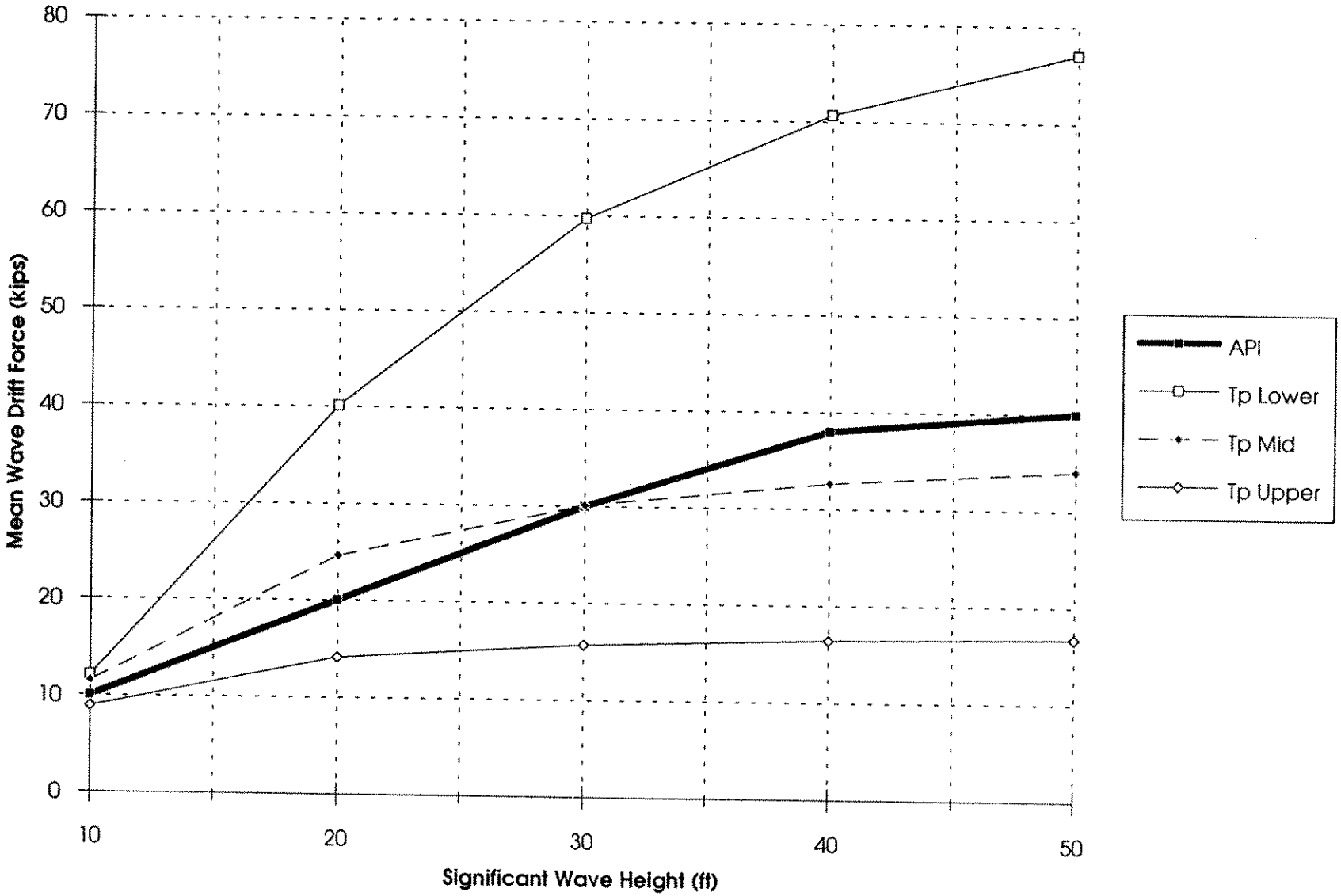
SEDCO 704 at 60 ft Survival Draft
Quartering Seas



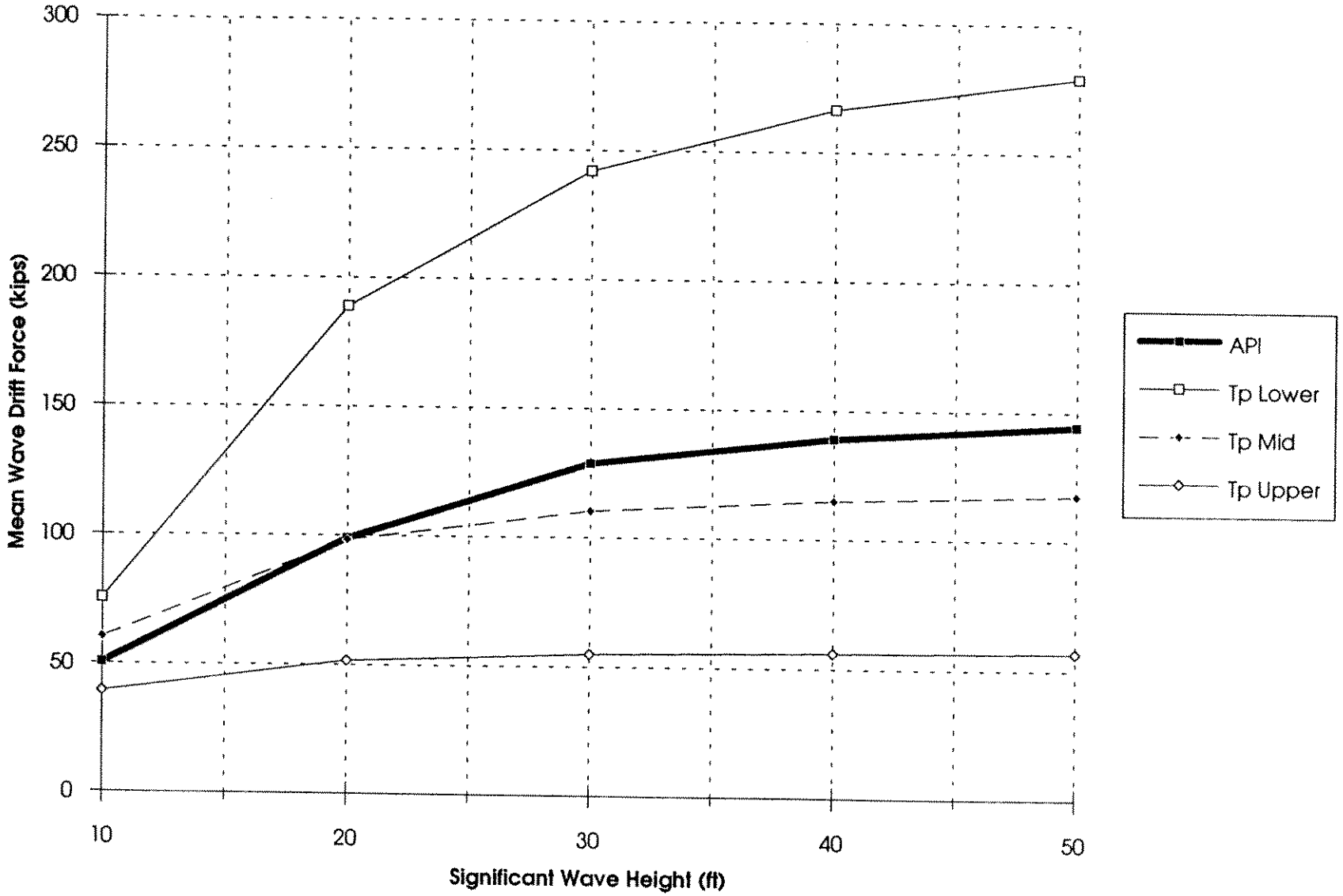
SEDCO 704 at 60 ft Survival Draft
Beam Seas



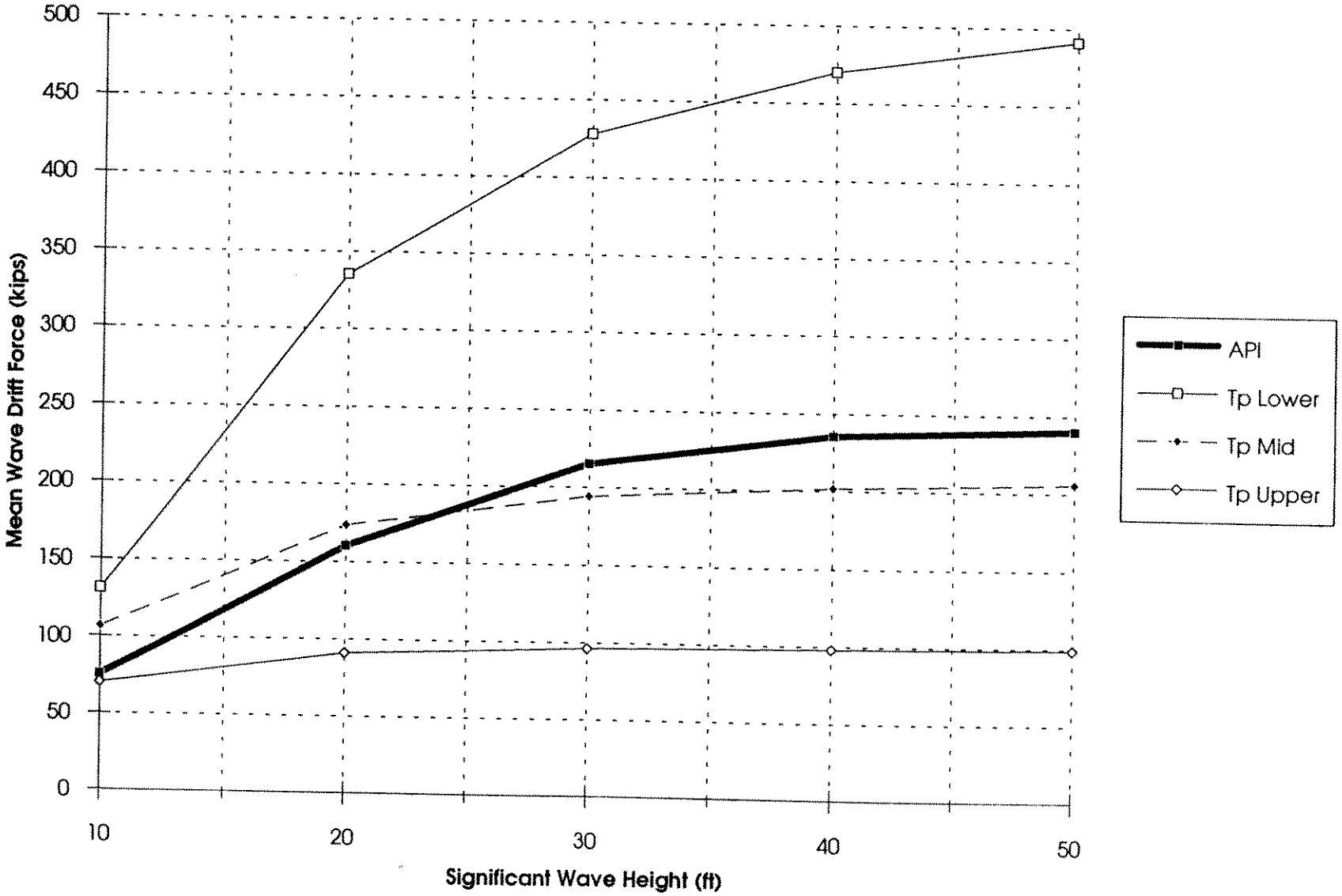
Deepsea Duchess at 24 ft Op/Surv Draft
Bow Seas



Deepsea Duchess at 24 ft Op/Surv Draft
Quartering Seas



Deepsea Duchess at 24 ft Op/Surv Draft
Beam Seas



4. QUASI-STATIC MOORING ANALYSIS RESULTS:

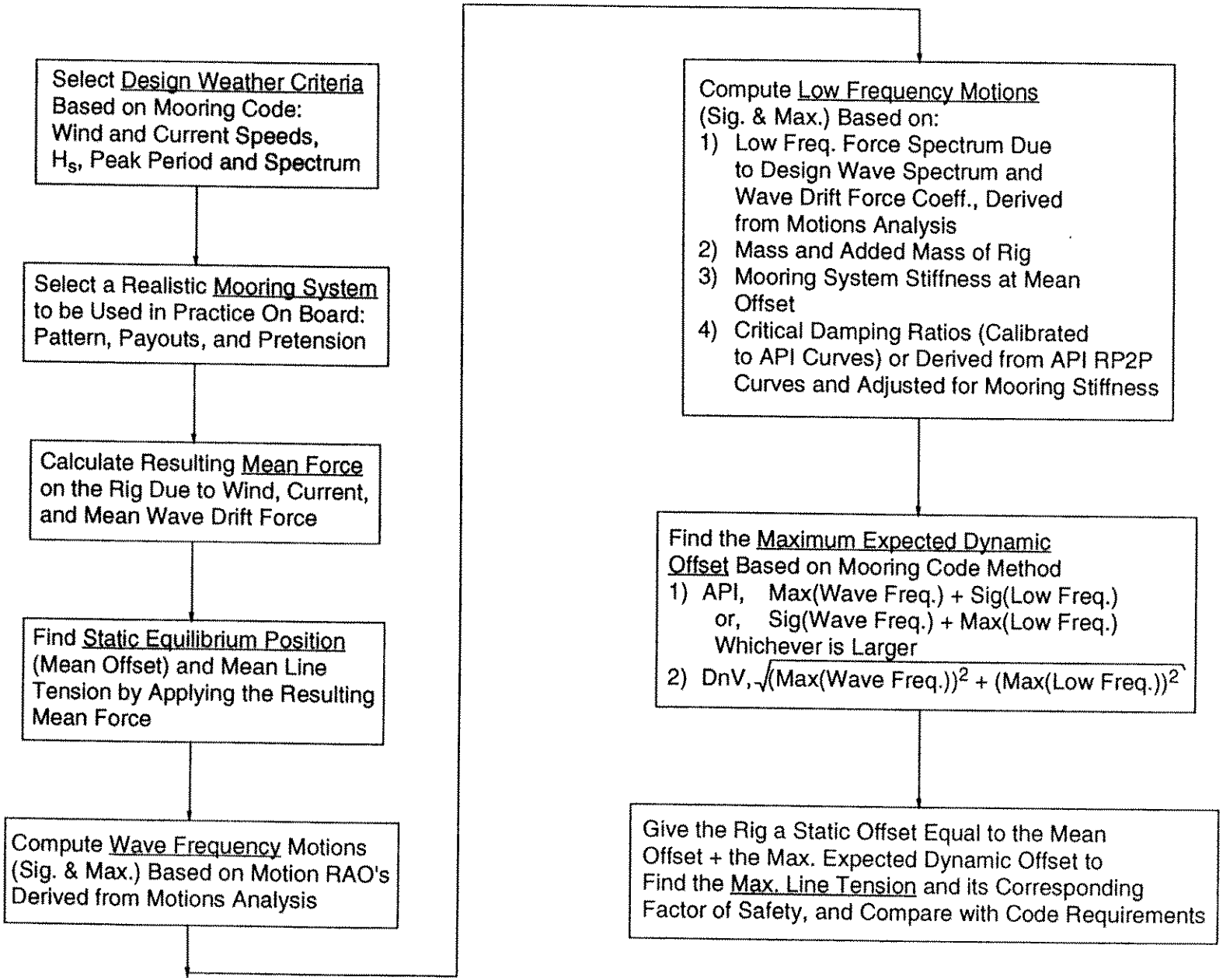
a. PER SITE FOR ALL RIGS AND CODES

- 2 Sites:
  - GOMEX
  - N North Sea

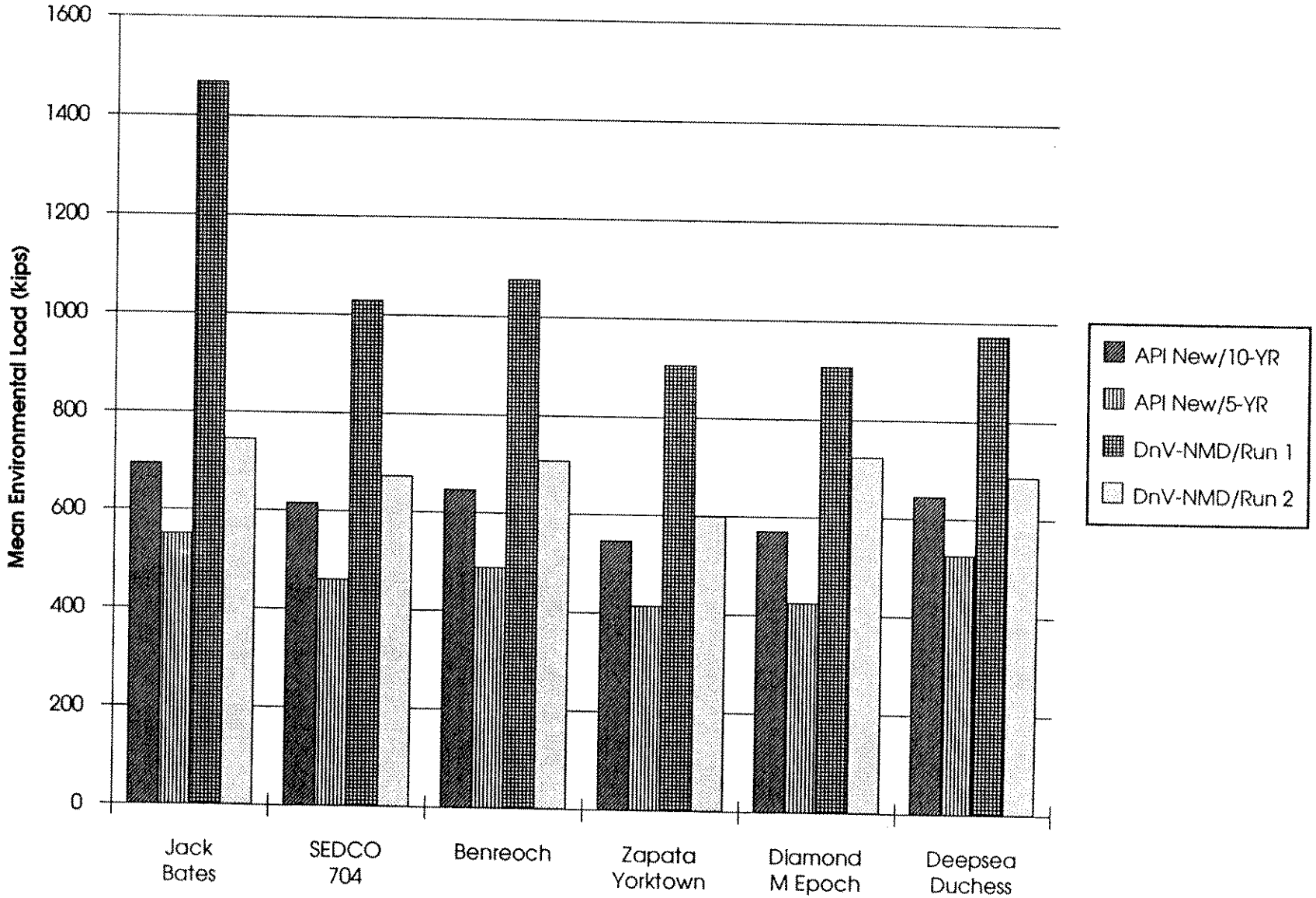
- 2 Water Depths:
  - 300 Ft.
  - 1500 Ft.

- 99.9% Non-Exceedance Weather Criteria in GOMEX

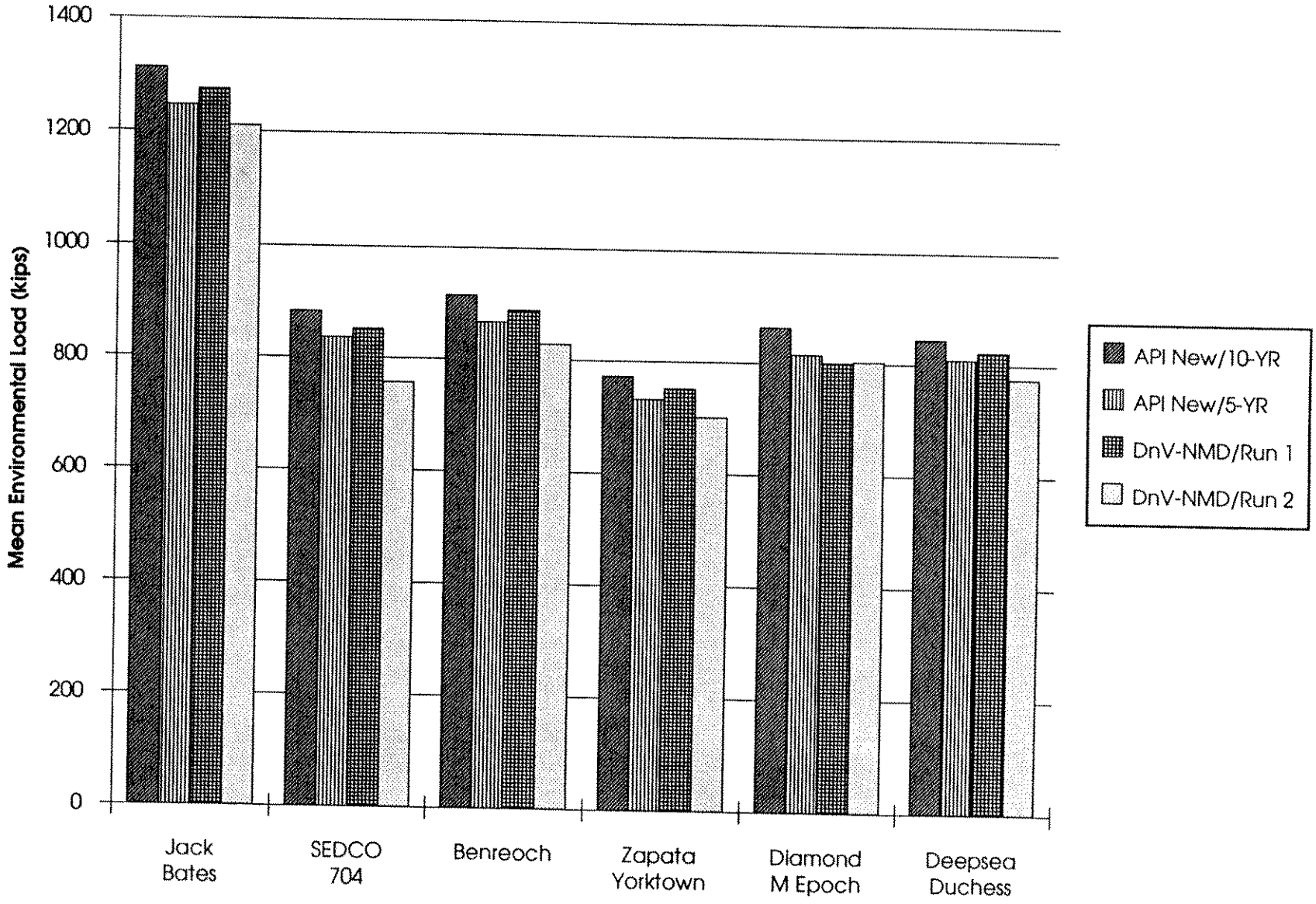
METHOD OF QUASI - STATIC MOORING ANALYSIS



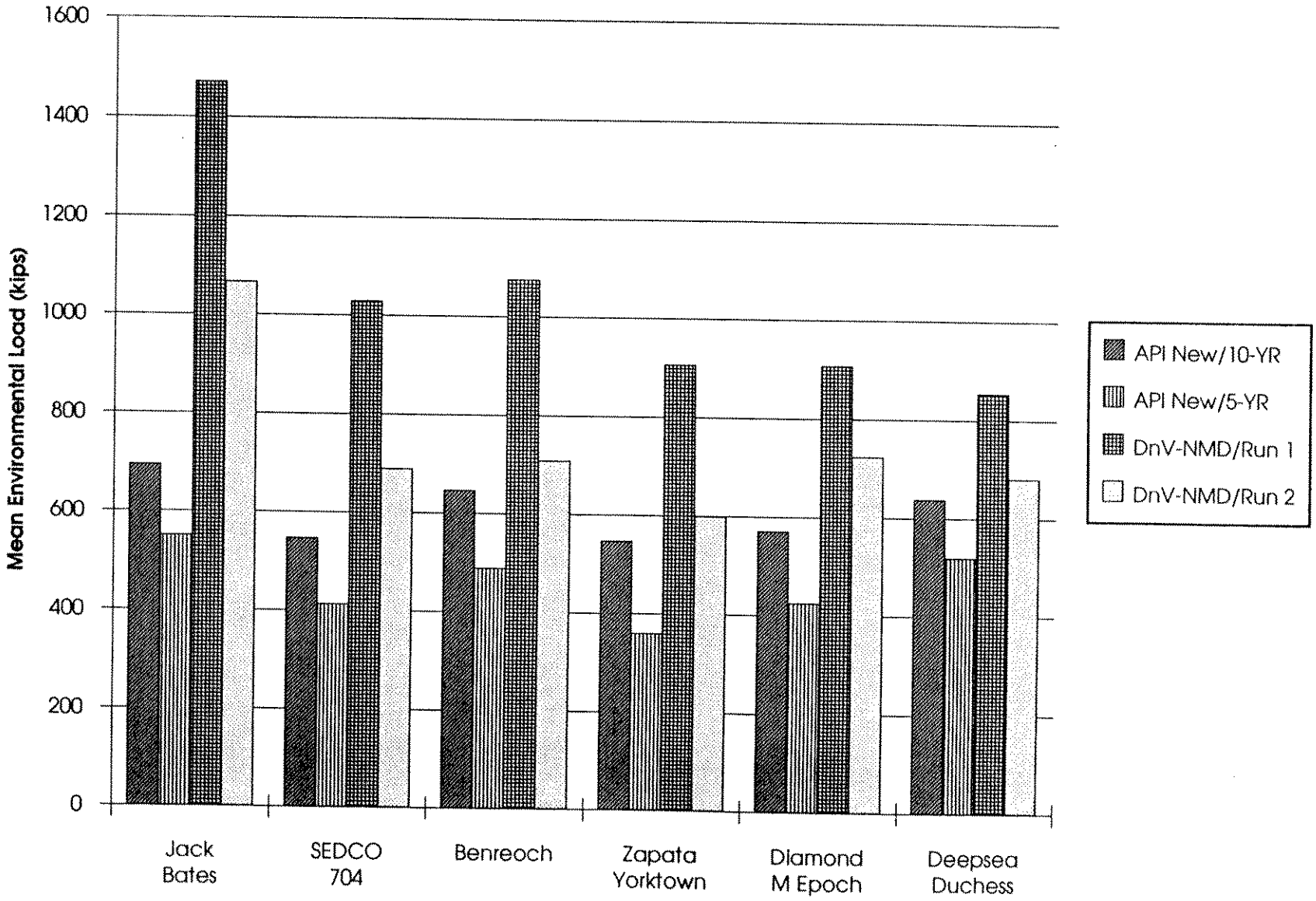
Mean Environmental Load Comparison
1500 Ft. Water Depth, GOMEX



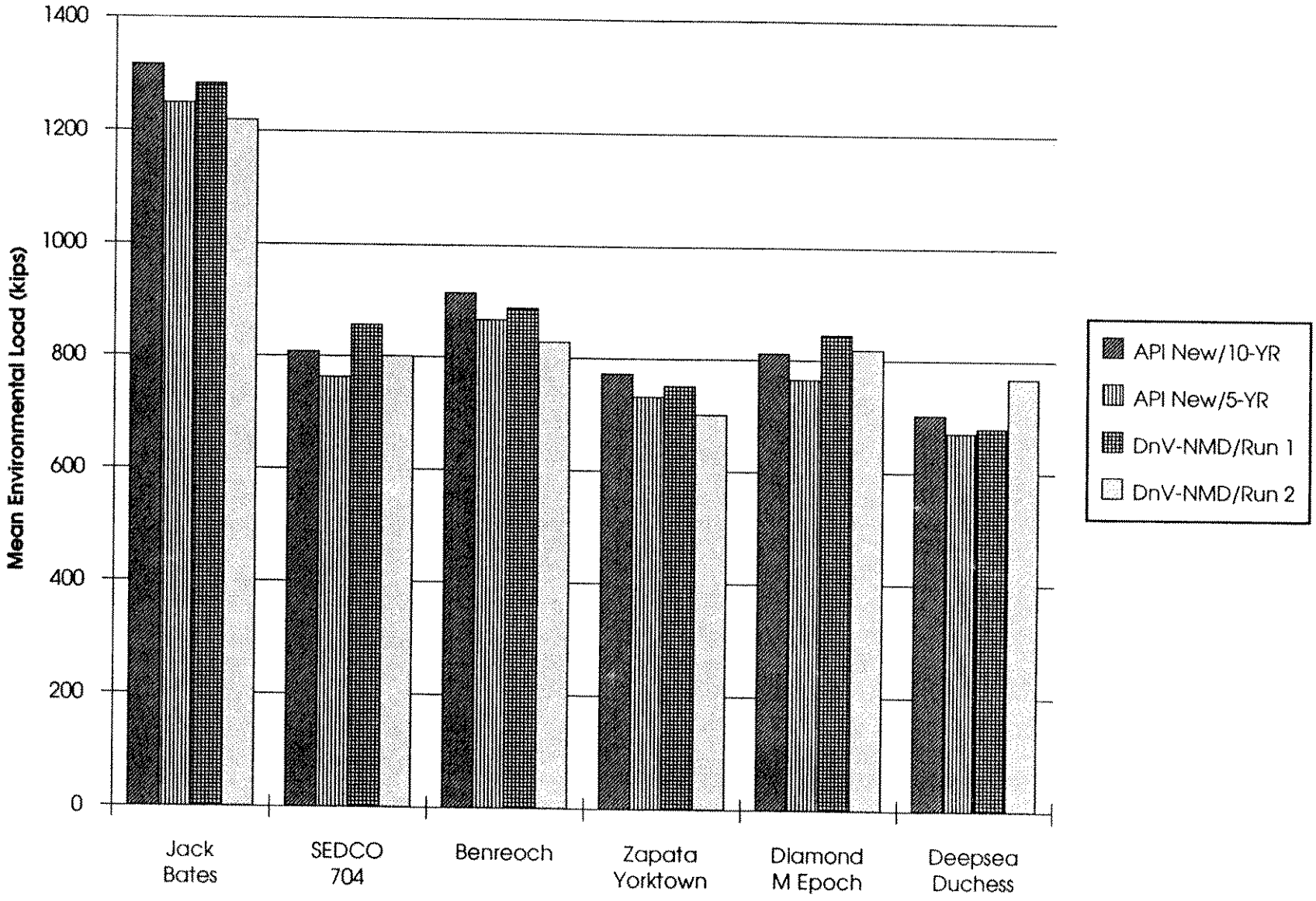
Mean Environmental Load Comparison
1500 Ft. Water Depth, N North Sea



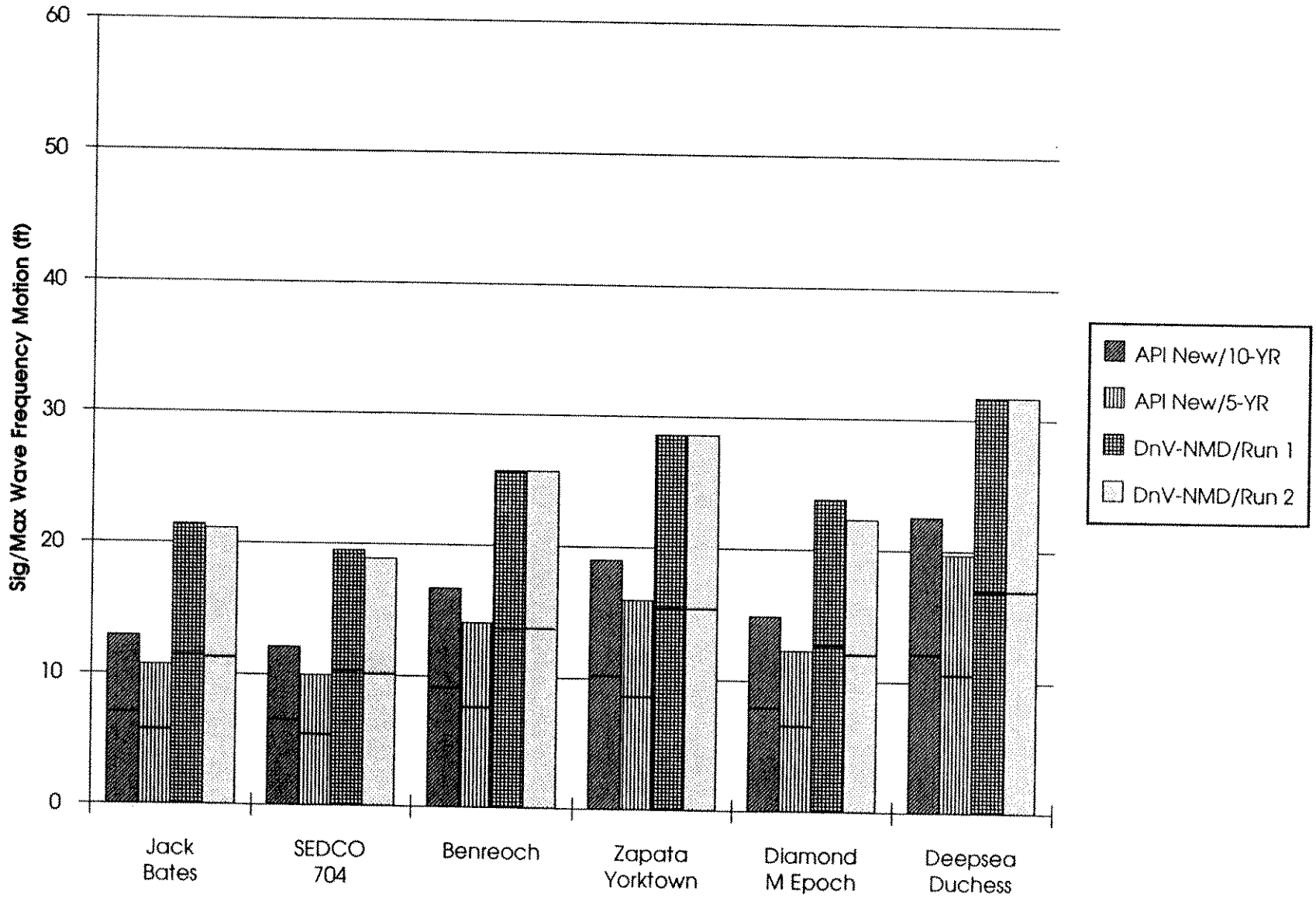
Mean Environmental Load Comparison
300 Ft. Water Depth, GOMEX



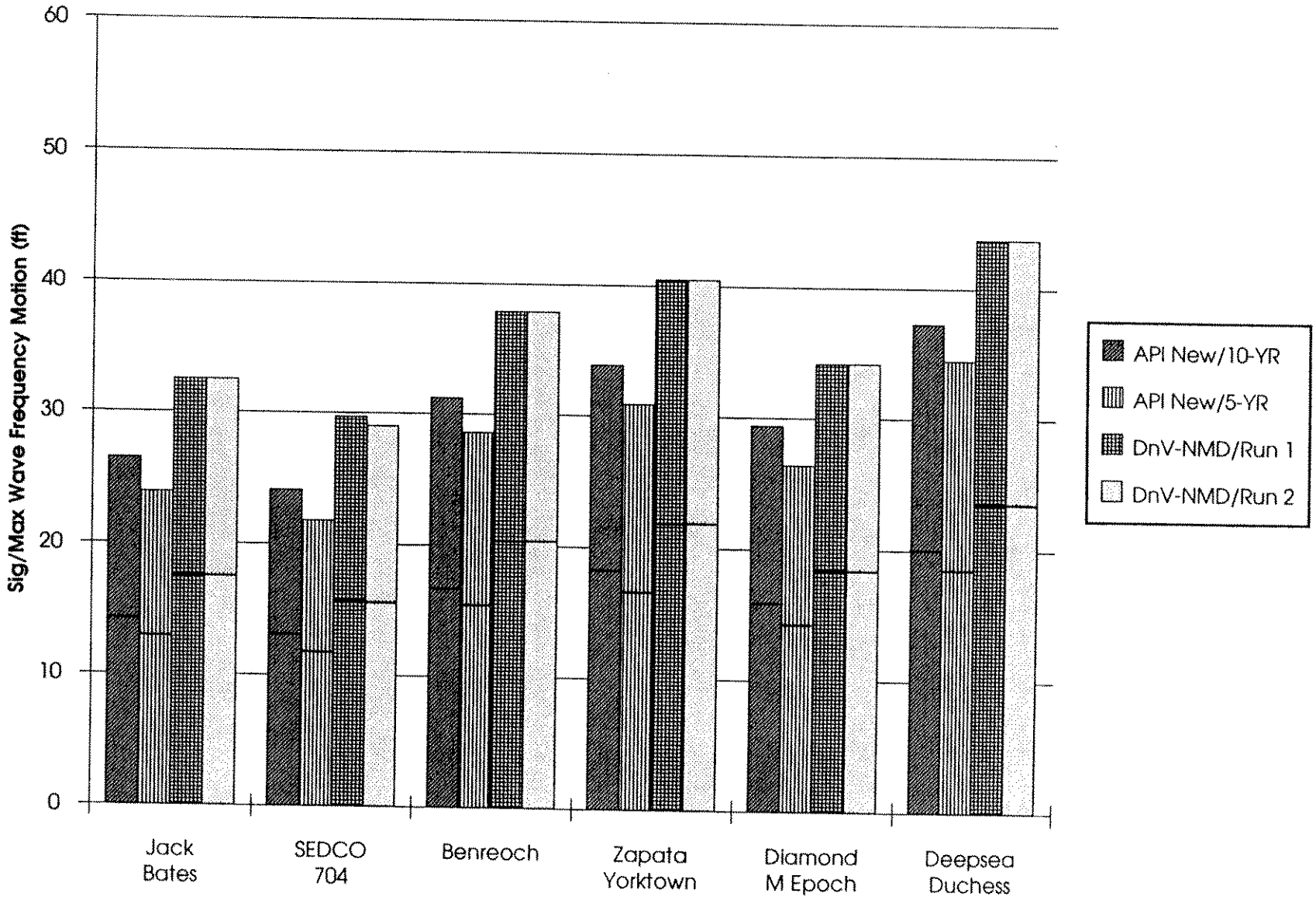
Mean Environmental Load Comparison
300 Ft. Water Depth, N North Sea



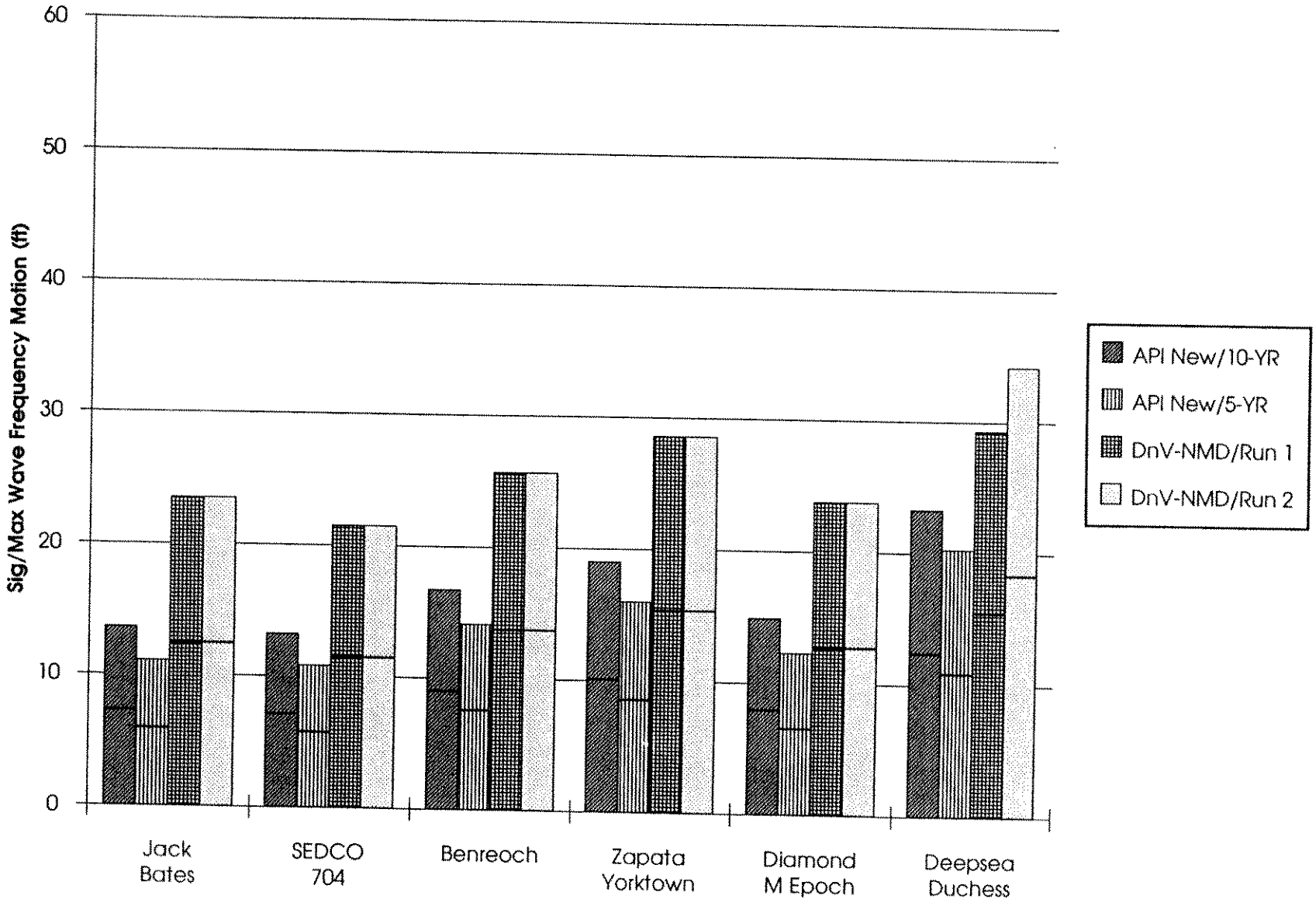
Wave Frequency Motion Comparison
1500 Ft. Water Depth, GOMEX



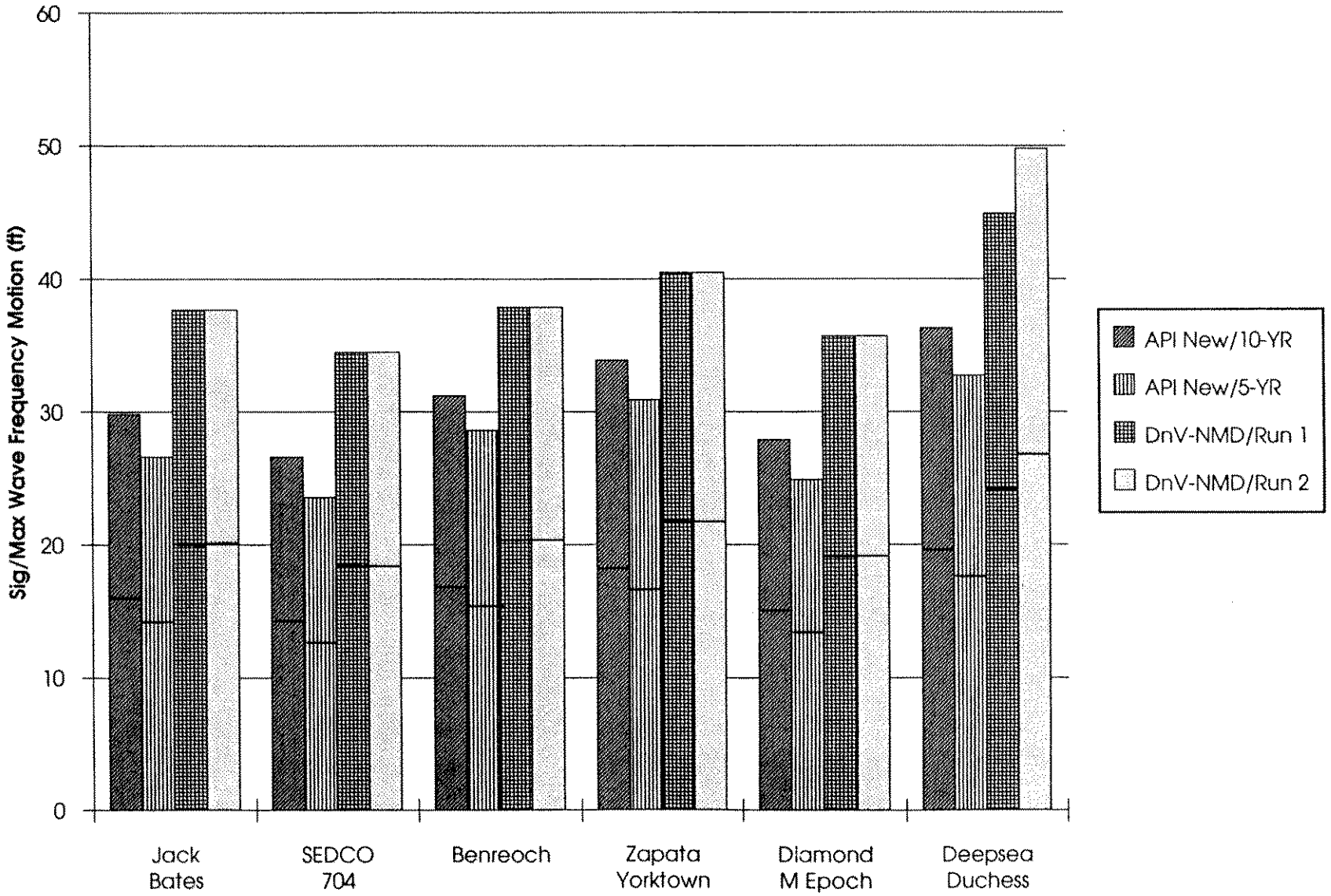
Wave Frequency Motion Comparison
1500 Ft. Water Depth, N North Sea



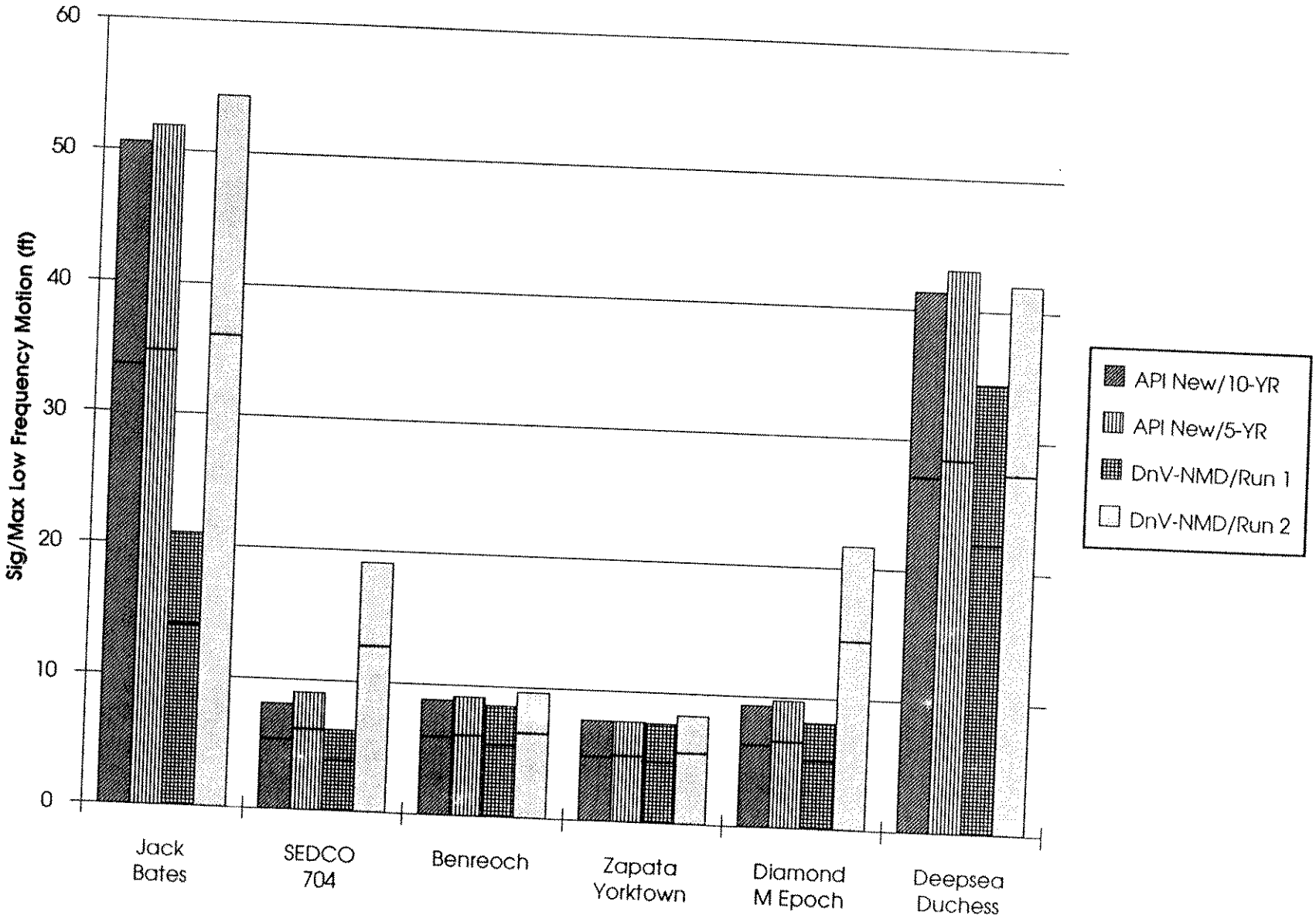
Wave Frequency Motion Comparison
300 Ft. Water Depth, GOMEX



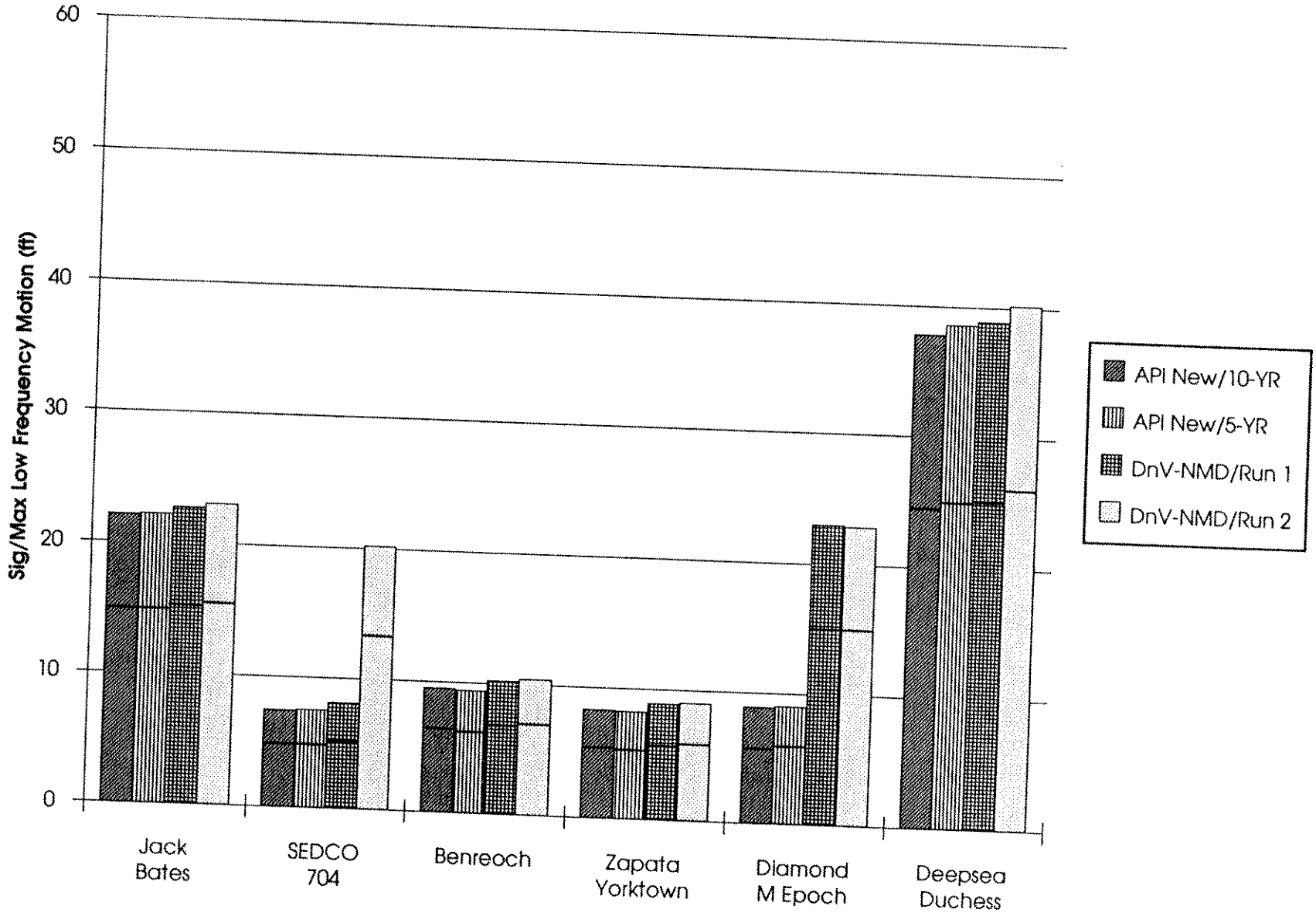
Wave Frequency Motion Comparison
300 Ft. Water Depth, N North Sea



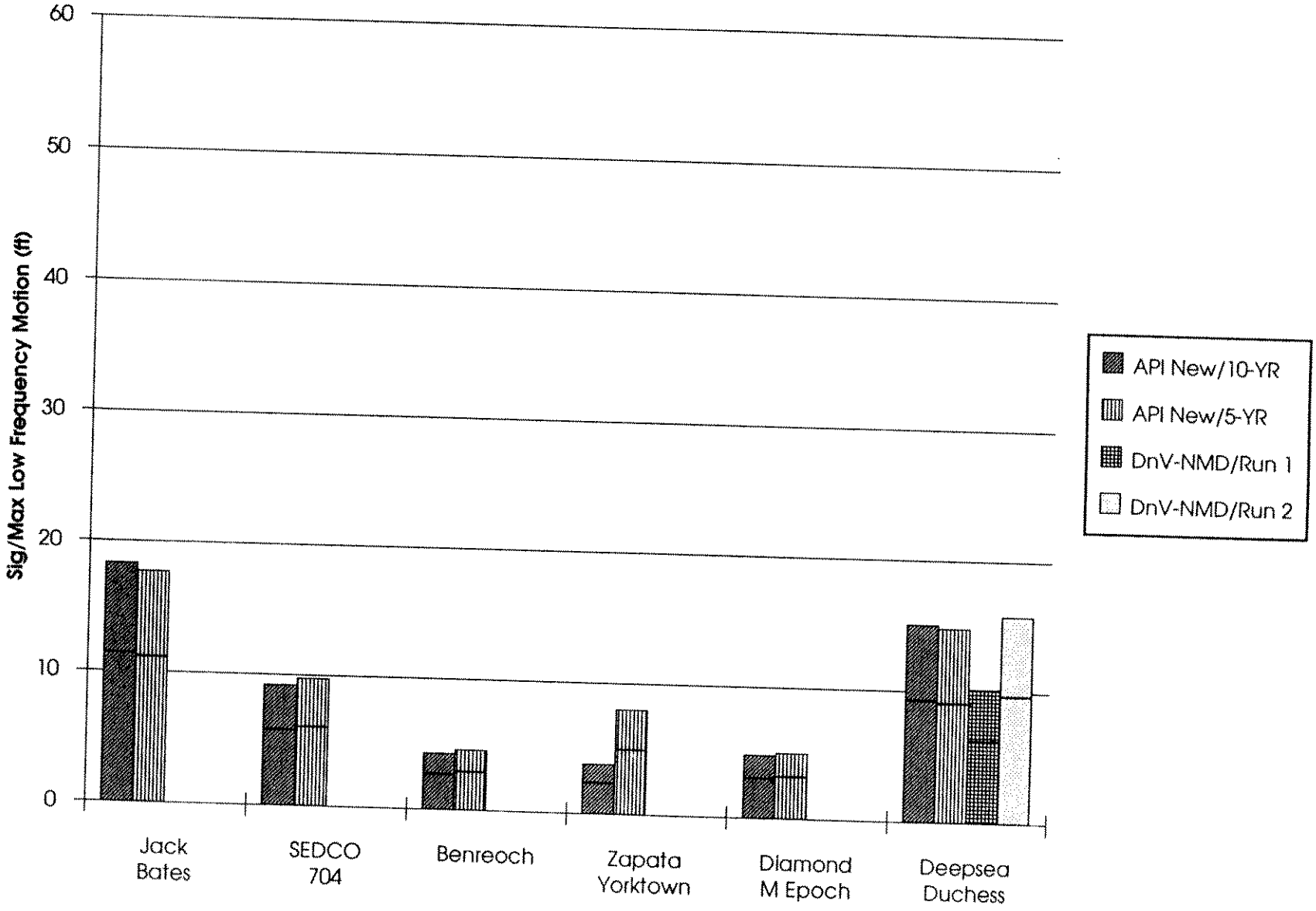
Low Frequency Motion Comparison
1500 Ft. Water Depth, GOMEX



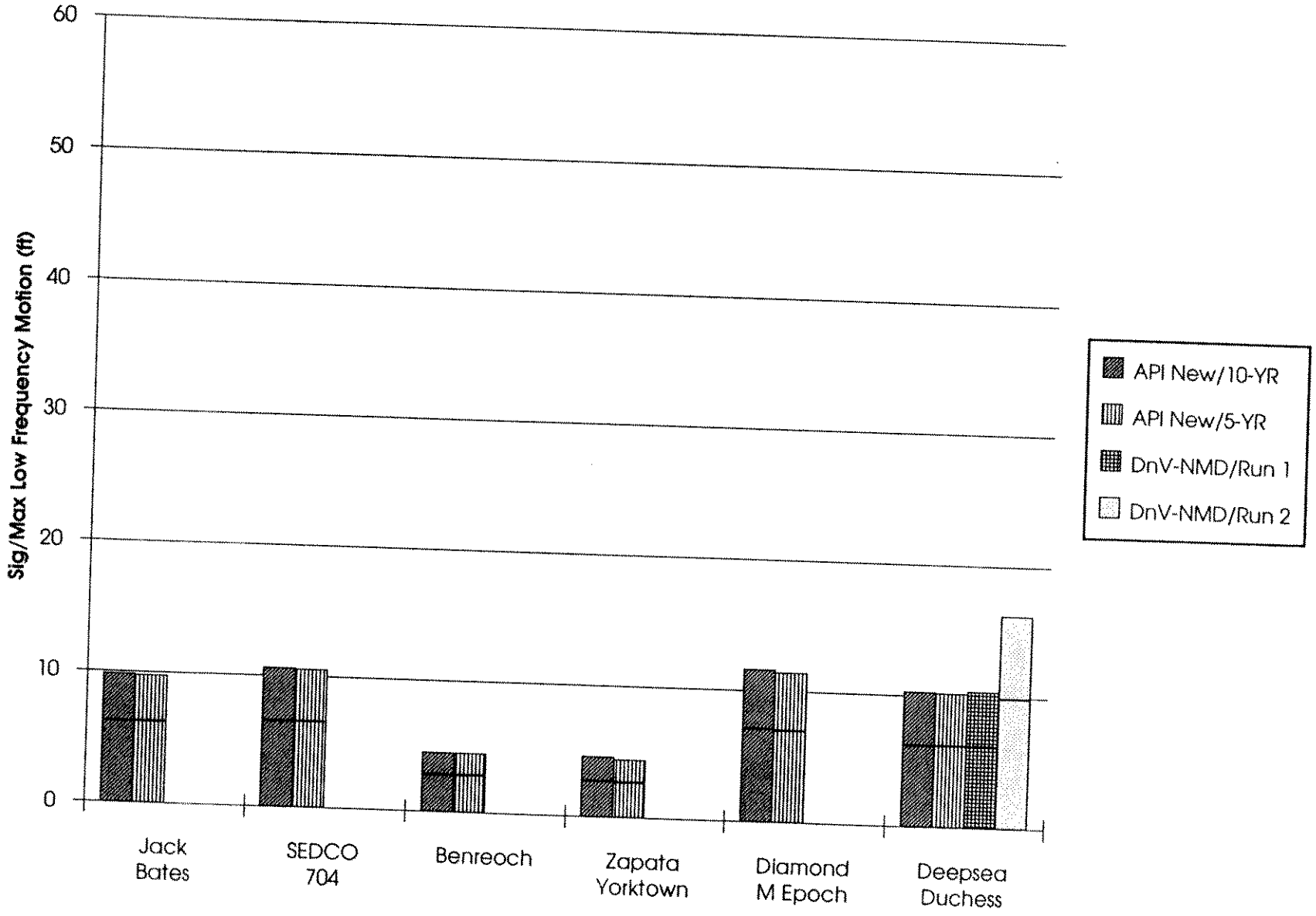
Low Frequency Motion Comparison
1500 Ft. Water Depth, N North Sea



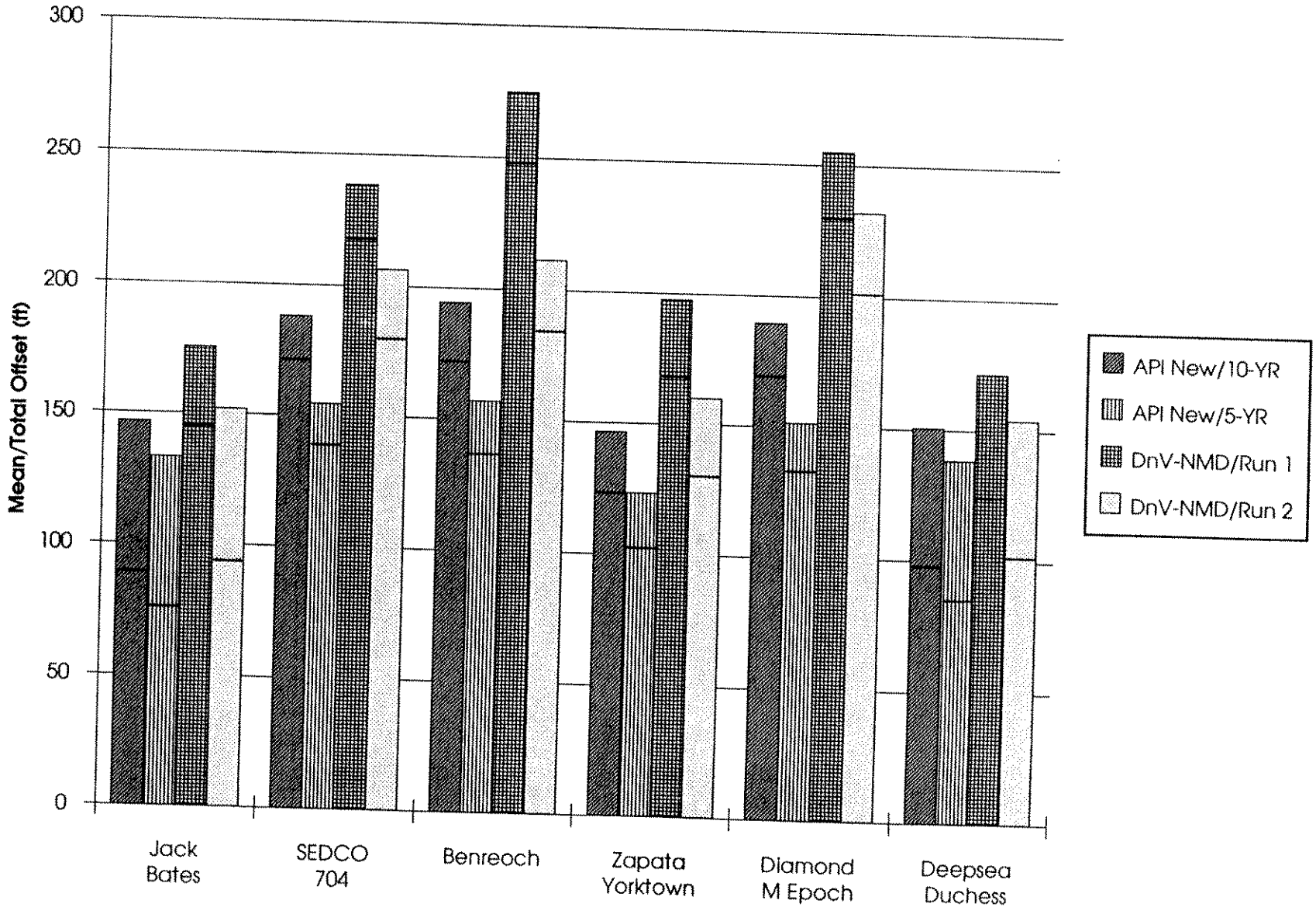
Low Frequency Motion Comparison
300 Ft. Water Depth, GOMEX



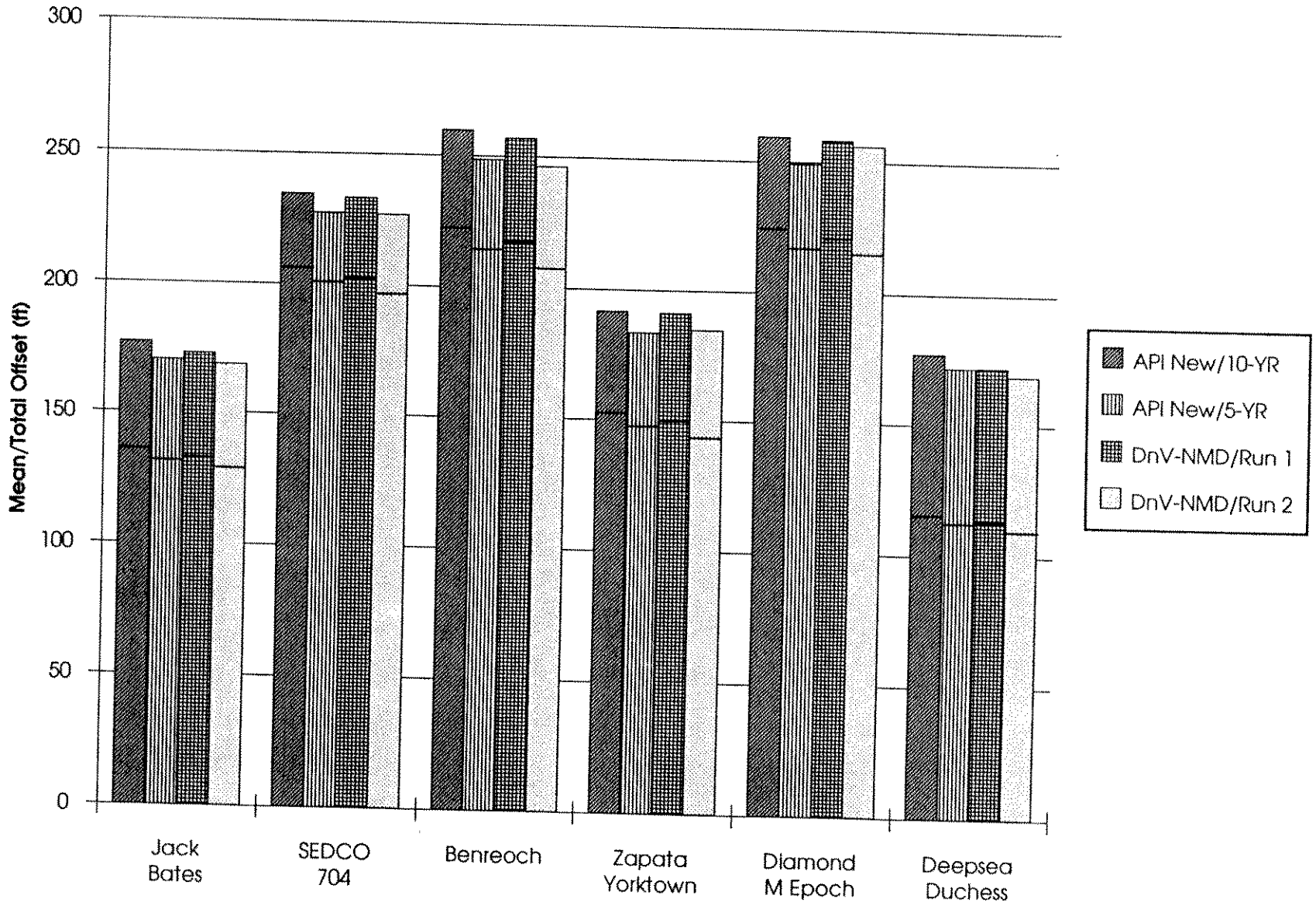
Low Frequency Motion Comparison
300 Ft. Water Depth, N North Sea



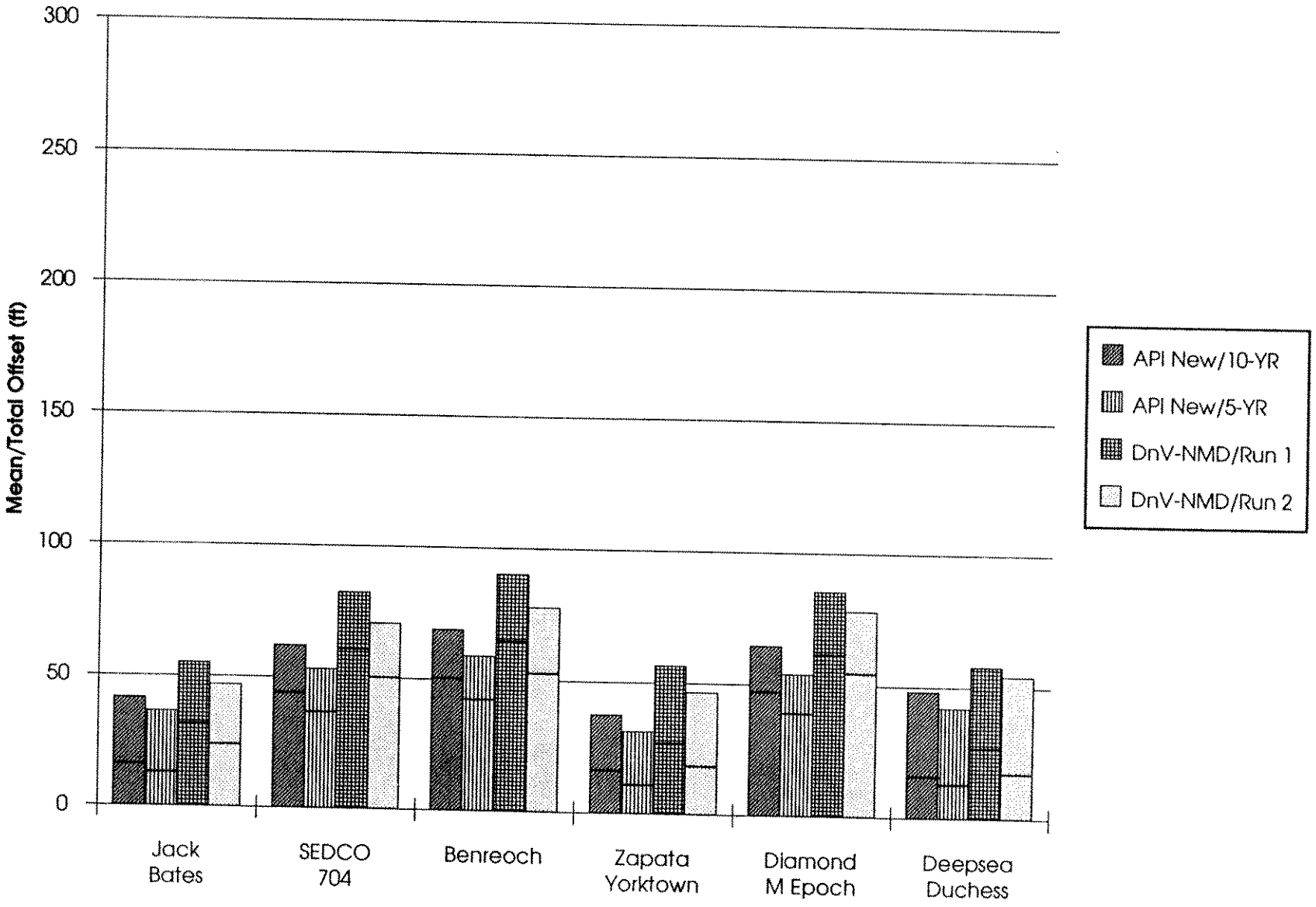
Vessel Offset Comparison
1500 Ft. Water Depth, GOMEX



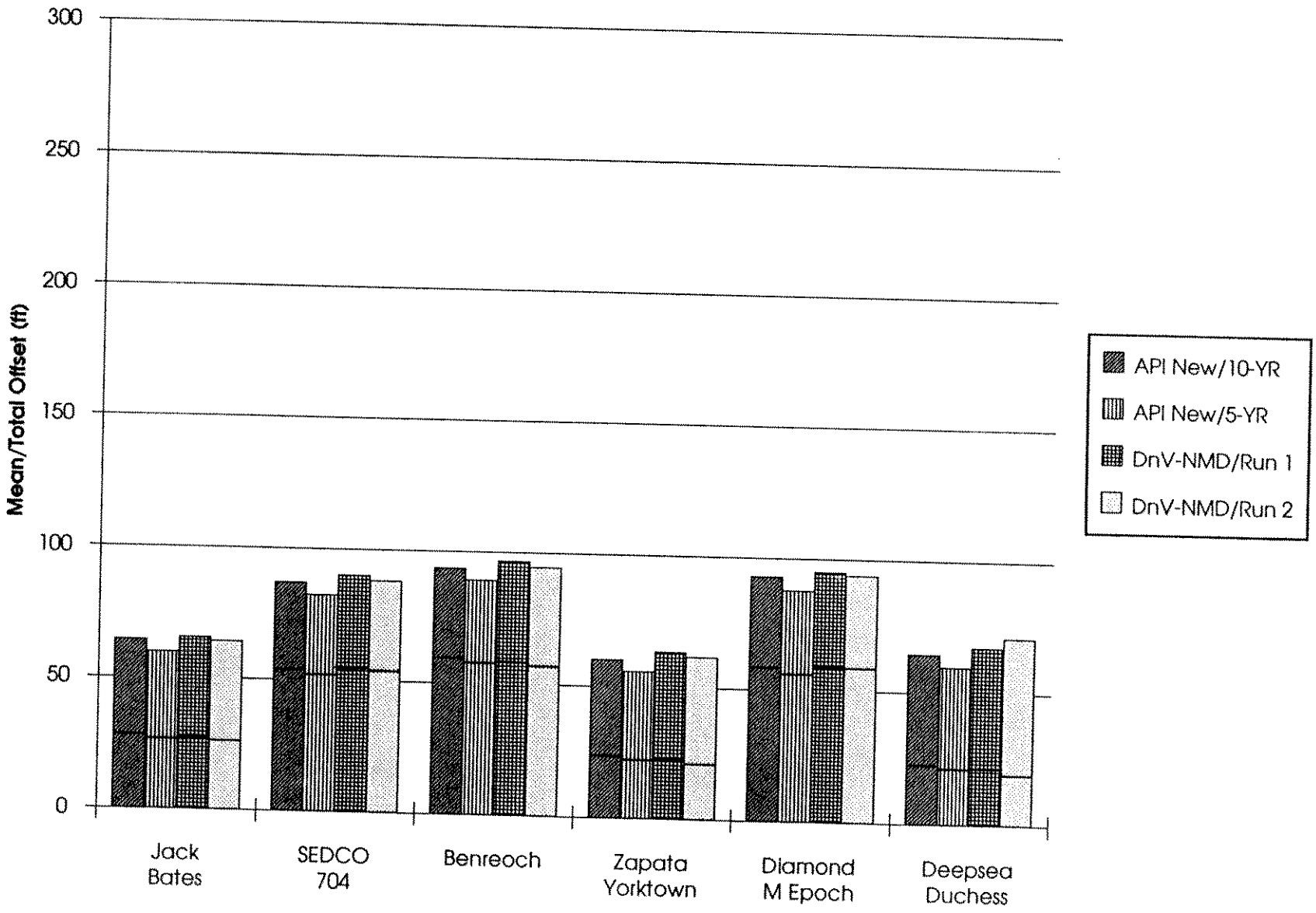
Vessel Offset Comparison
1500 Ft. Water Depth, N North Sea



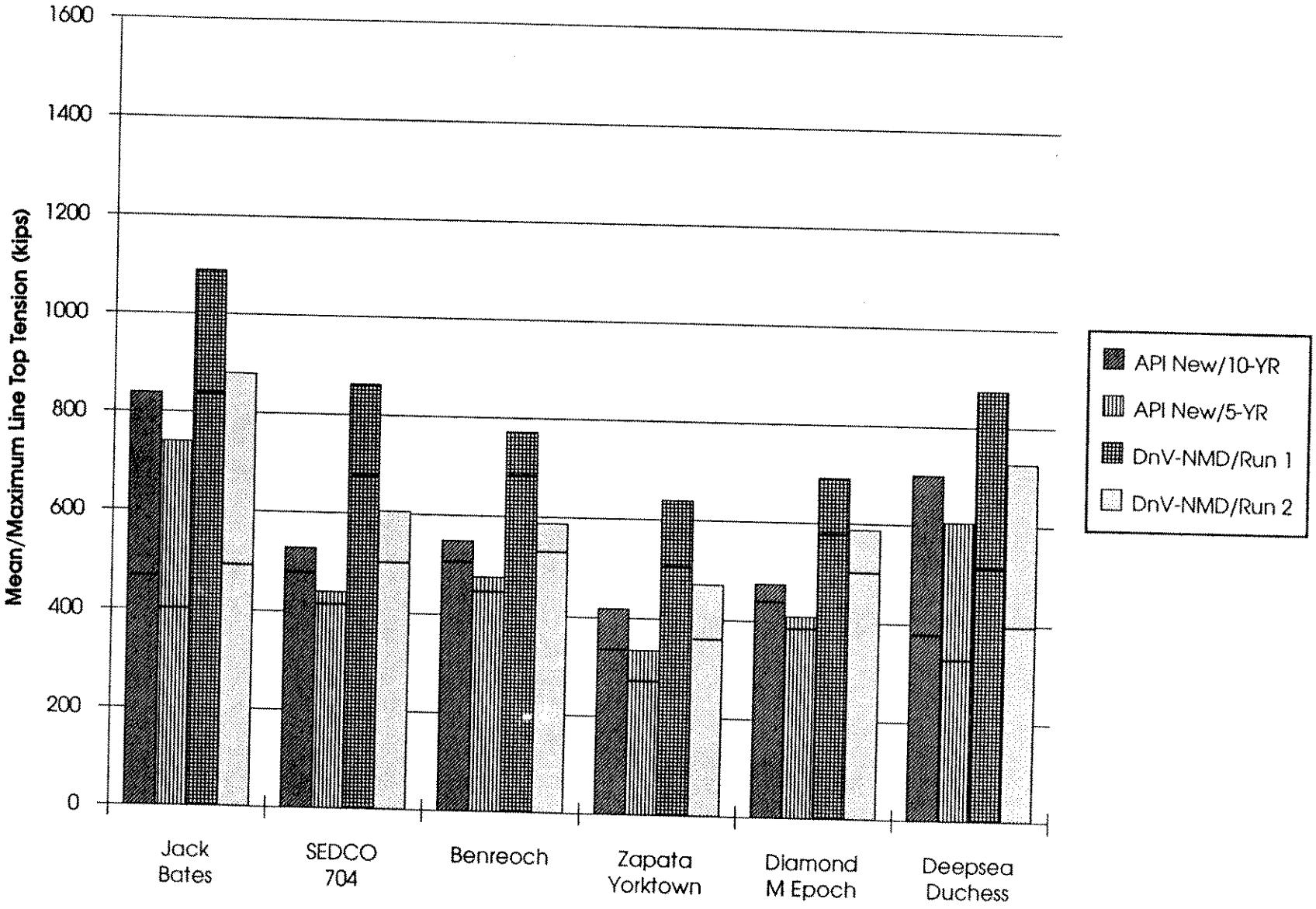
Vessel Offset Comparison
300 Ft. Water Depth, GOMEX



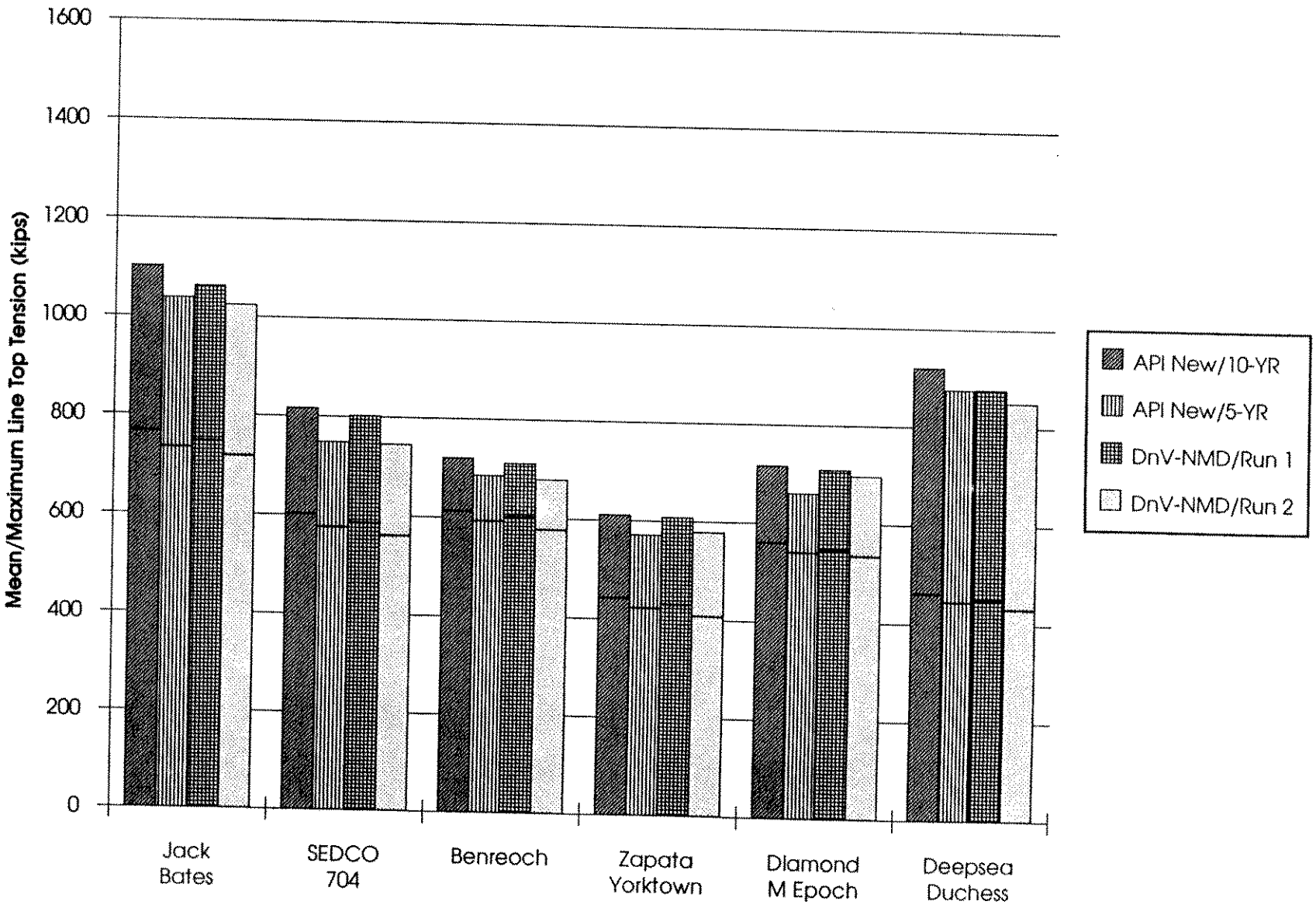
Vessel Offset Comparison
300 Ft. Water Depth, N North Sea



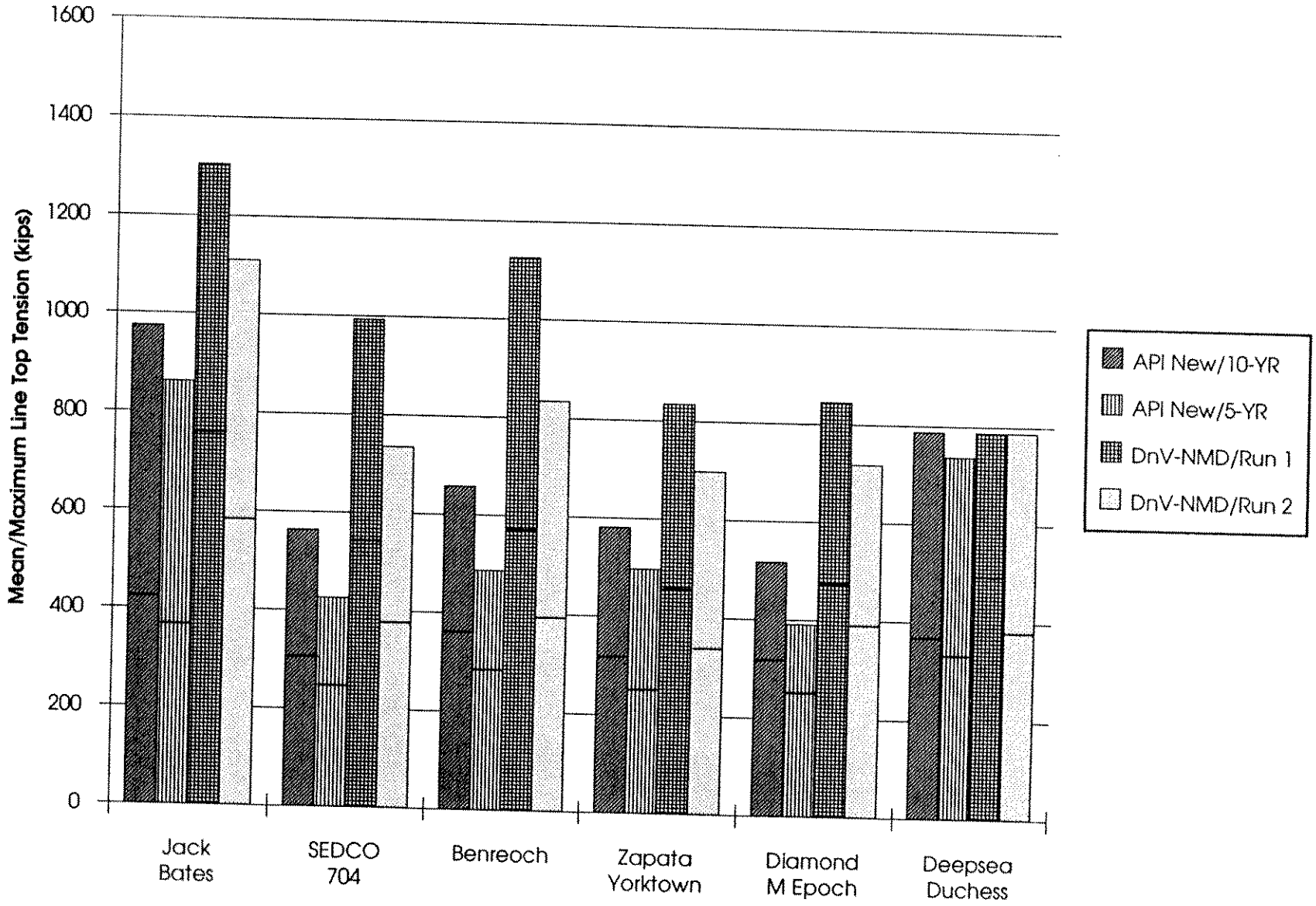
Line Tension Comparison
1500 Ft. Water Depth, GOMEX



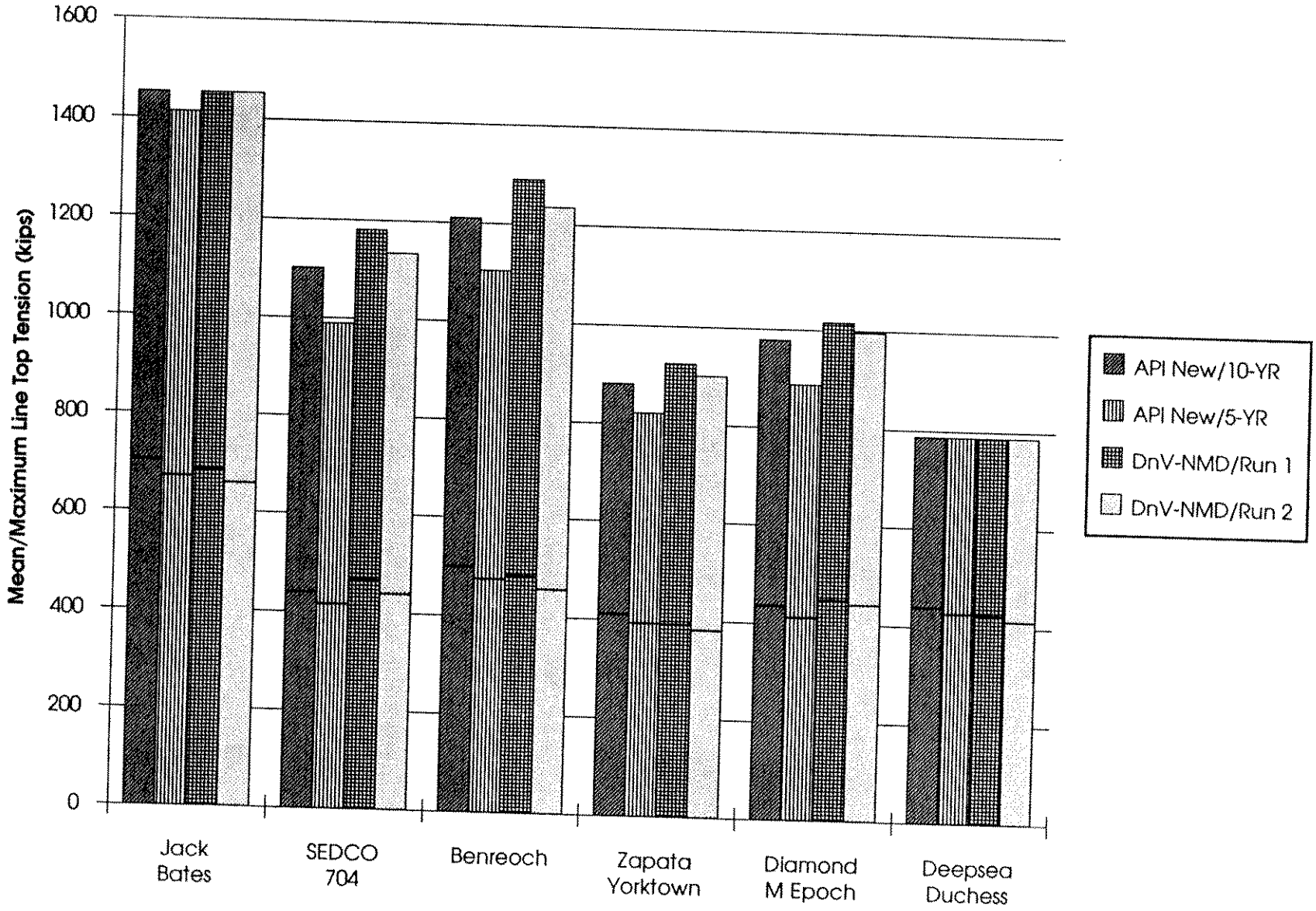
Line Tension Comparison
1500 Ft. Water Depth, N North Sea



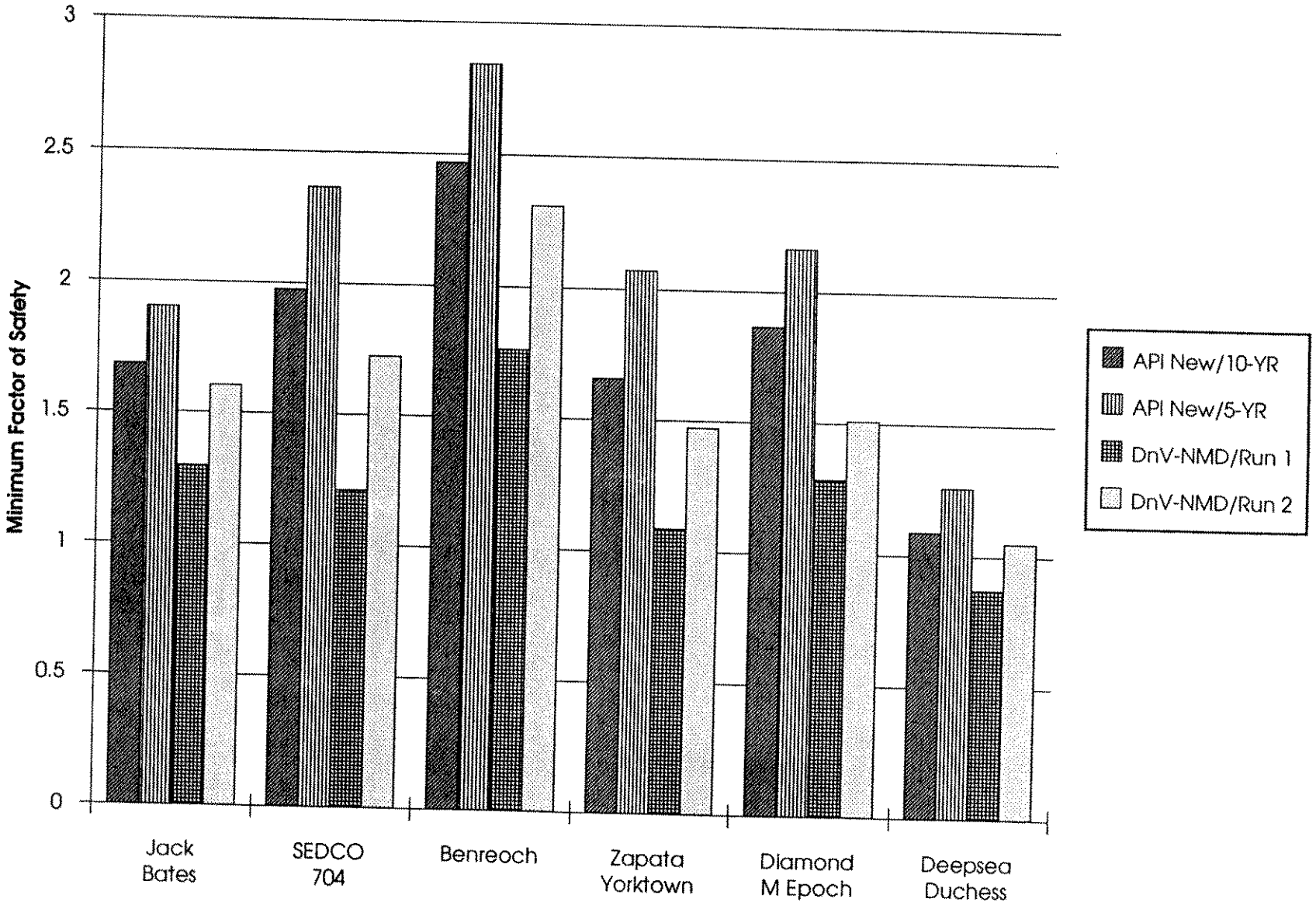
Line Tension Comparison
300 Ft. Water Depth, GOMEX



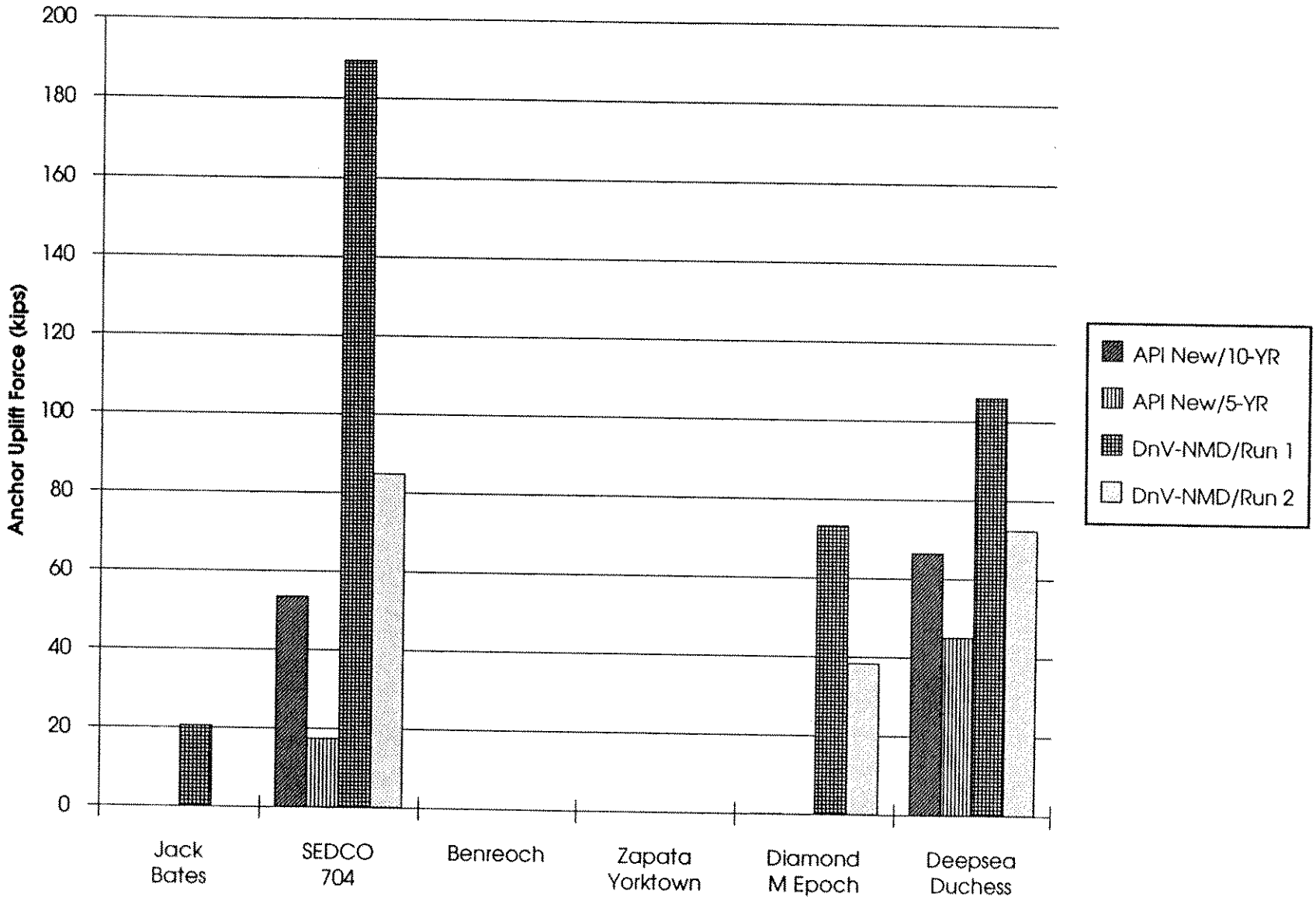
Line Tension Comparison
300 Ft. Water Depth, N North Sea



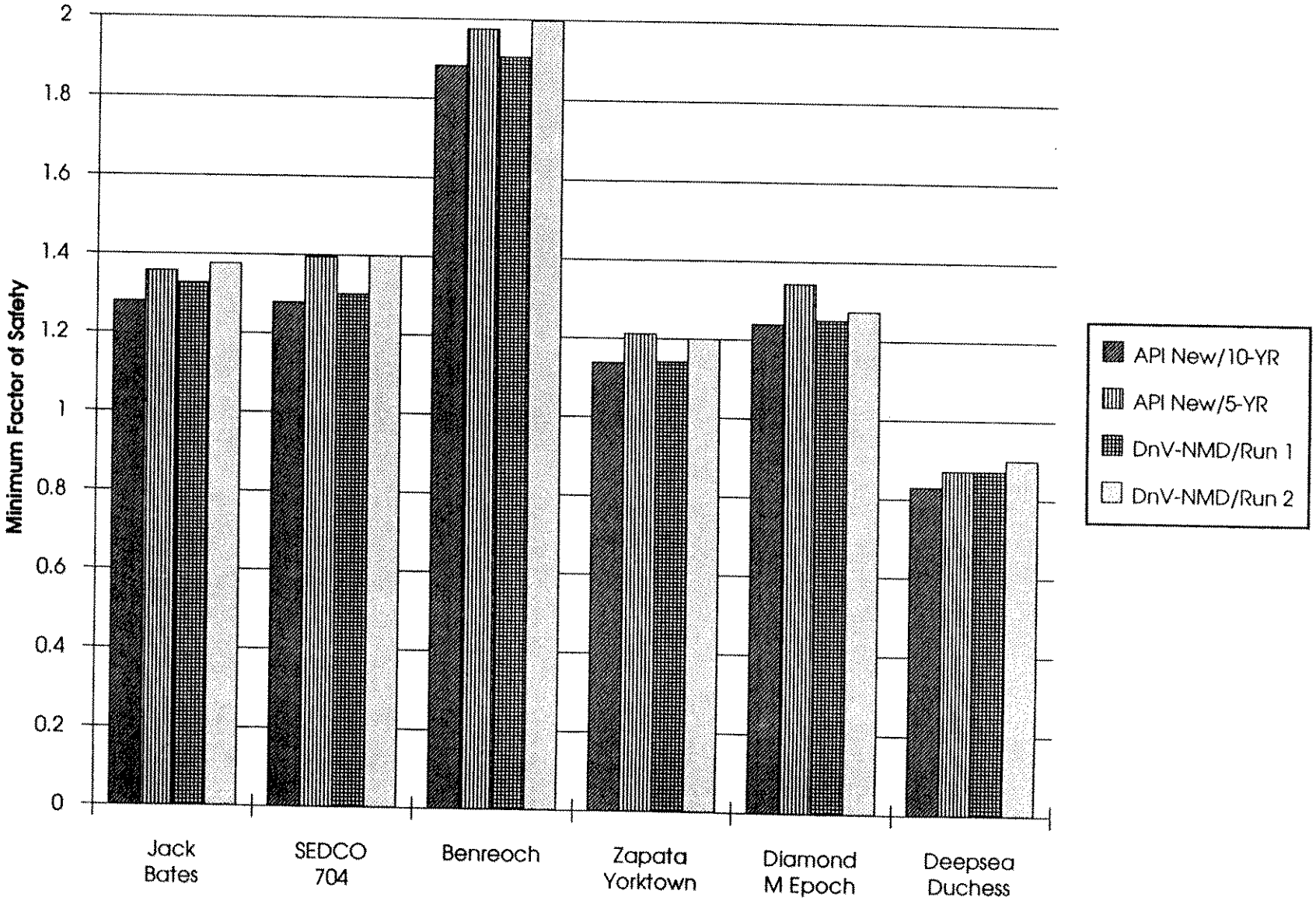
Minimum Factor of Safety Comparison
1500 Ft. Water Depth, GOMEX



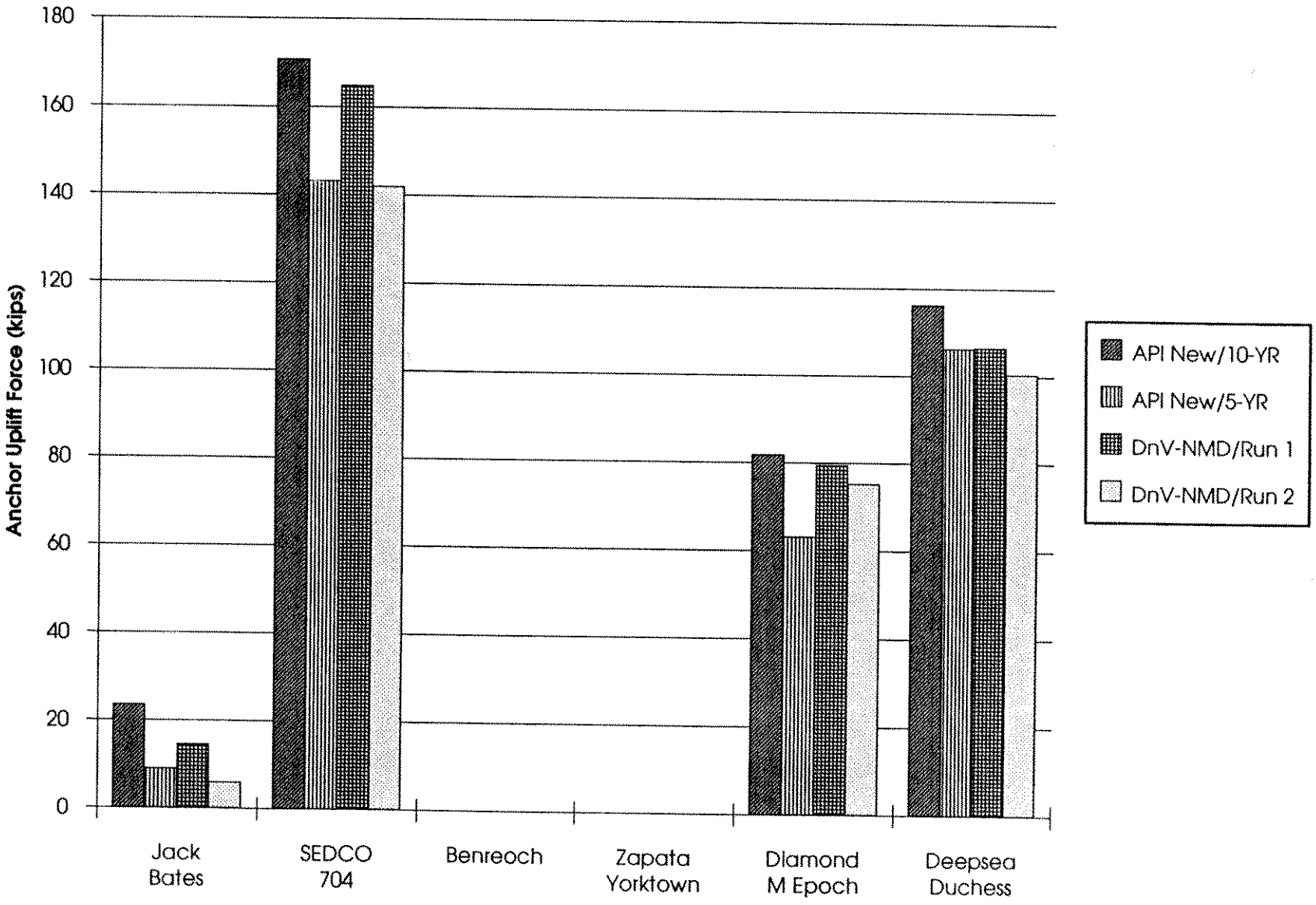
Anchor Uplift Comparison
1500 Ft. Water Depth, GOMEX



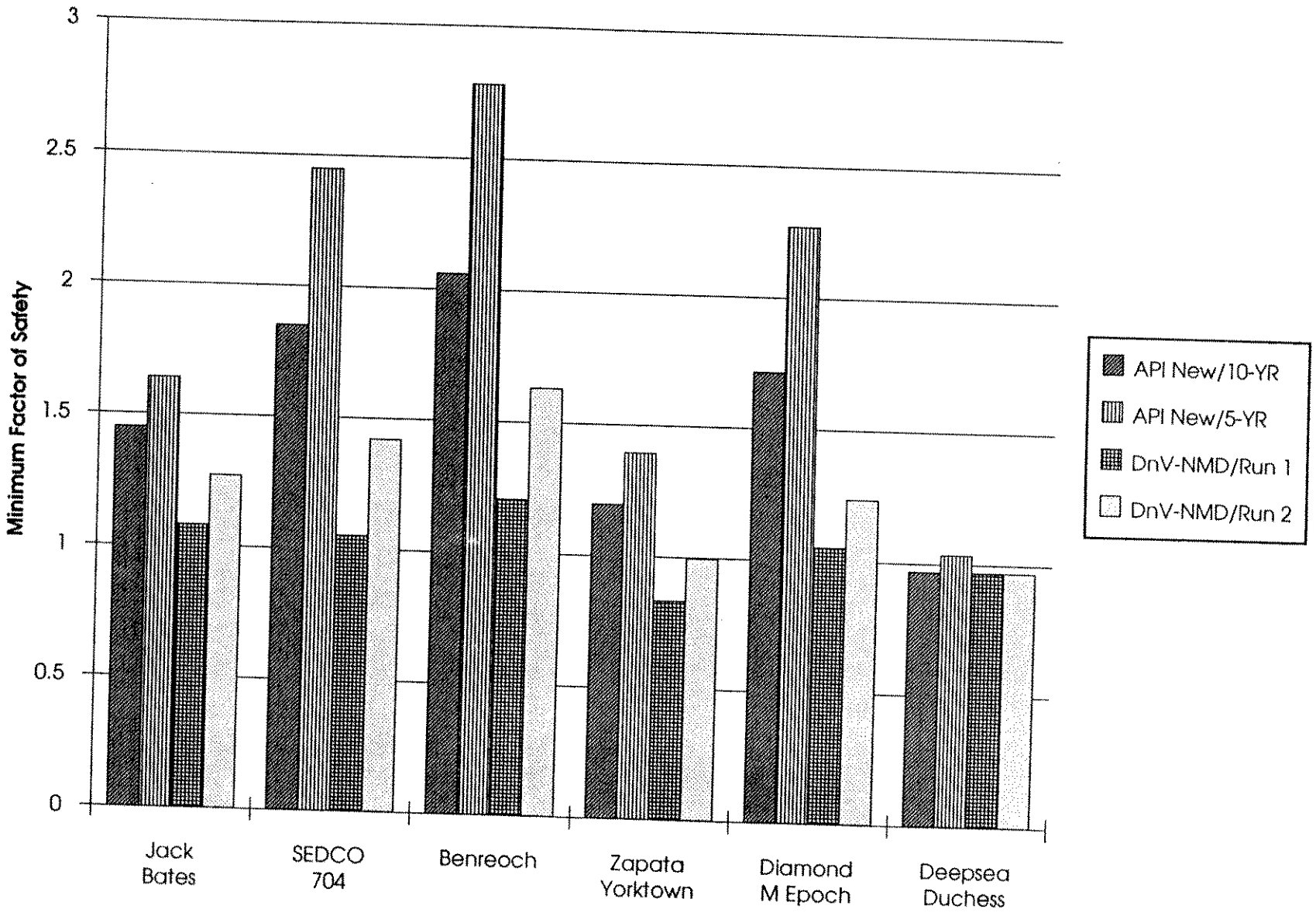
Minimum Factor of Safety Comparison
1500 Ft. Water Depth, N North Sea



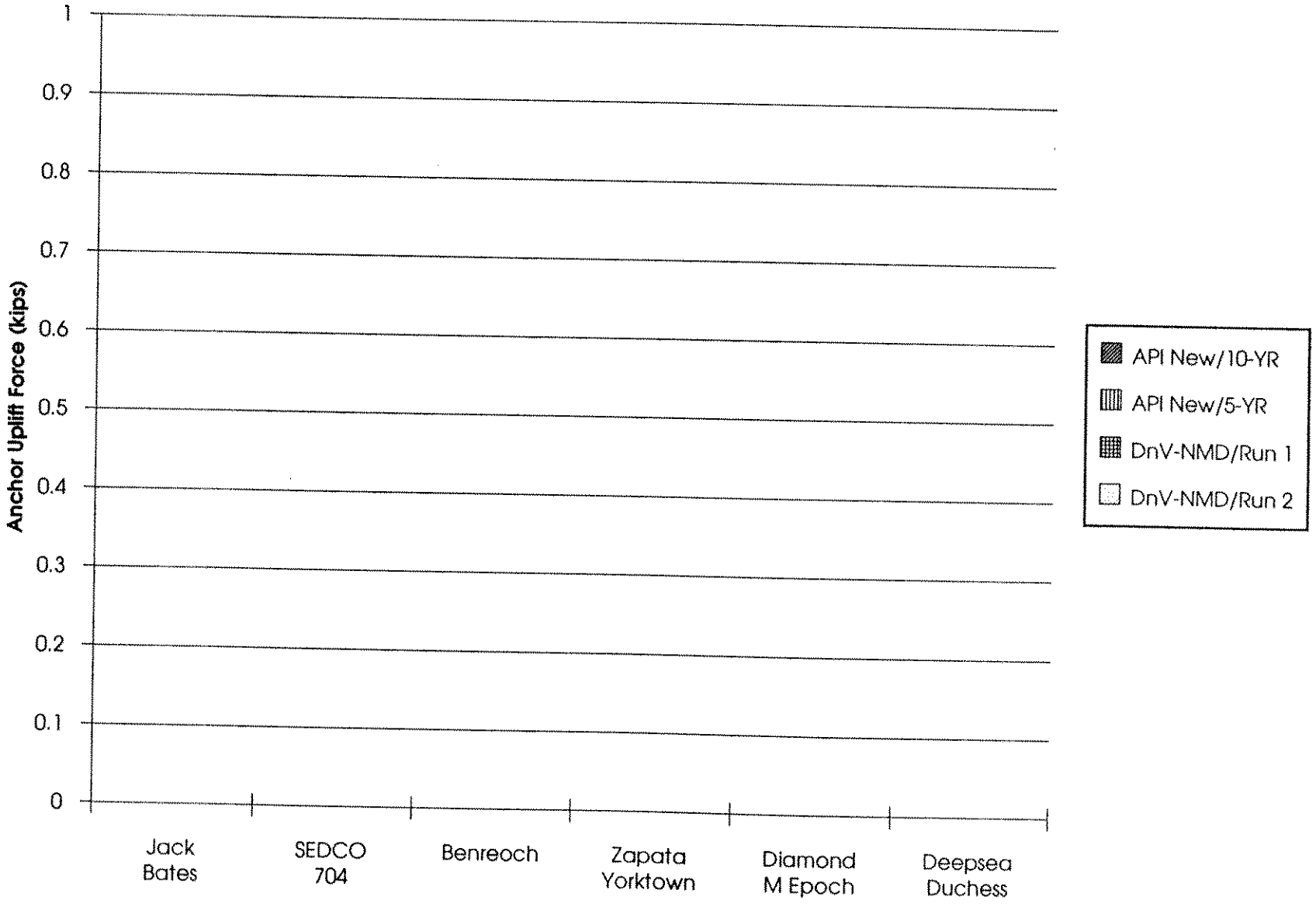
Anchor Uplift Comparison
1500 Ft. Water Depth, N North Sea



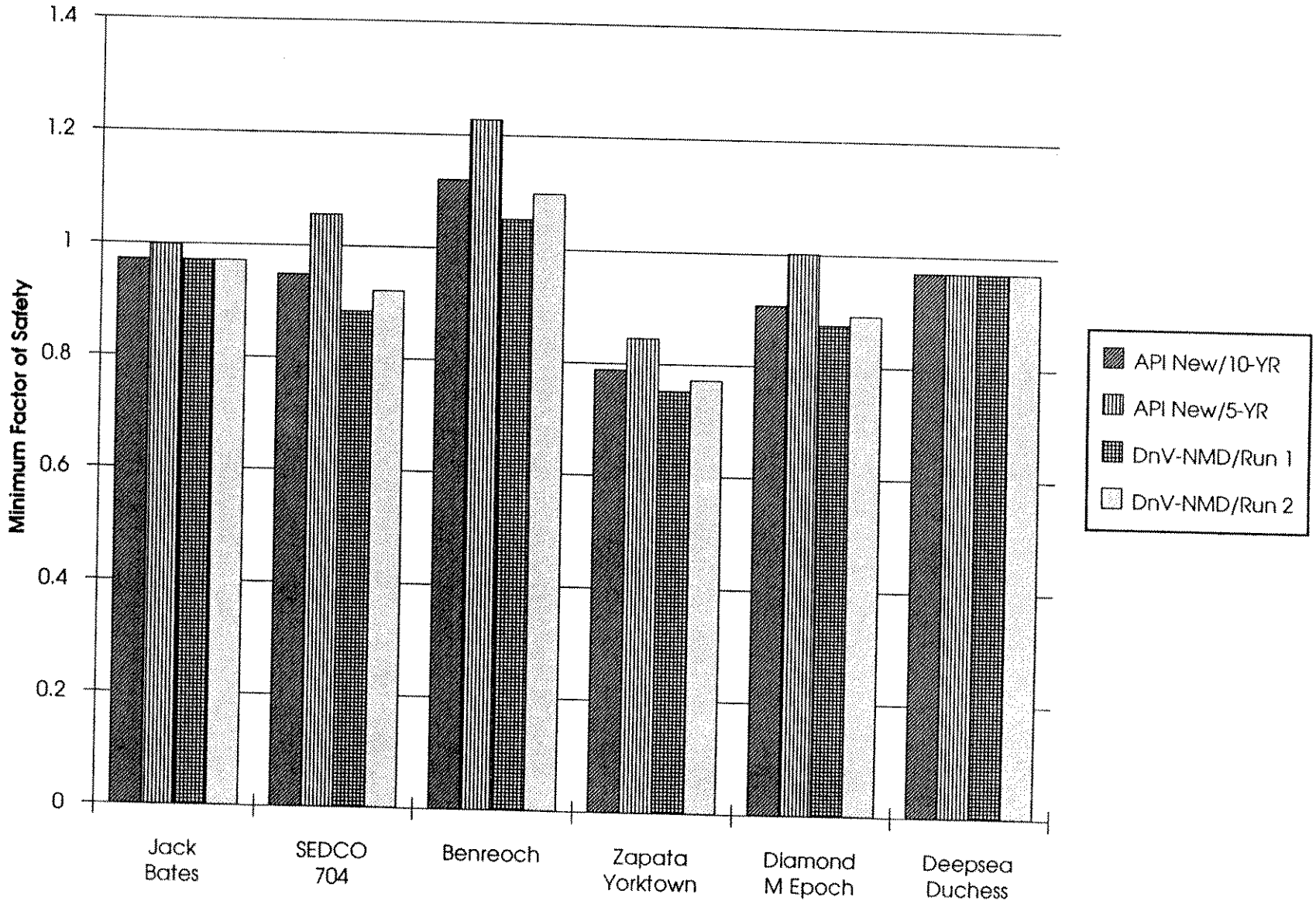
Minimum Factor of Safety Comparison
300 Ft. Water Depth, GOMEX



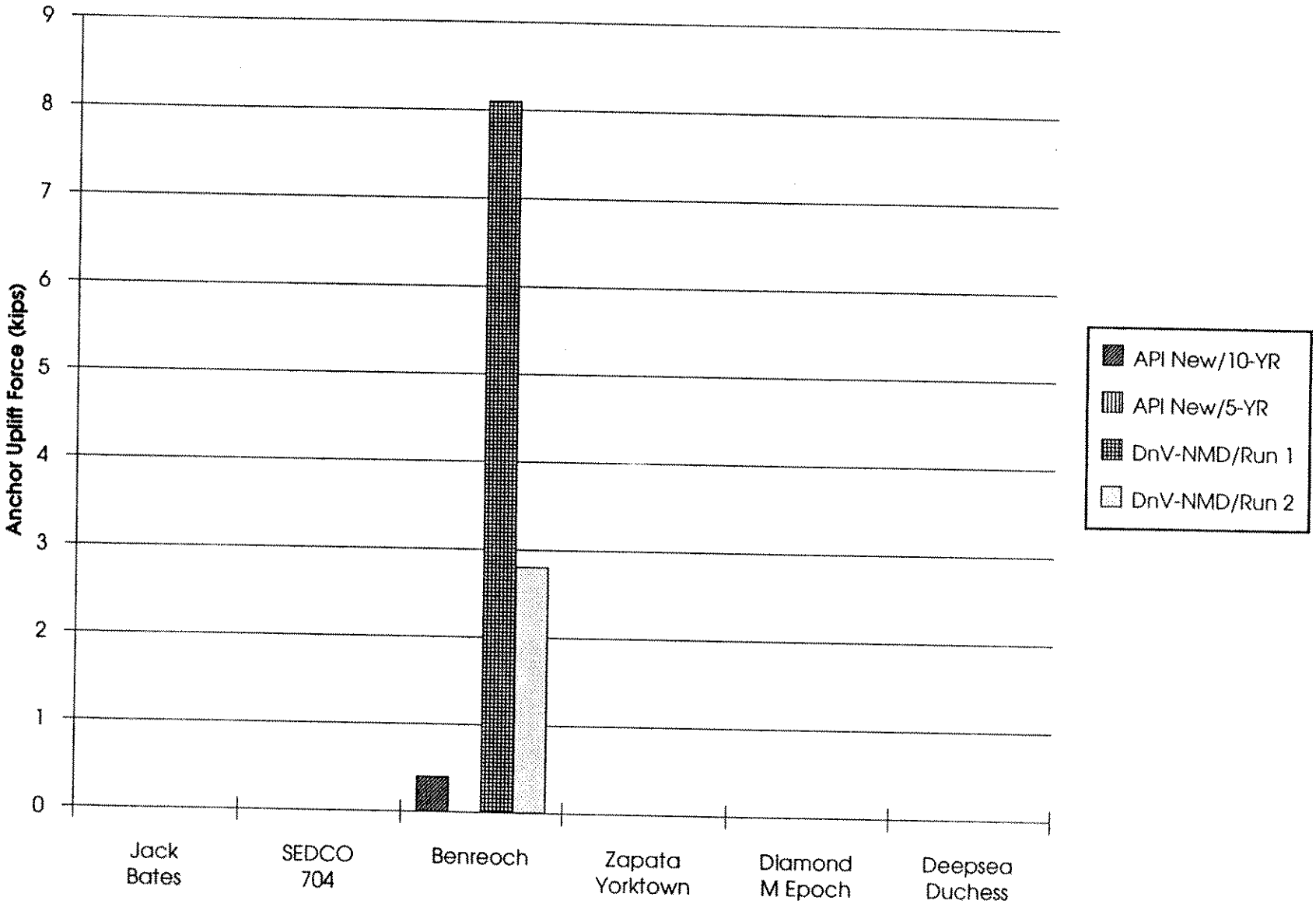
Anchor Uplift Comparison
300 Ft. Water Depth, GOMEX



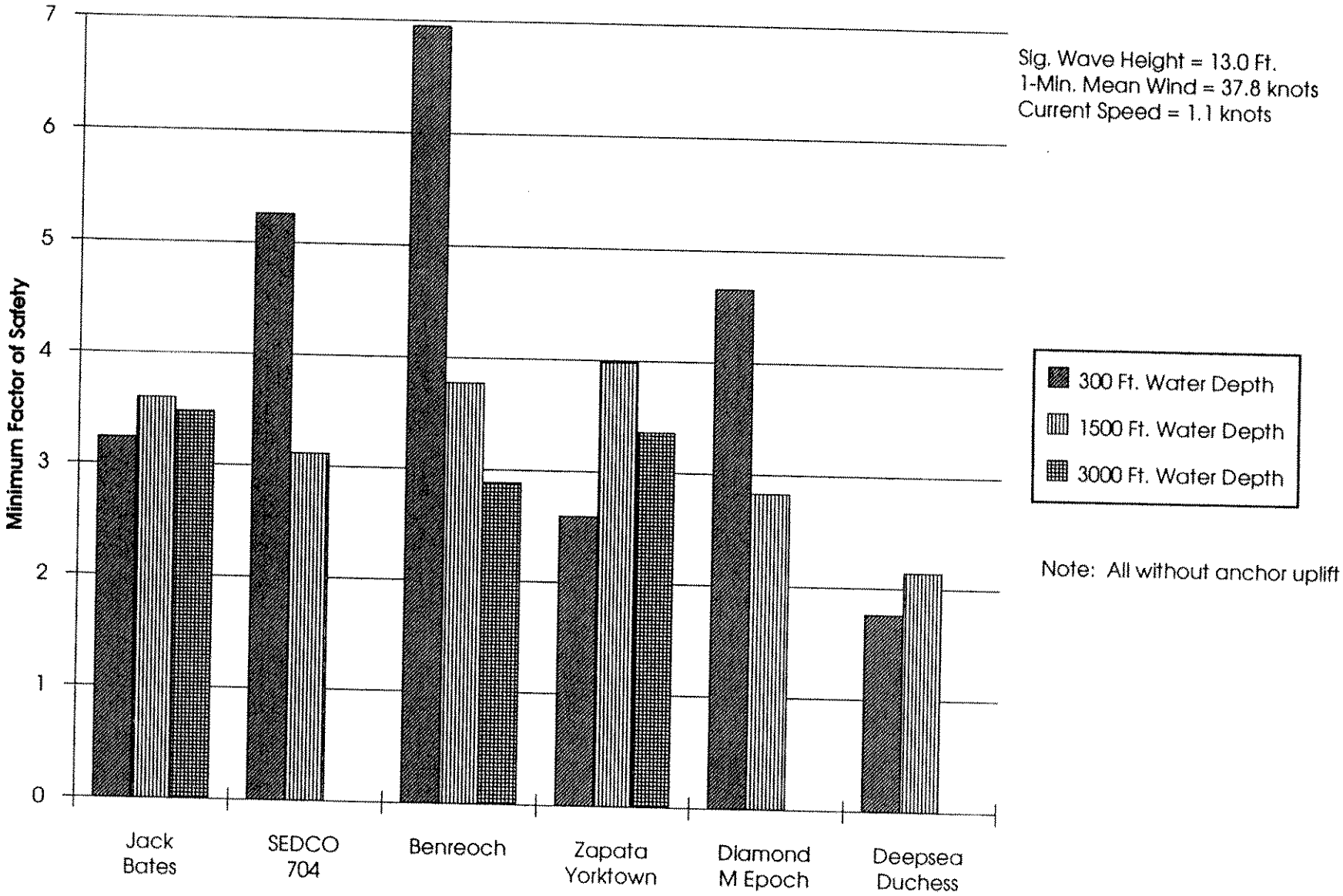
Minimum Factor of Safety Comparison
300 Ft. Water Depth, N North Sea



Anchor Uplift Comparison
300 Ft. Water Depth, N North Sea



Minimum Factor of Safety Comparison
API RP-2P 99.9% Non-Exceedance Weather Criteria in GOMEX



4. QUASI-STATIC MOORING ANALYSIS RESULTS:
b. PER RIG AND CODE FOR ALL SITES

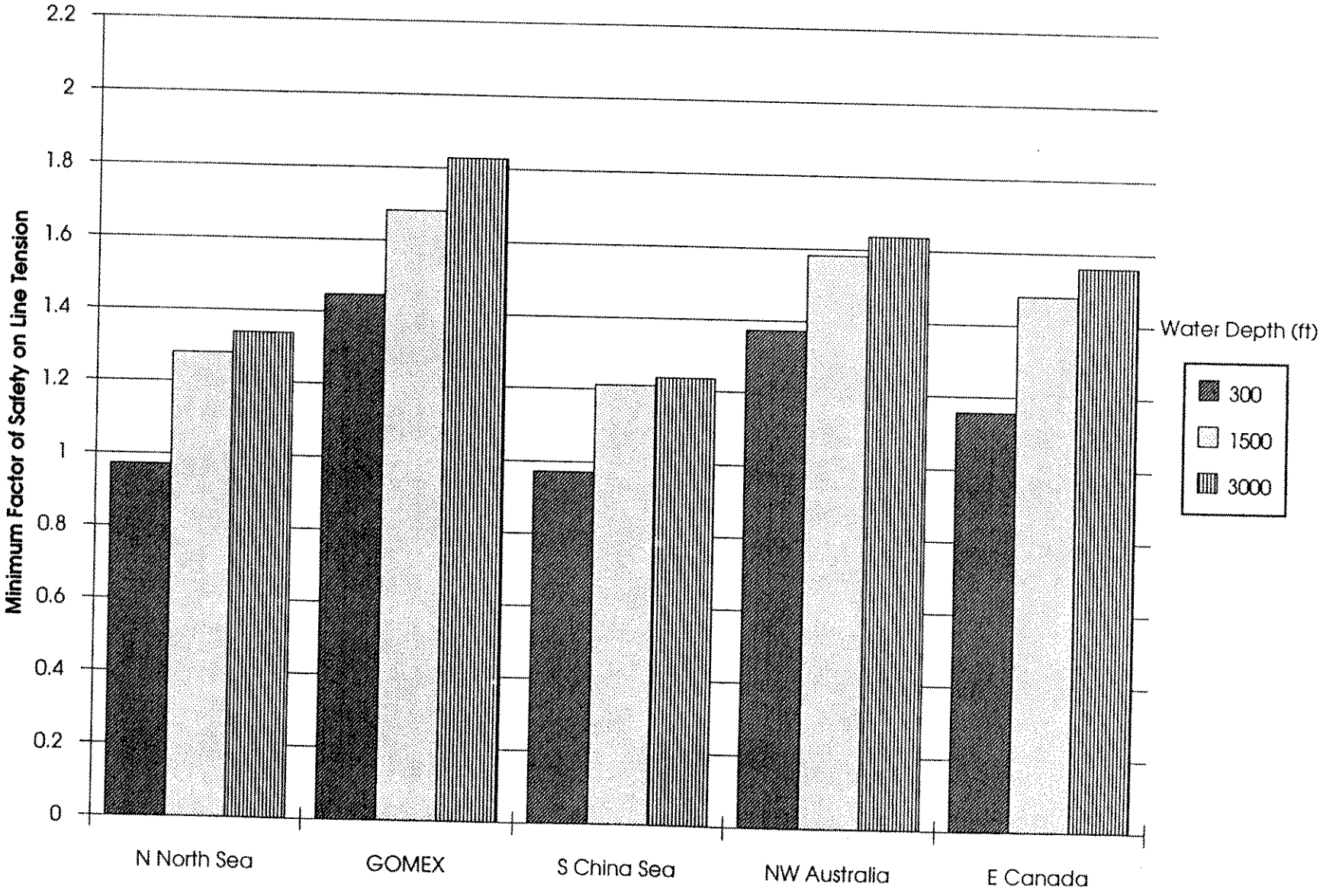
- 6 Drilling Rigs

- 4 Weather Criteria
  - API New Code/10-Year Storm
  - API New Code/5-Year Storm
  - DnV/NMD Code/Run 1
  - DnV/NMD Code/Run 2

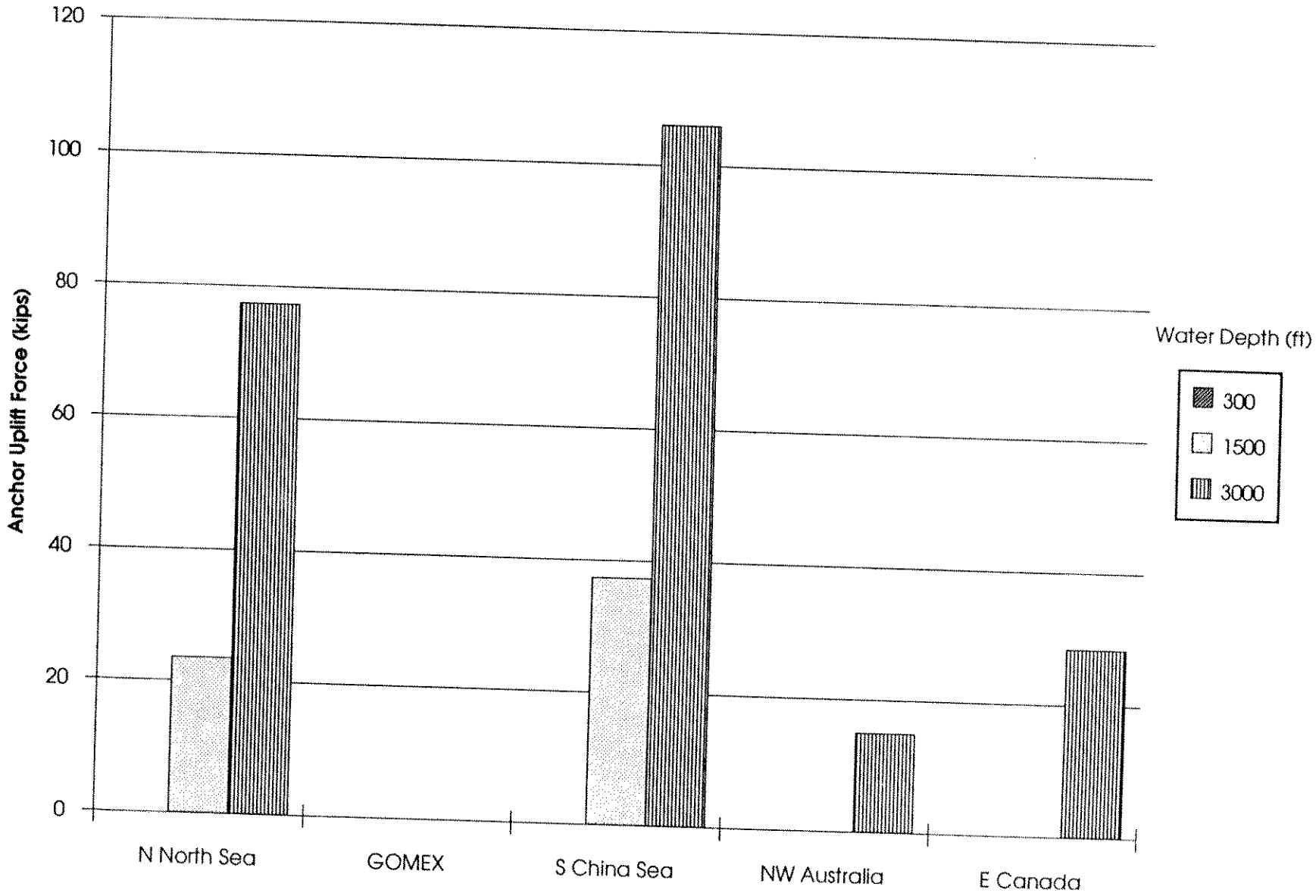
- Min. Factor of Safety on Line Tension, and

- Anchor Uplift Forces, if any.

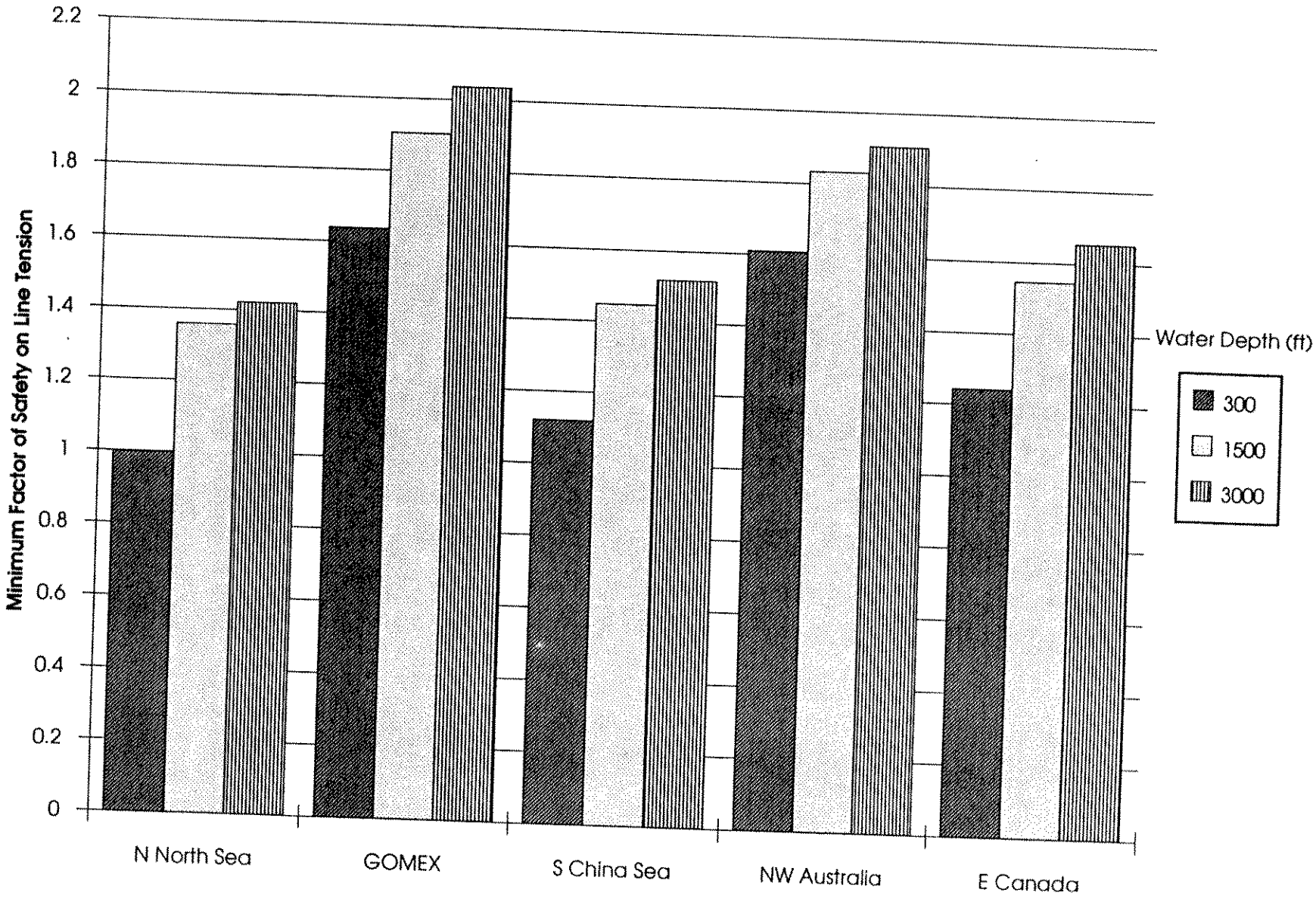
API New Code, 10-Year Return Storm, Near Other Installations
Jack Bates



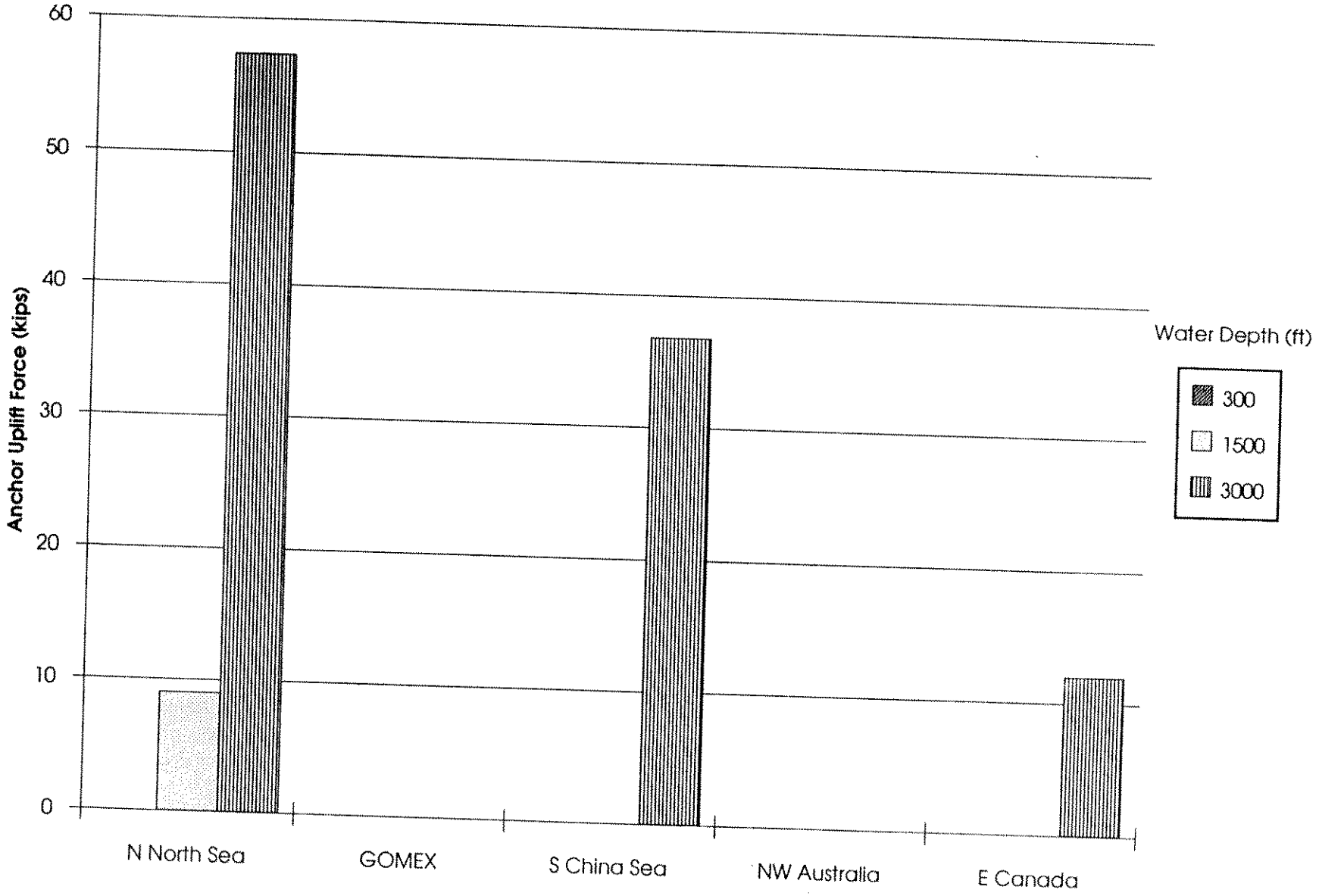
API New Code, 10-Year Return Storm, Near Other Installations
Jack Bates

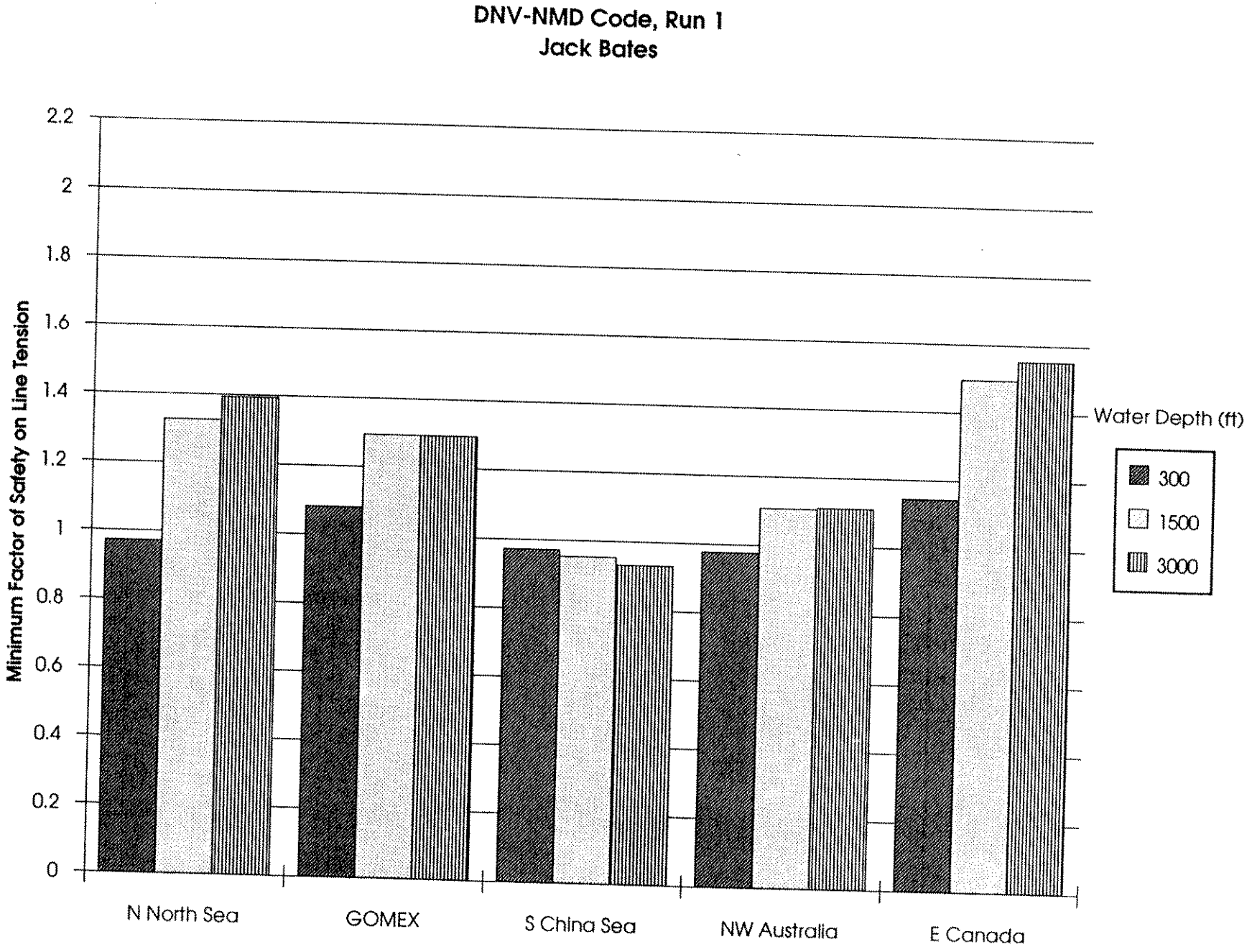


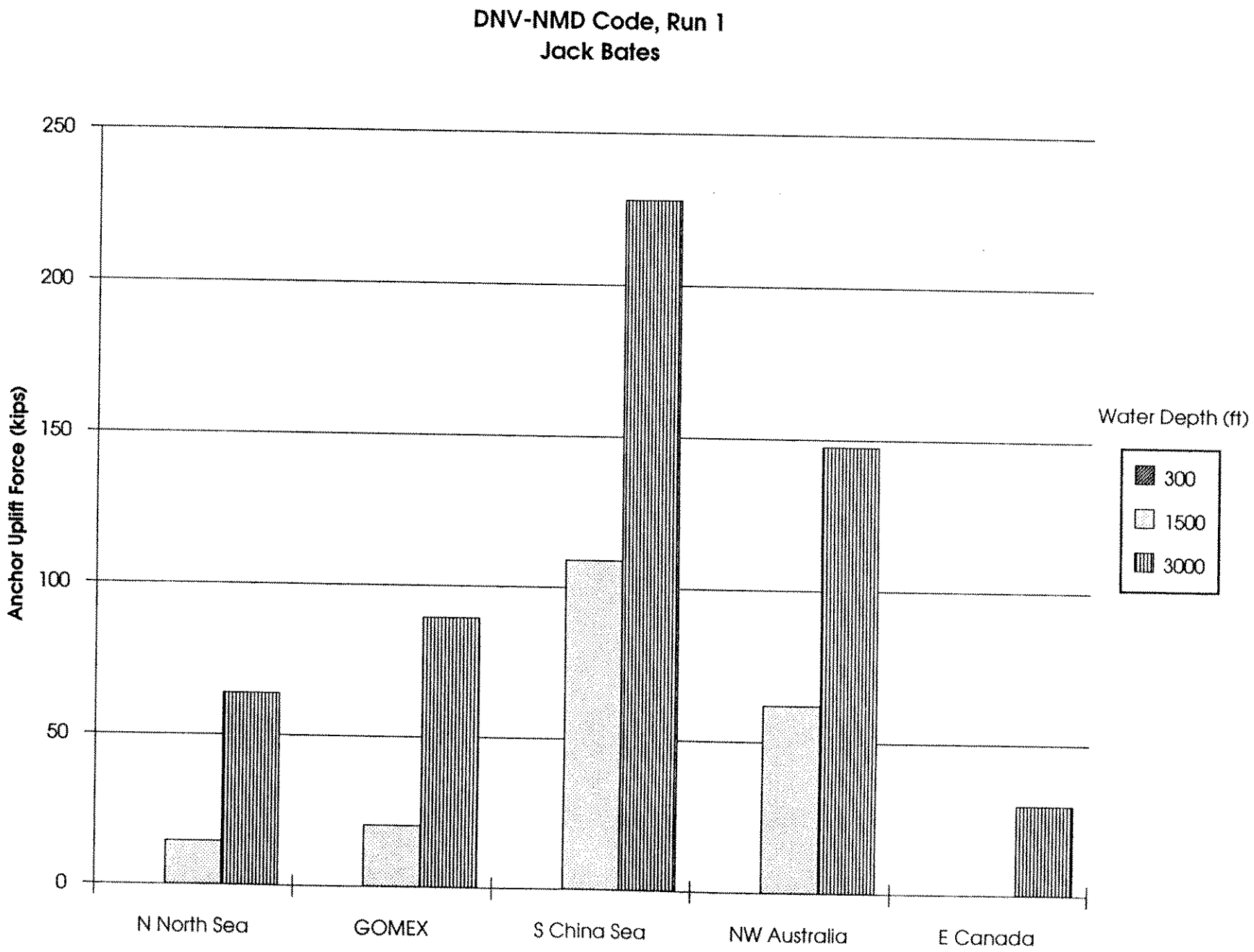
API New Code, 5-Year Return Storm, Far from Other Installations
Jack Bates

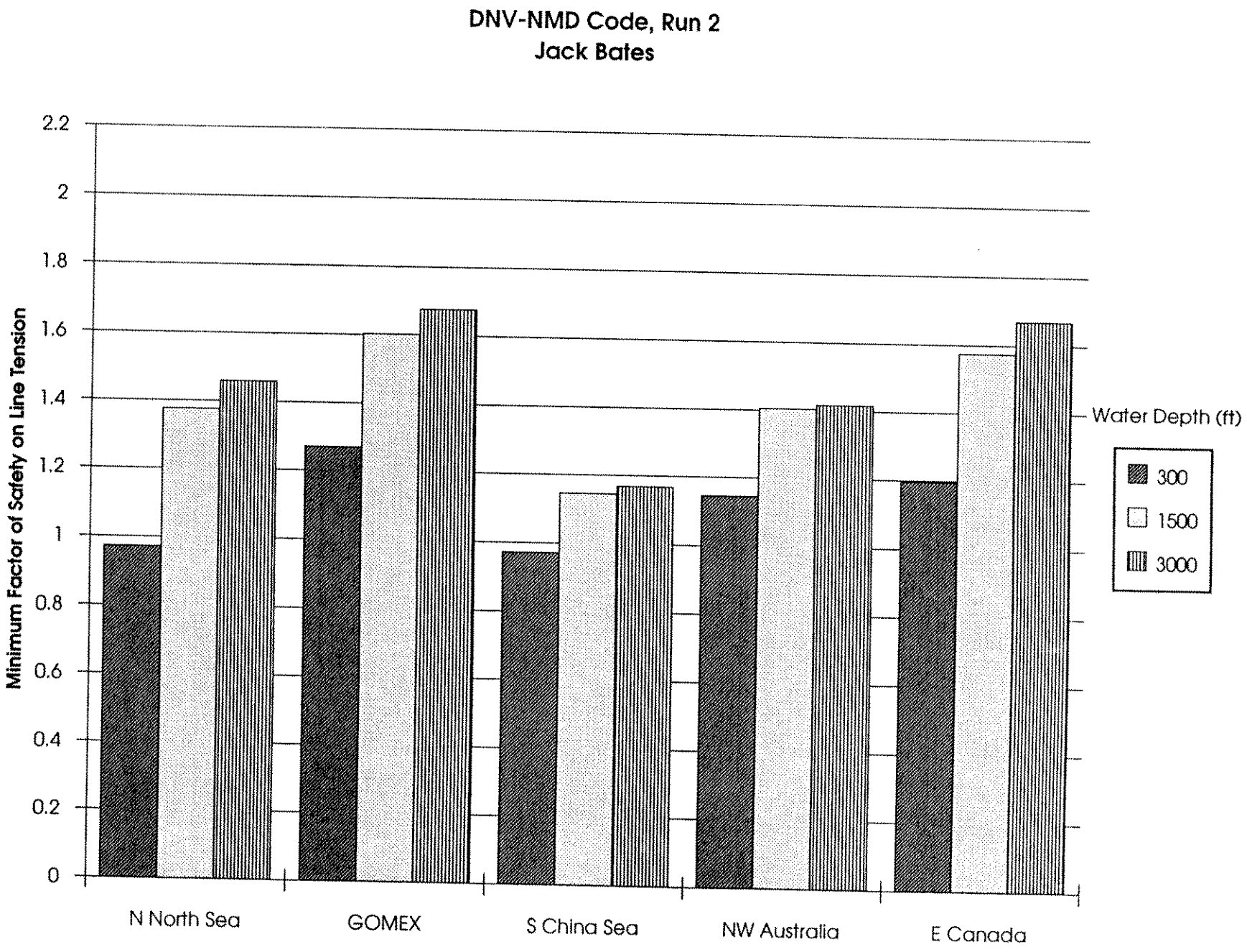


API New Code, 5-Year Return Storm, Far from Other Installations
Jack Bates

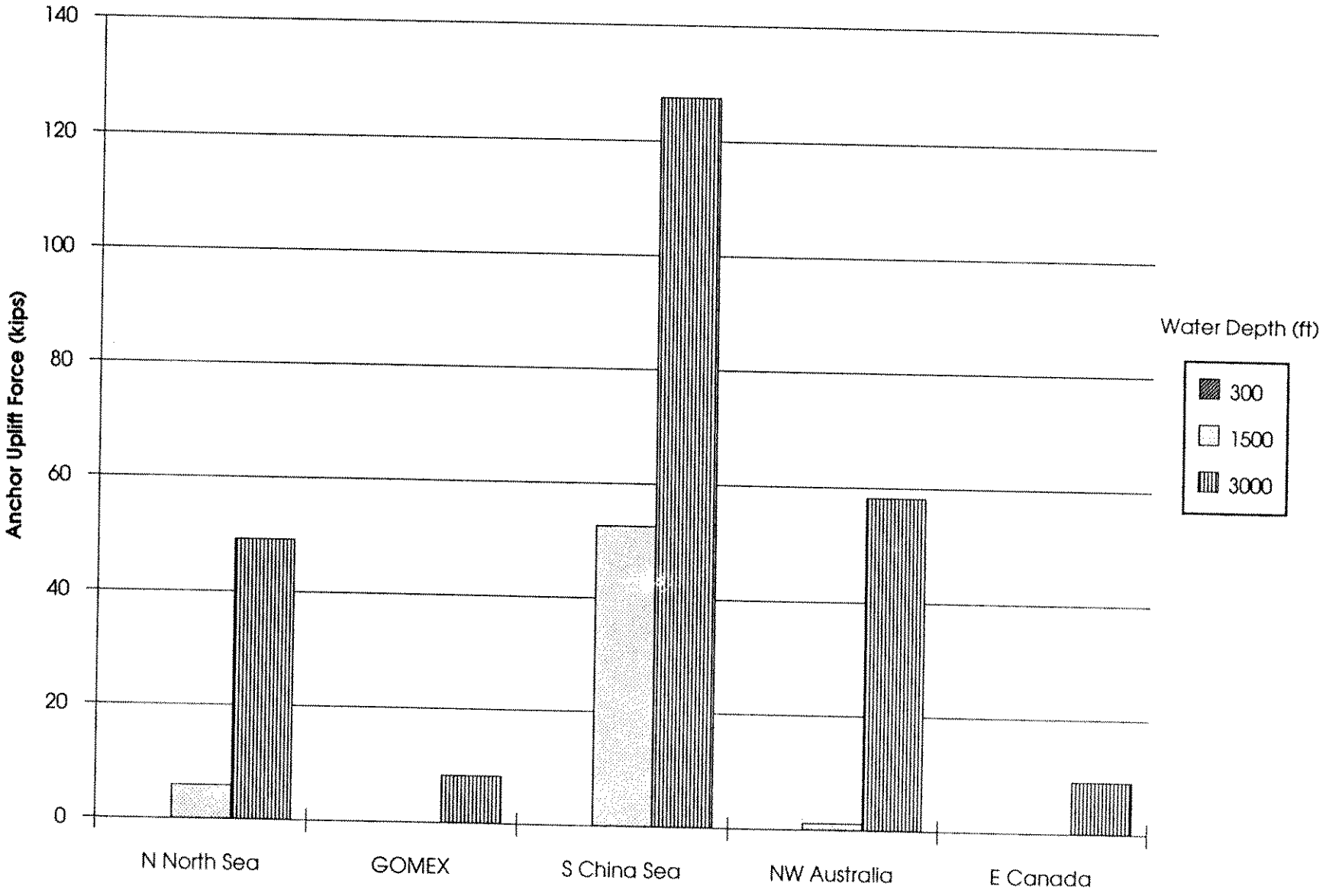



DNV-NMD Code, Run 1
Jack Bates
Minimum Factor of Safety on Line Tension
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500
3000

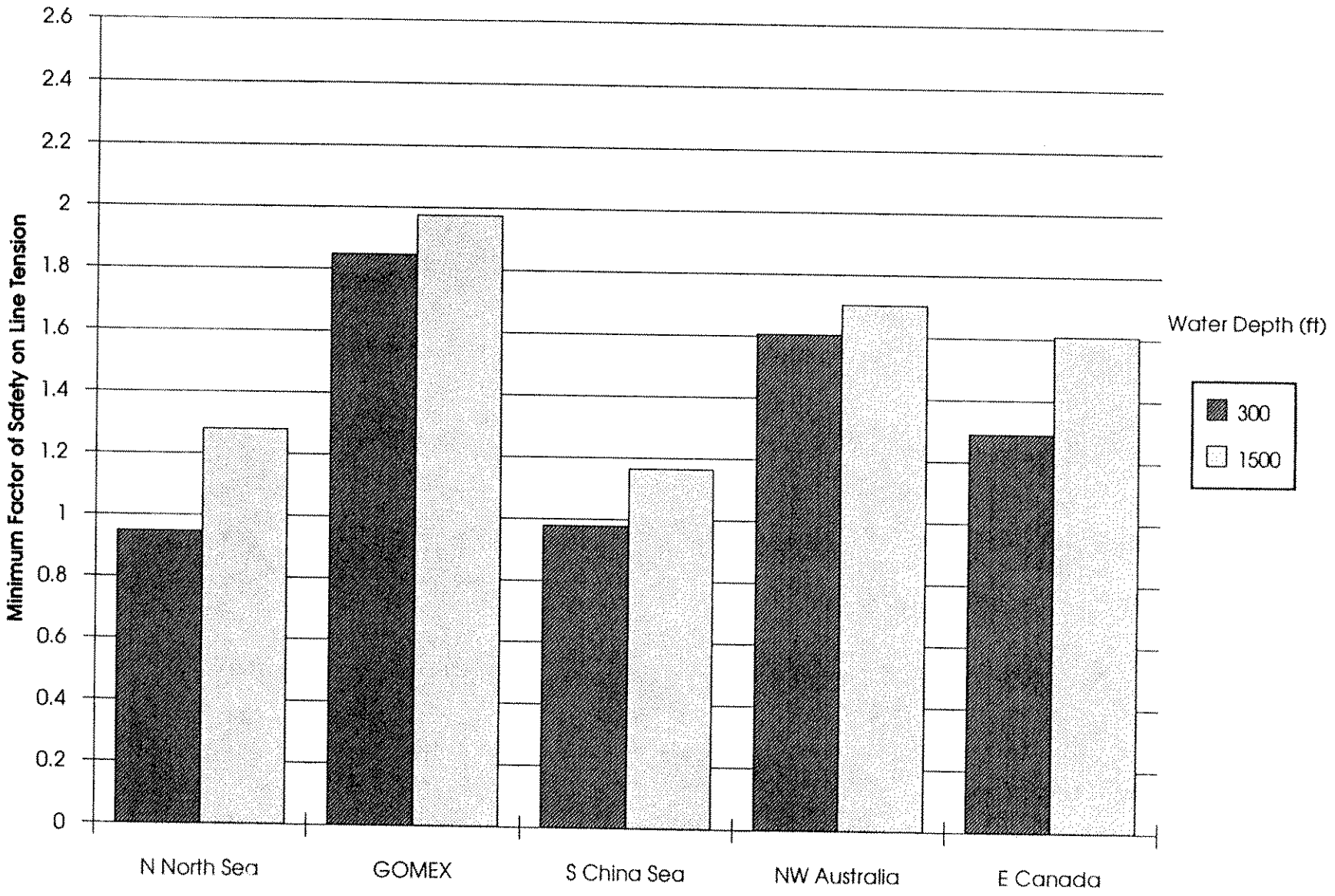

DNV-NMD Code, Run 1
Jack Bates
Anchor Uplift Force (kips)
250
200
150
100
50
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500
3000


DNV-NMD Code, Run 2
Jack Bates
Minimum Factor of Safety on Line Tension
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500
3000

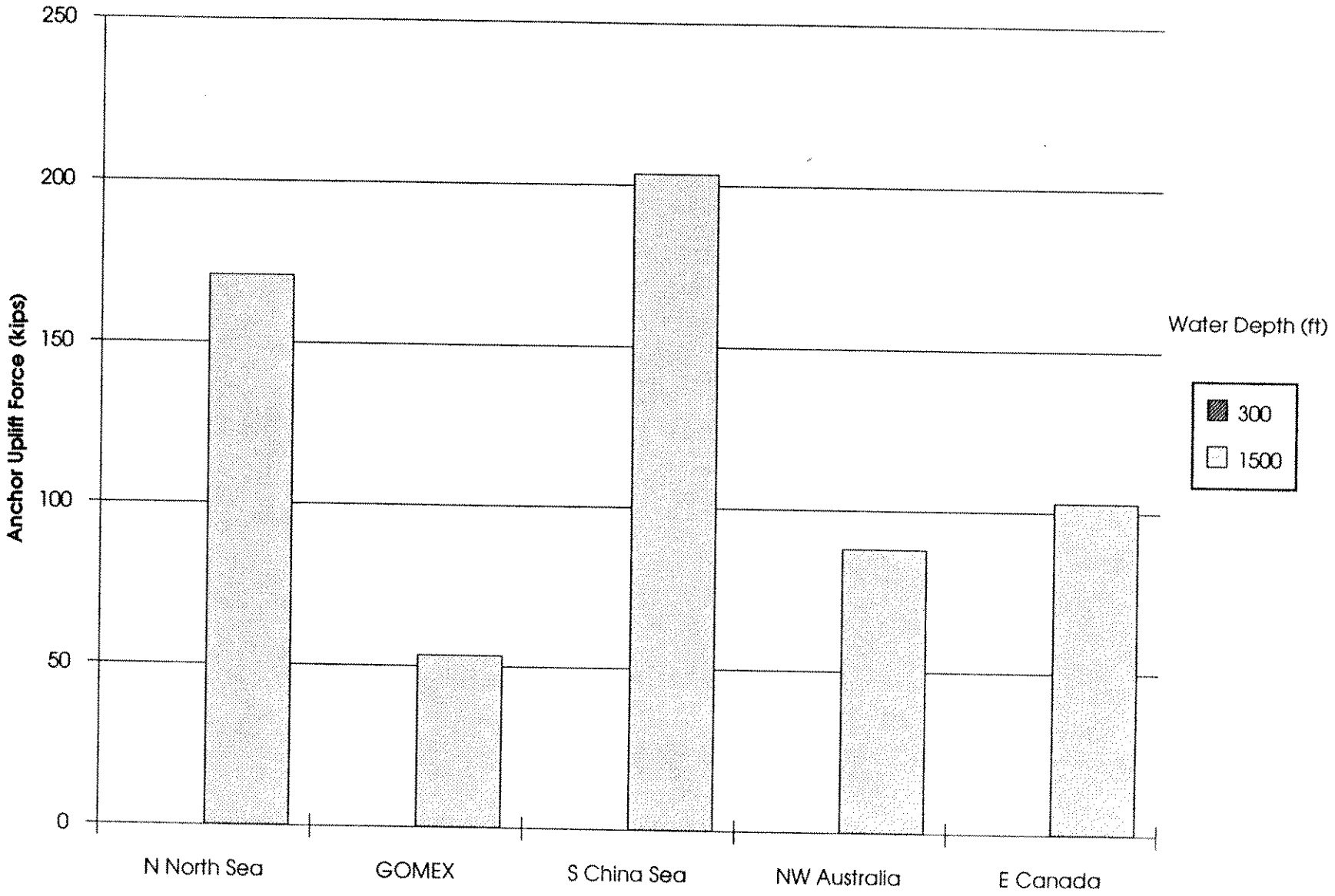
DNV-NMD Code, Run 2
Jack Bates



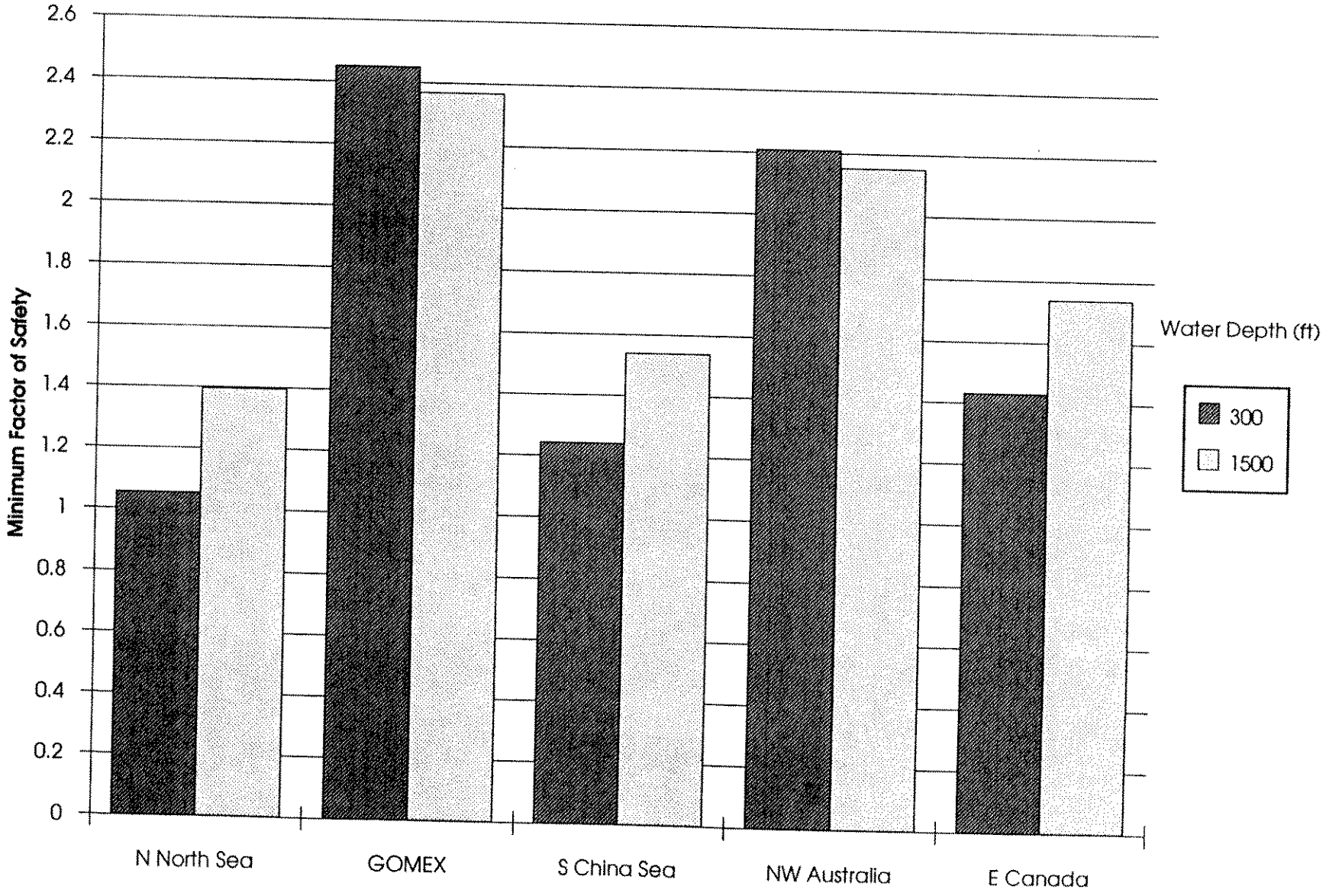
API New Code, 10-Year Return Storm, Near Other Installations
SEDCO 704



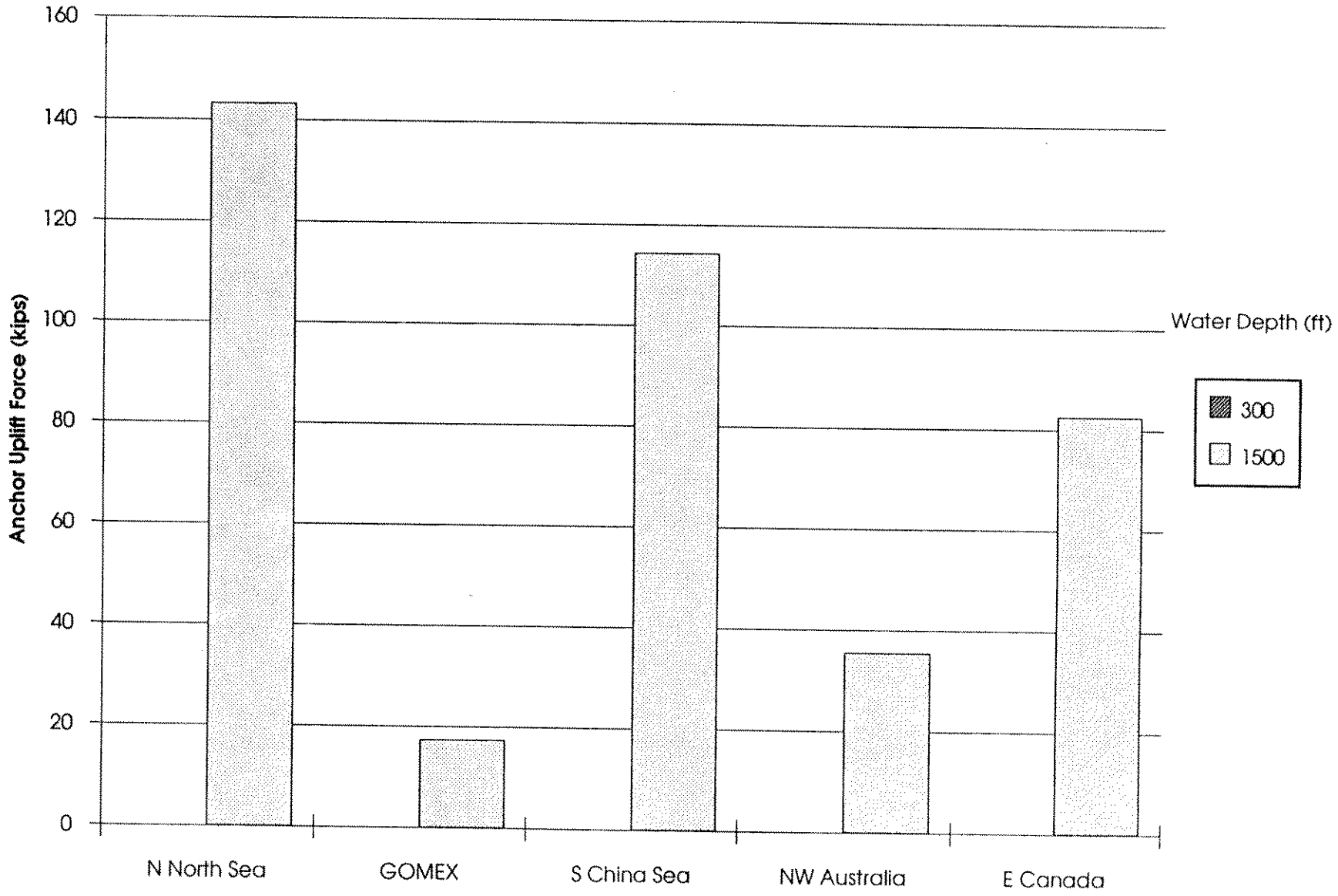
API New Code, 10-Year Return Storm, Near Other Installations
SEDCO 704



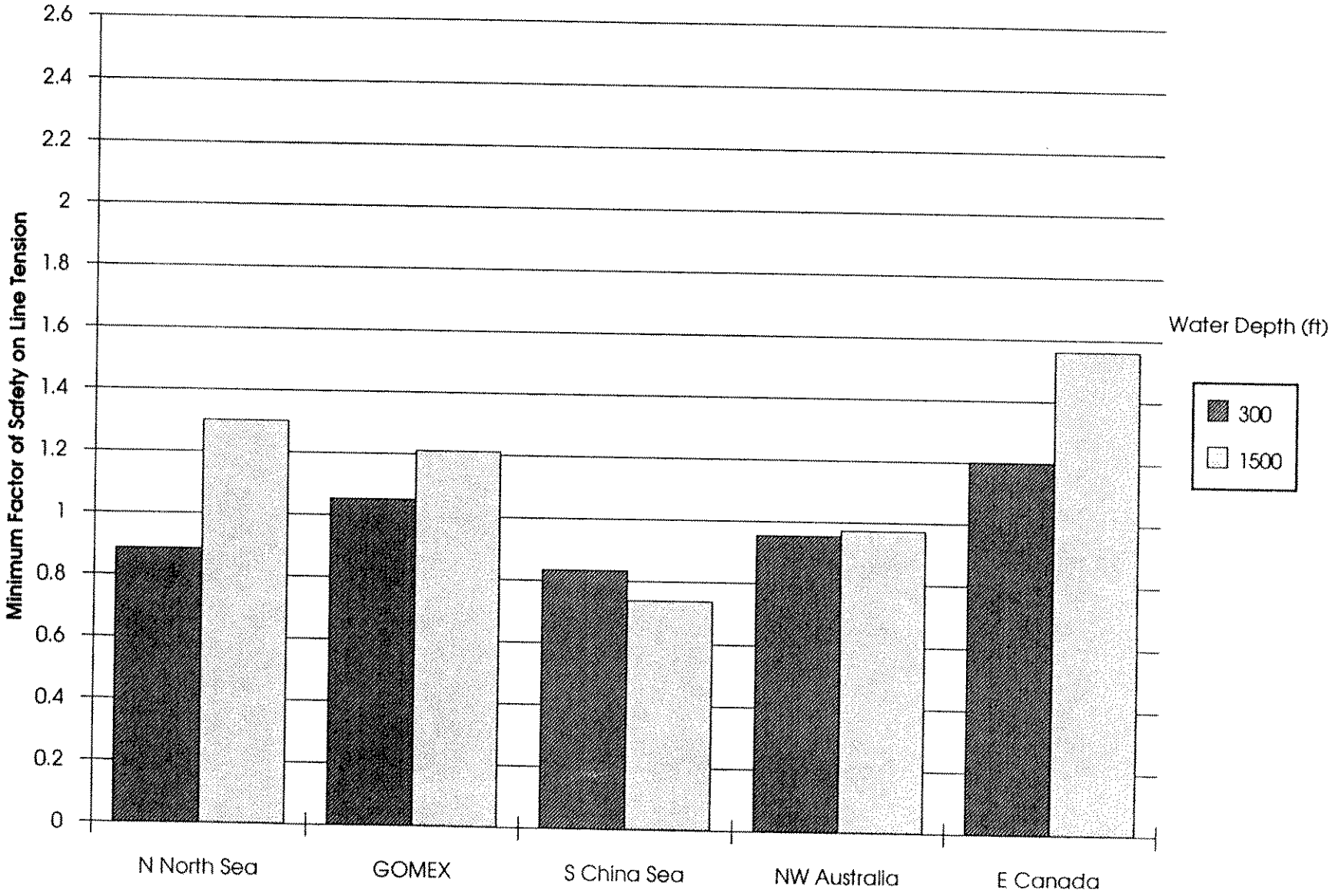
API New Code, 5-Year Return Storm, Far from Other Installations
SEDCO 704



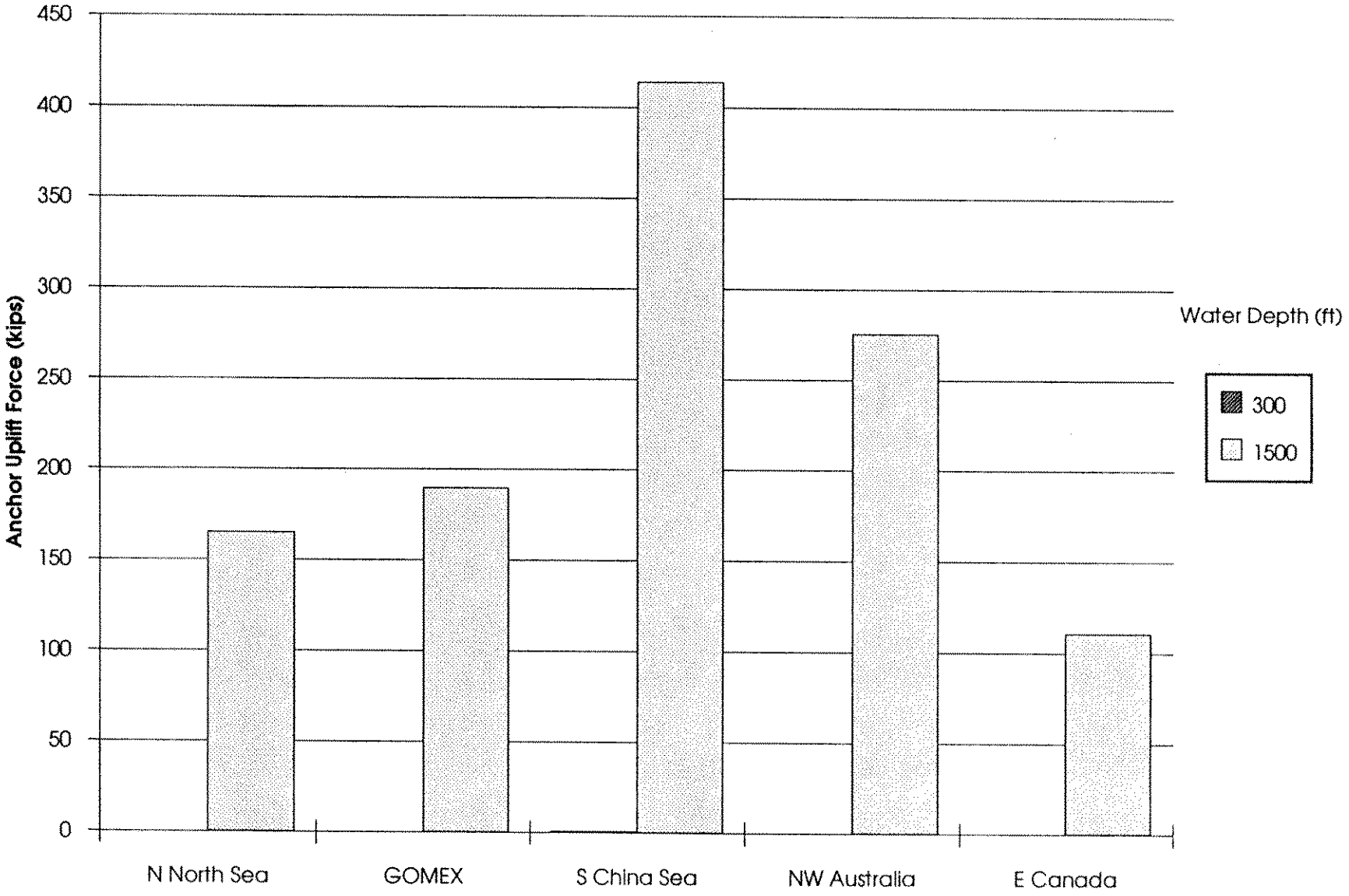
API New Code, 5-Year Return Storm, Far from Other Installations
SEDCO 704



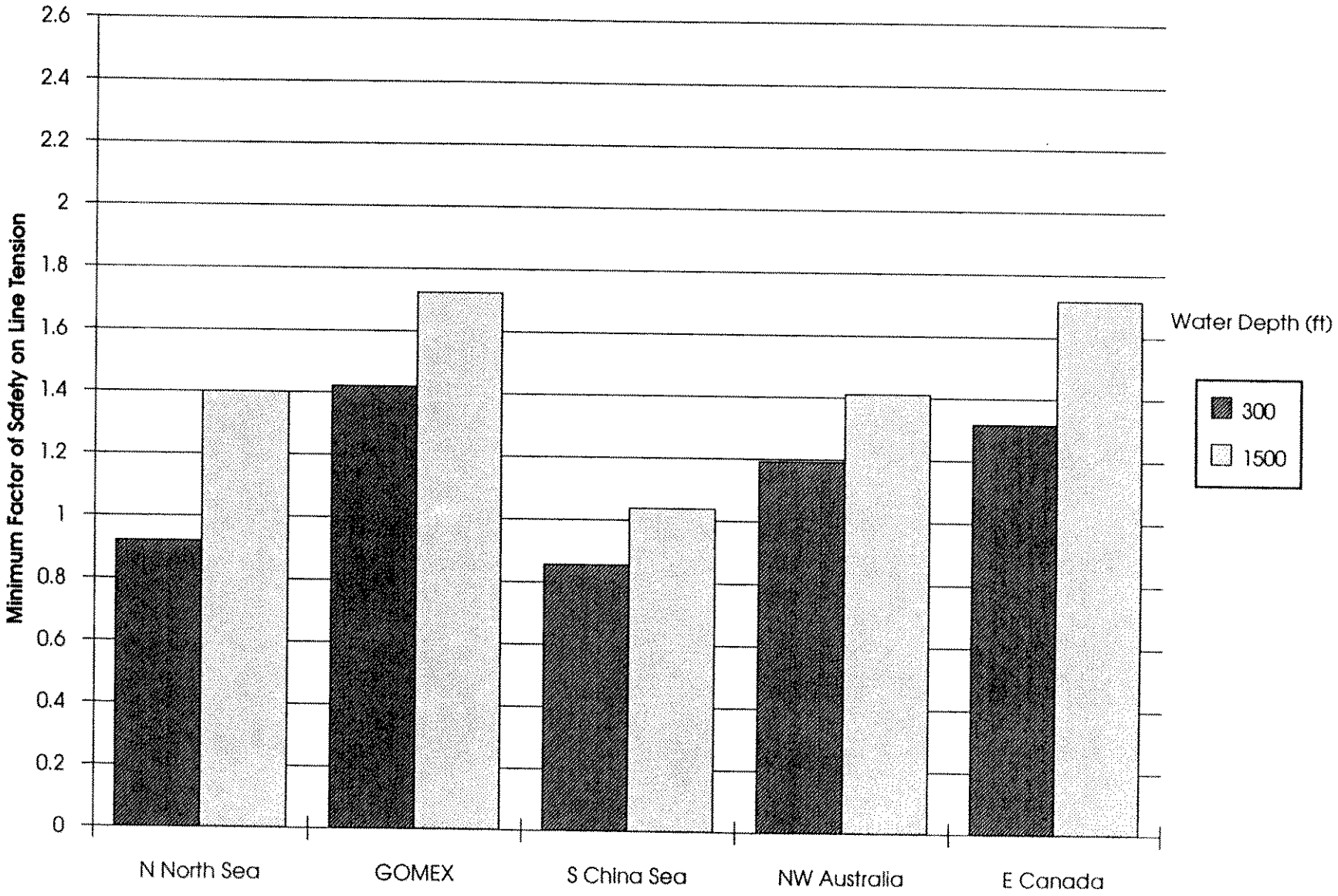
DNV-NMD Code, Run 1
SEDCO 704



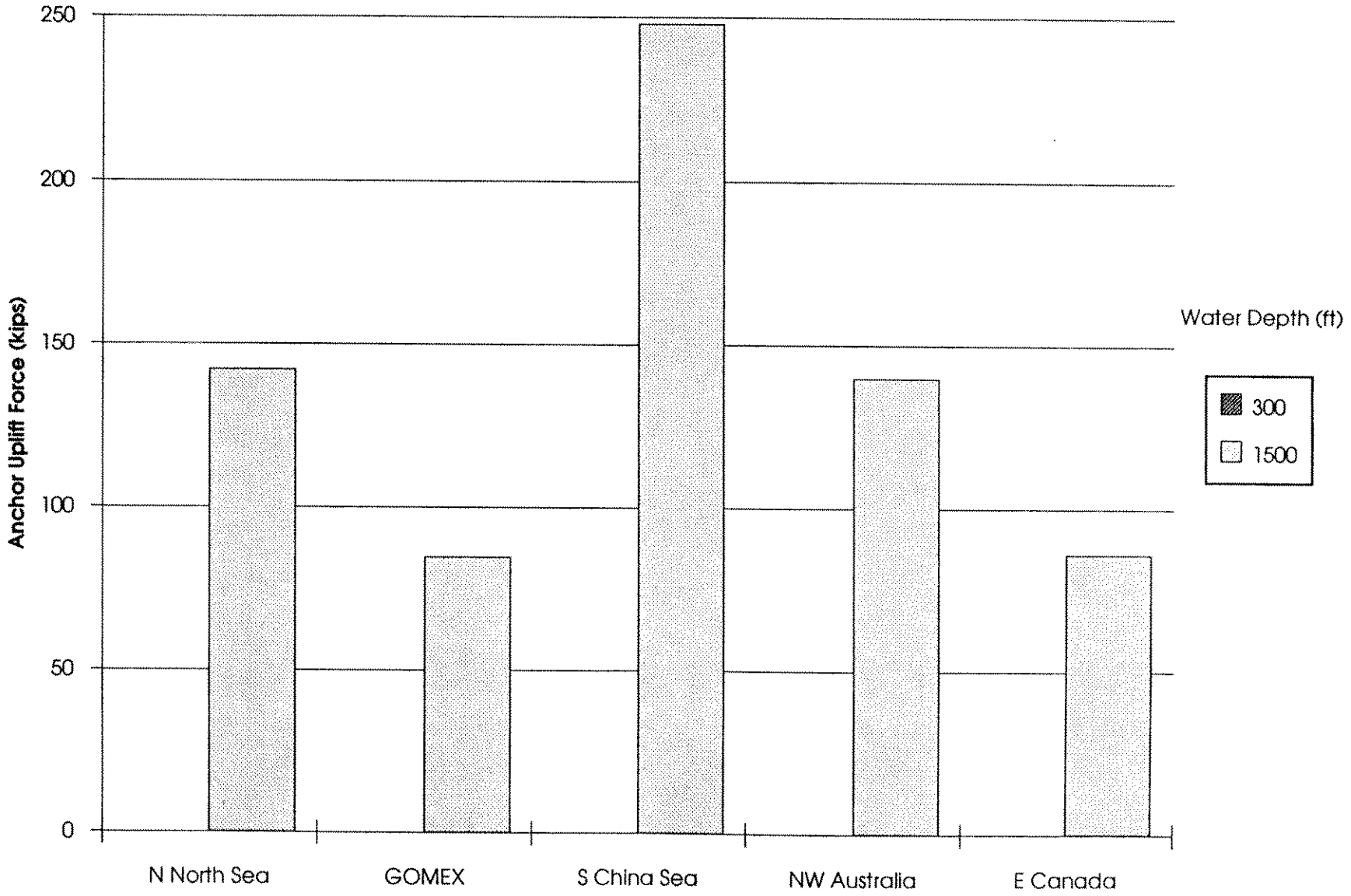
DNV-NMD Code, Run 1
SEDCO 704



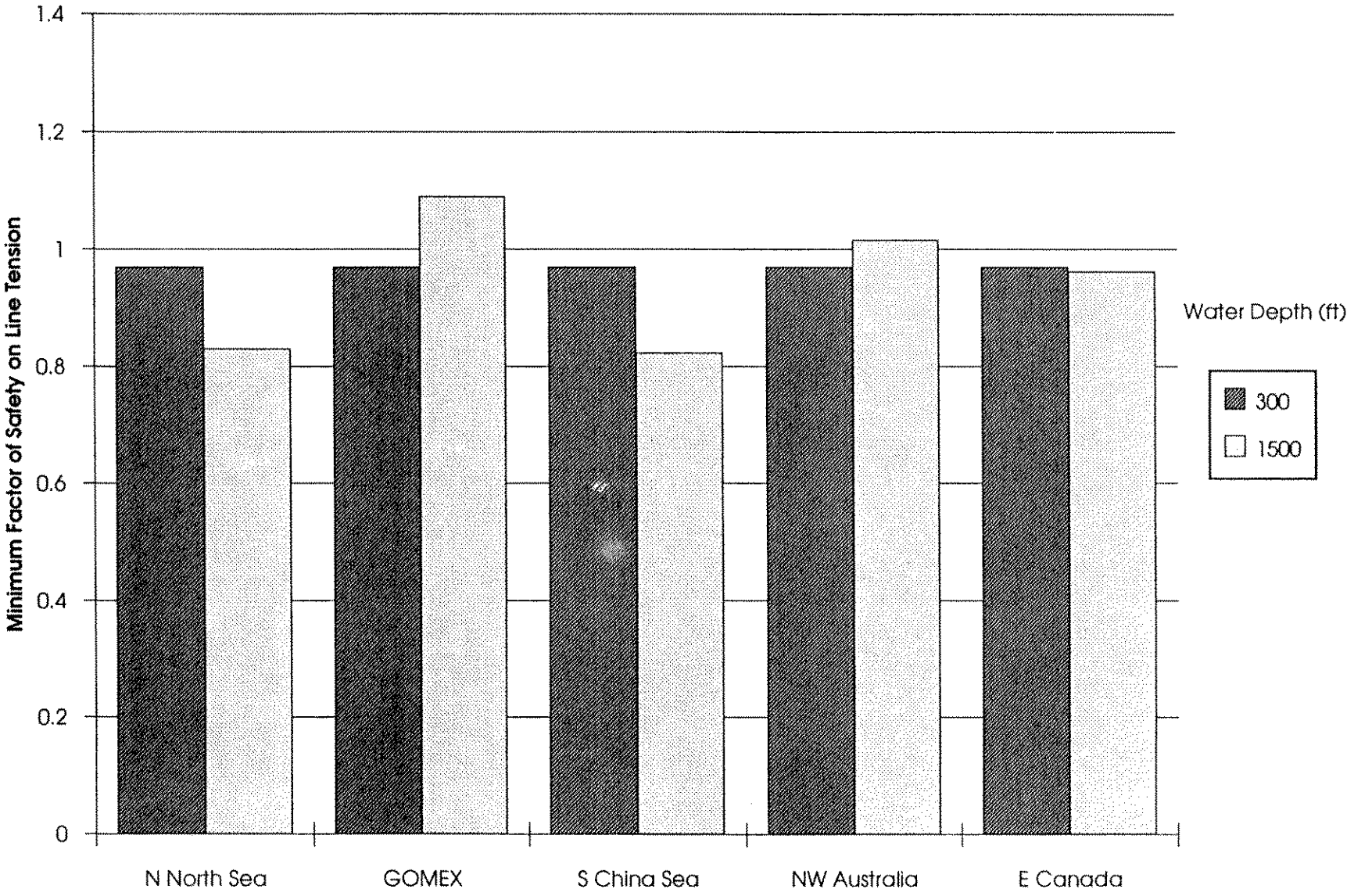
DNV-NMD Code, Run 2
SEDCO 704



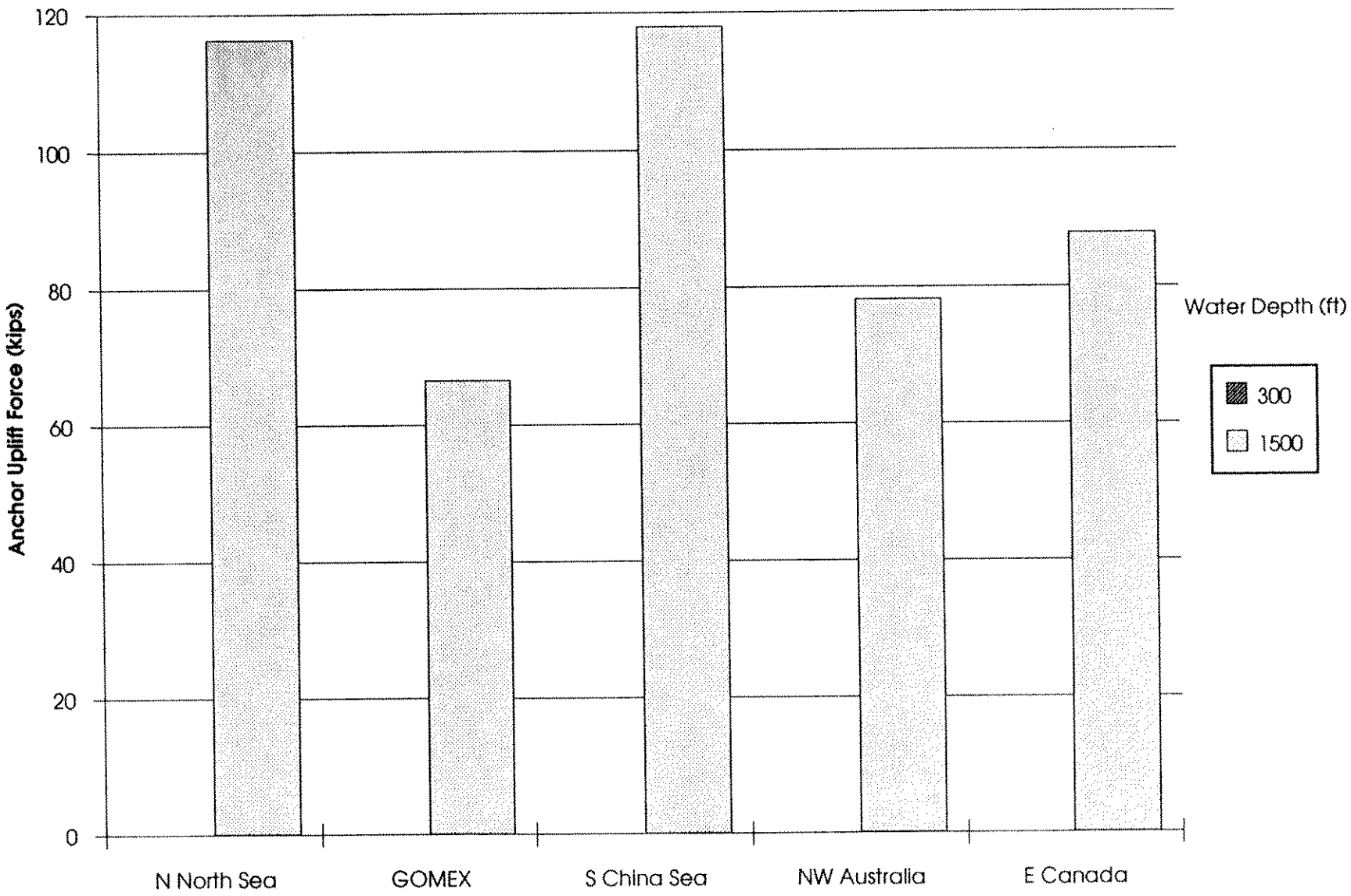
DNV-NMD Code, Run 2
SEDCO 704



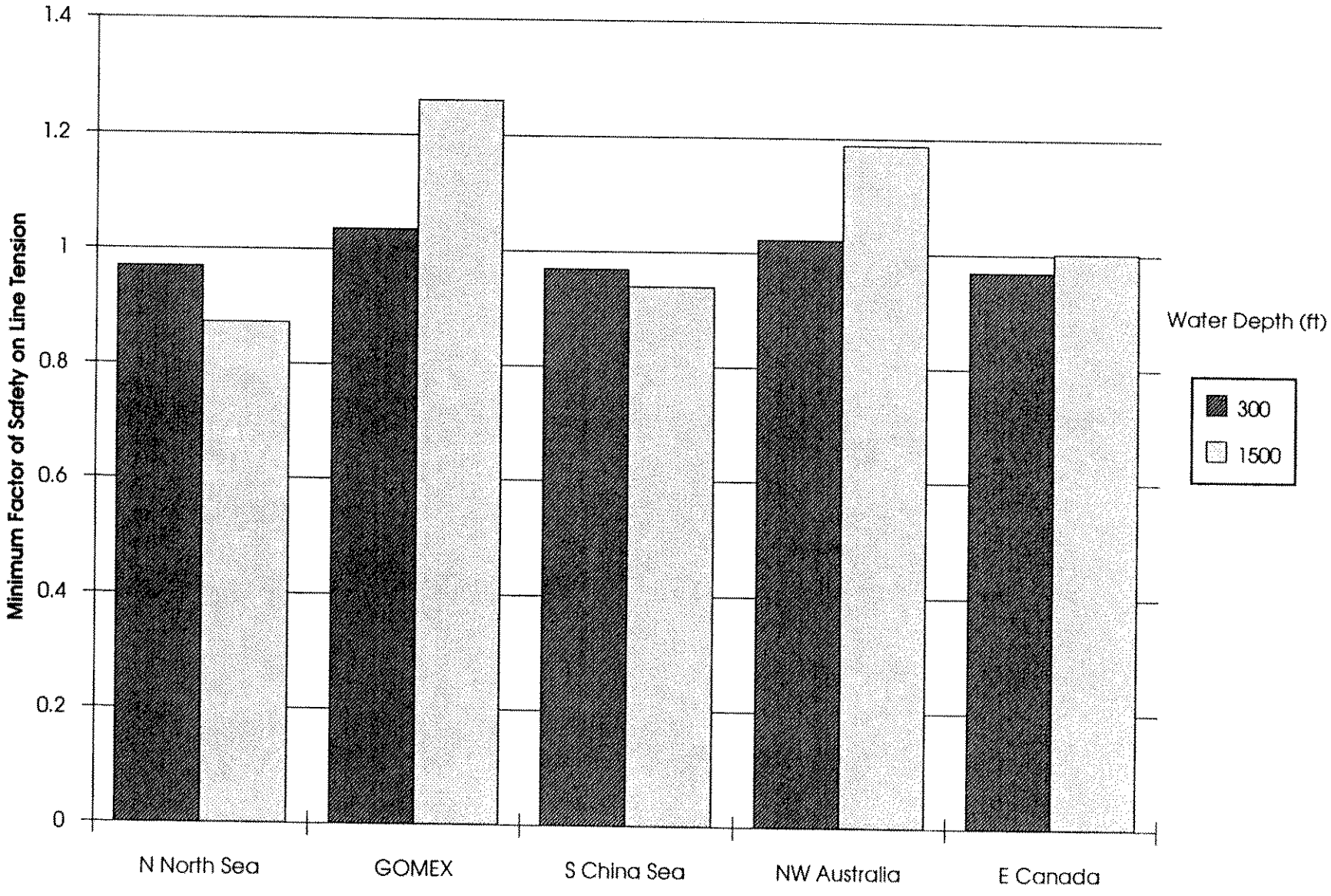
API New Code, 10-Year Return Storm, Near Other Installations
Deepsea Duchess



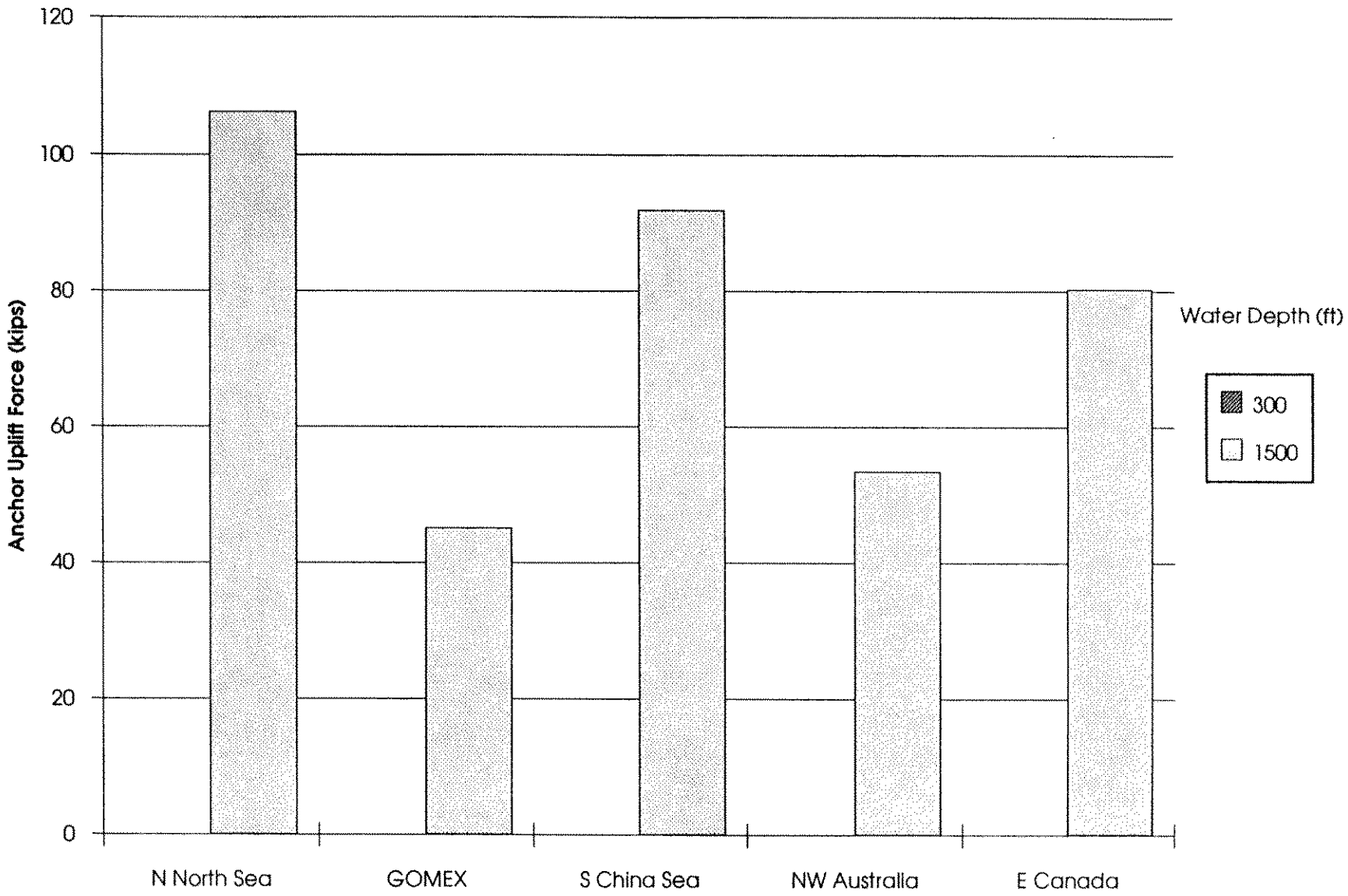
API New Code, 10-Year Return Storm, Near Other Installations
Deepsea Duchess



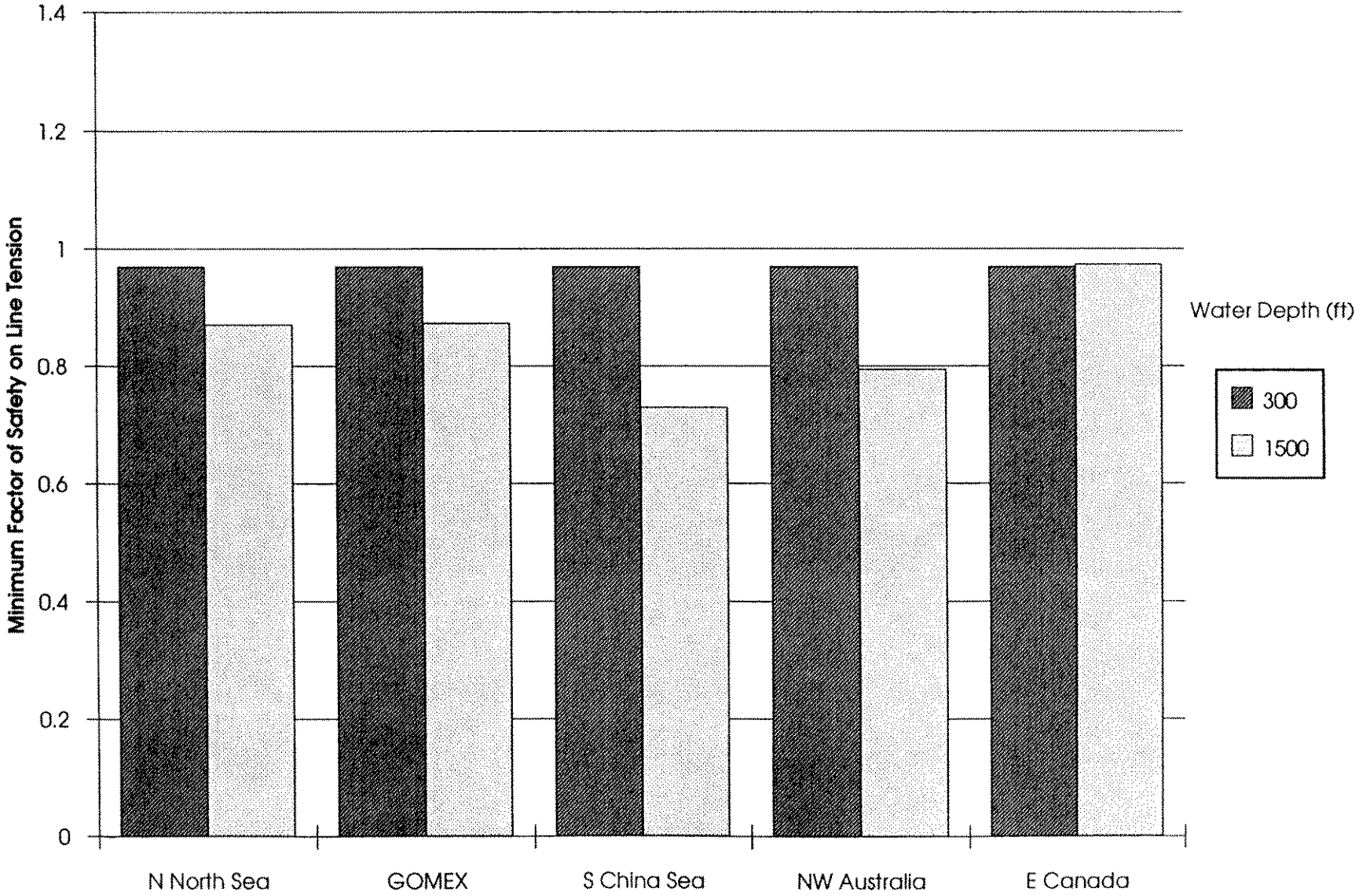
API New Code, 5-Year Return Storm, Far from Other Installations
Deepsea Duchess



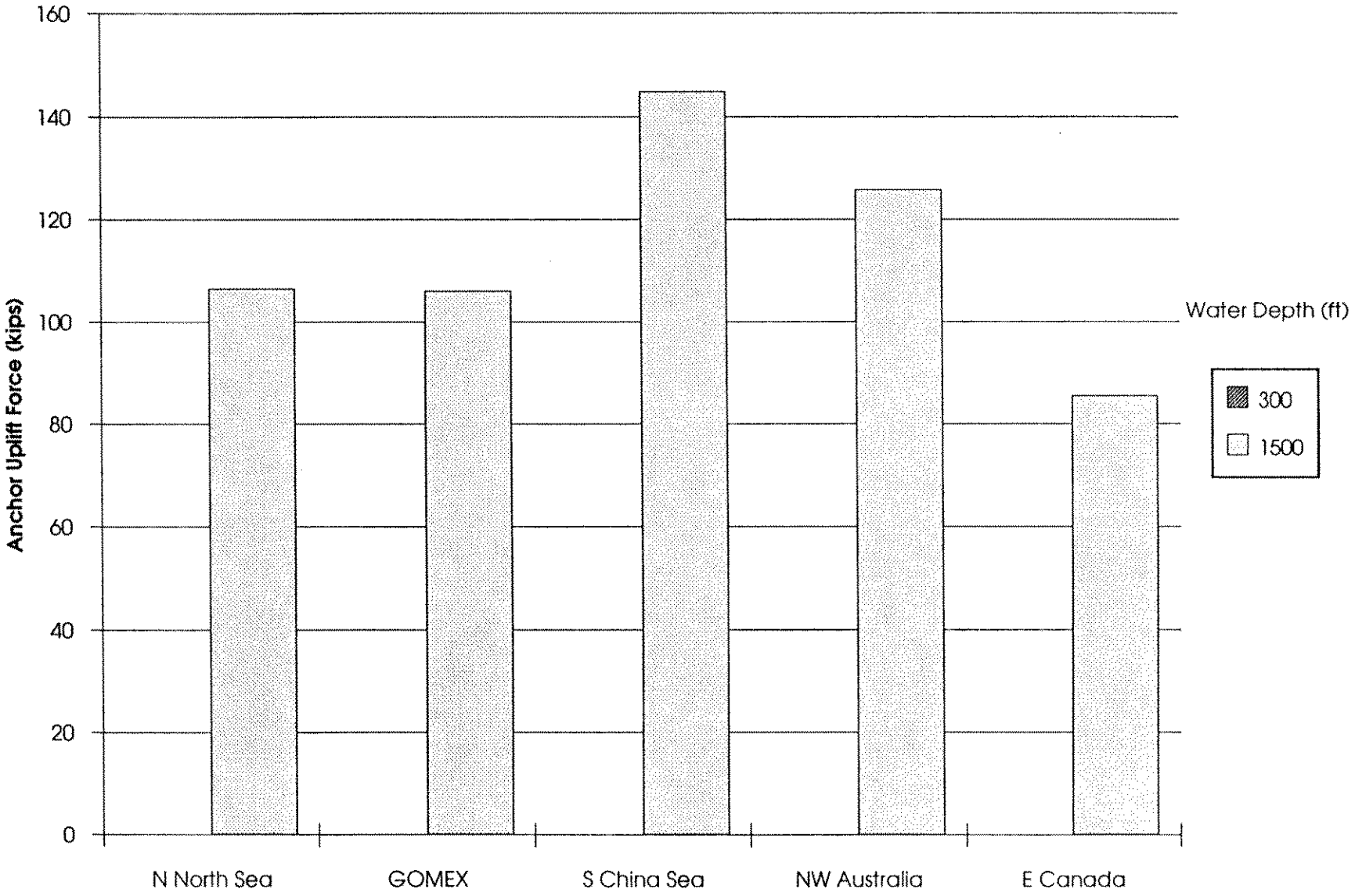
API New Code, 5-Year Return Storm, Far from Other Installations
Deepsea Duchess



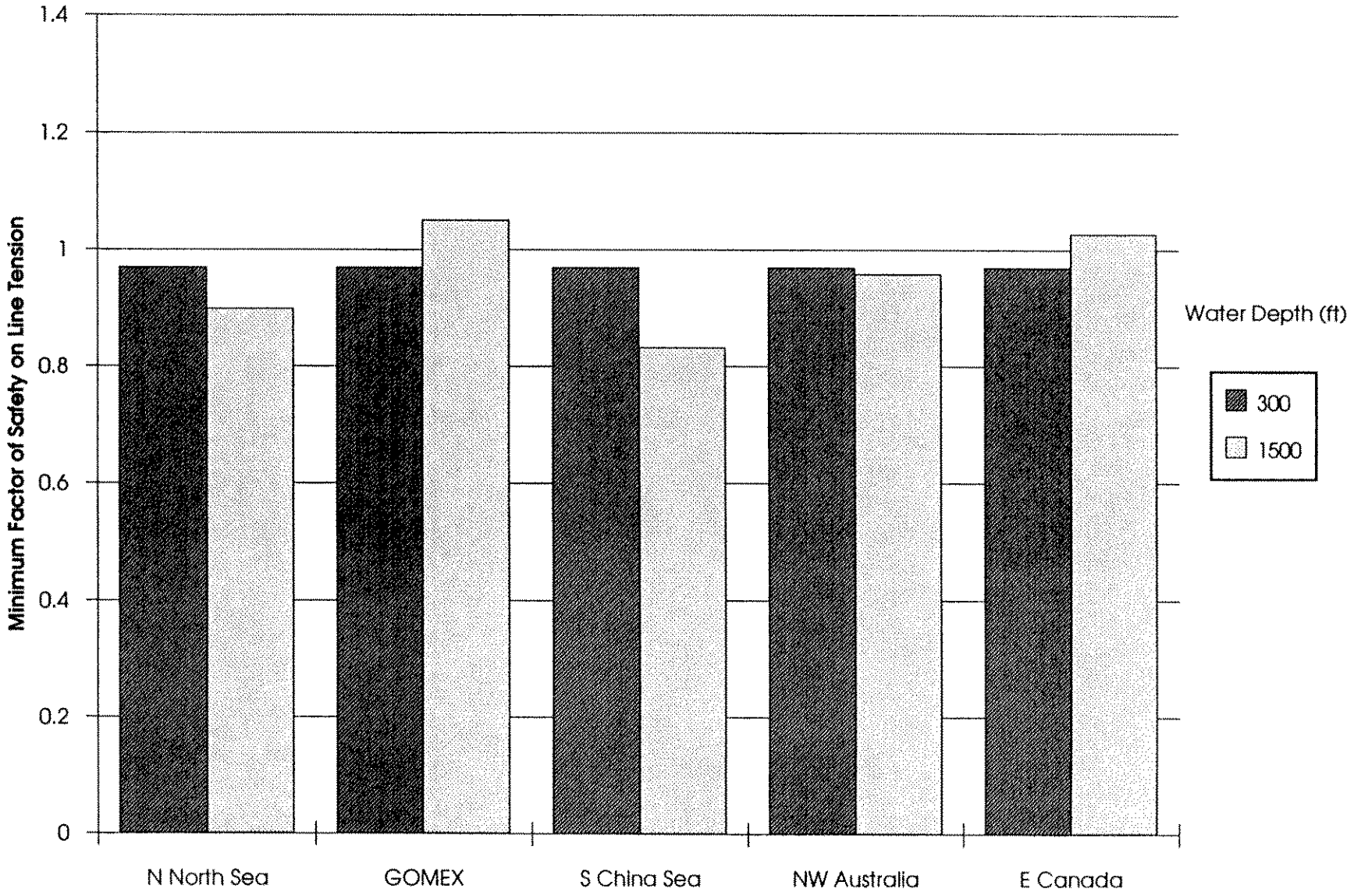
DNV-NMD Code, Run 1
Deepsea Duchess



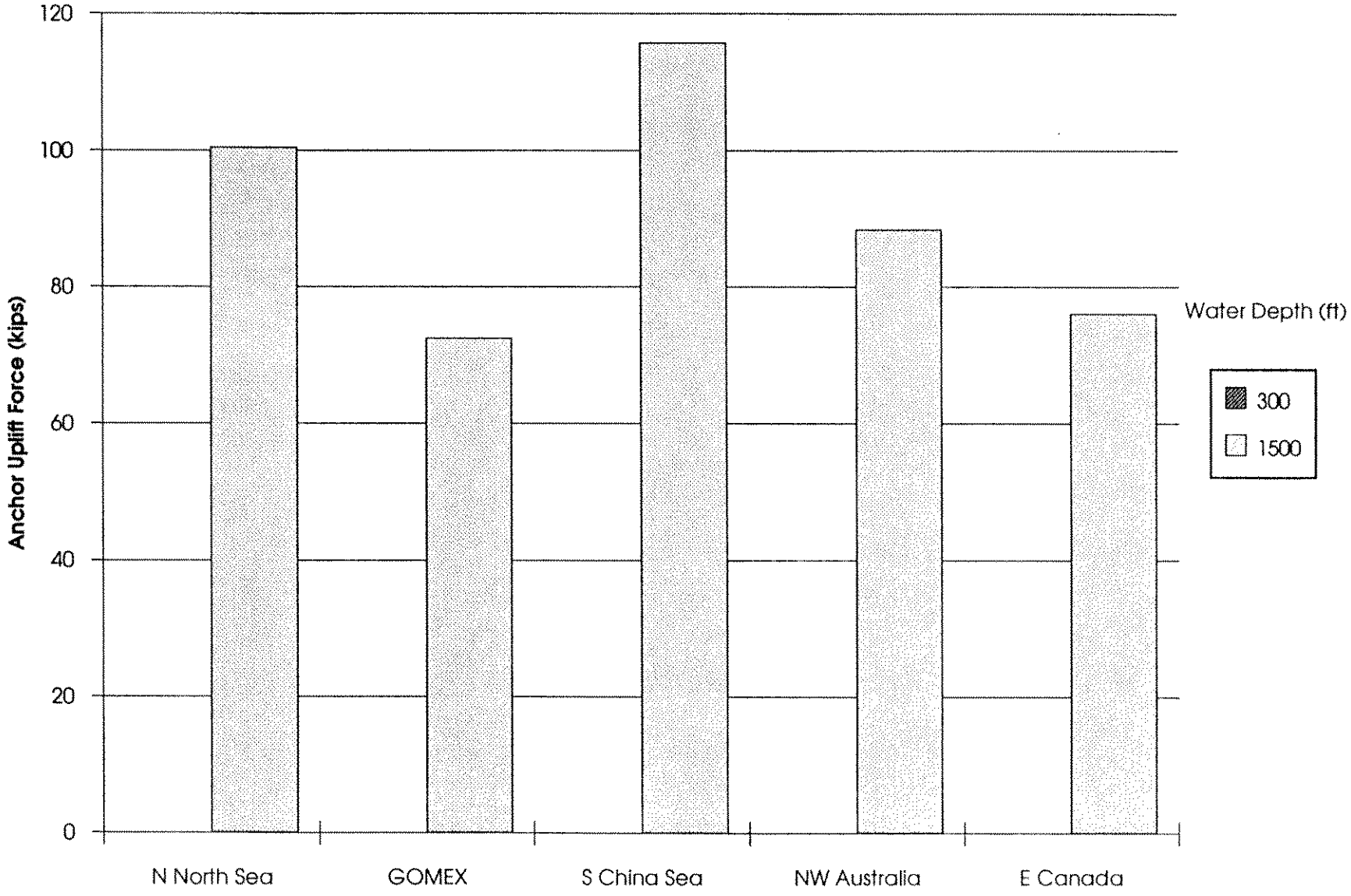
DNV-NMD Code, Run 1
Deepsea Duchess



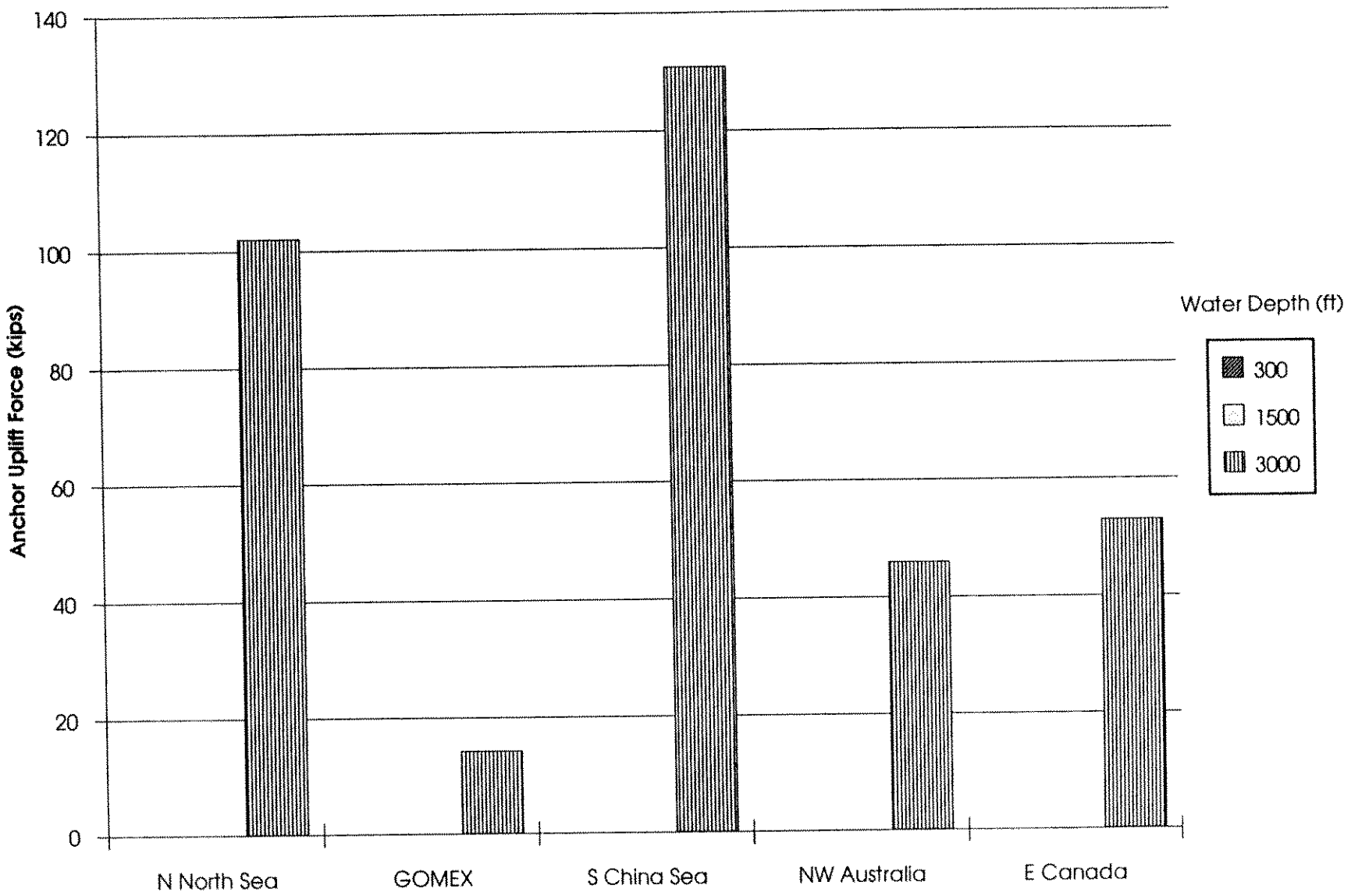
DNV-NMD Code, Run 2
Deepsea Duchess



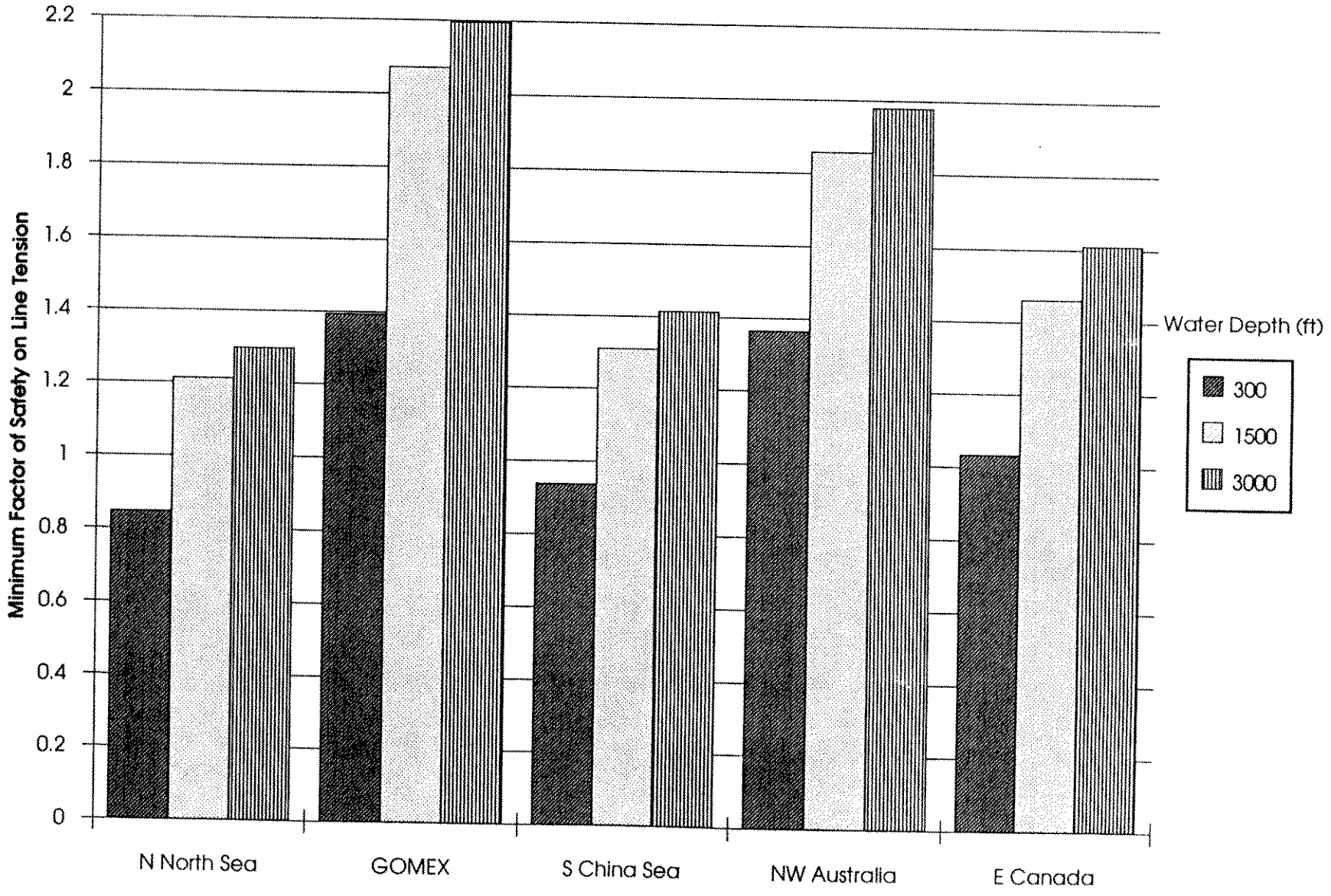
DNV-NMD Code, Run 2
Deepsea Duchess



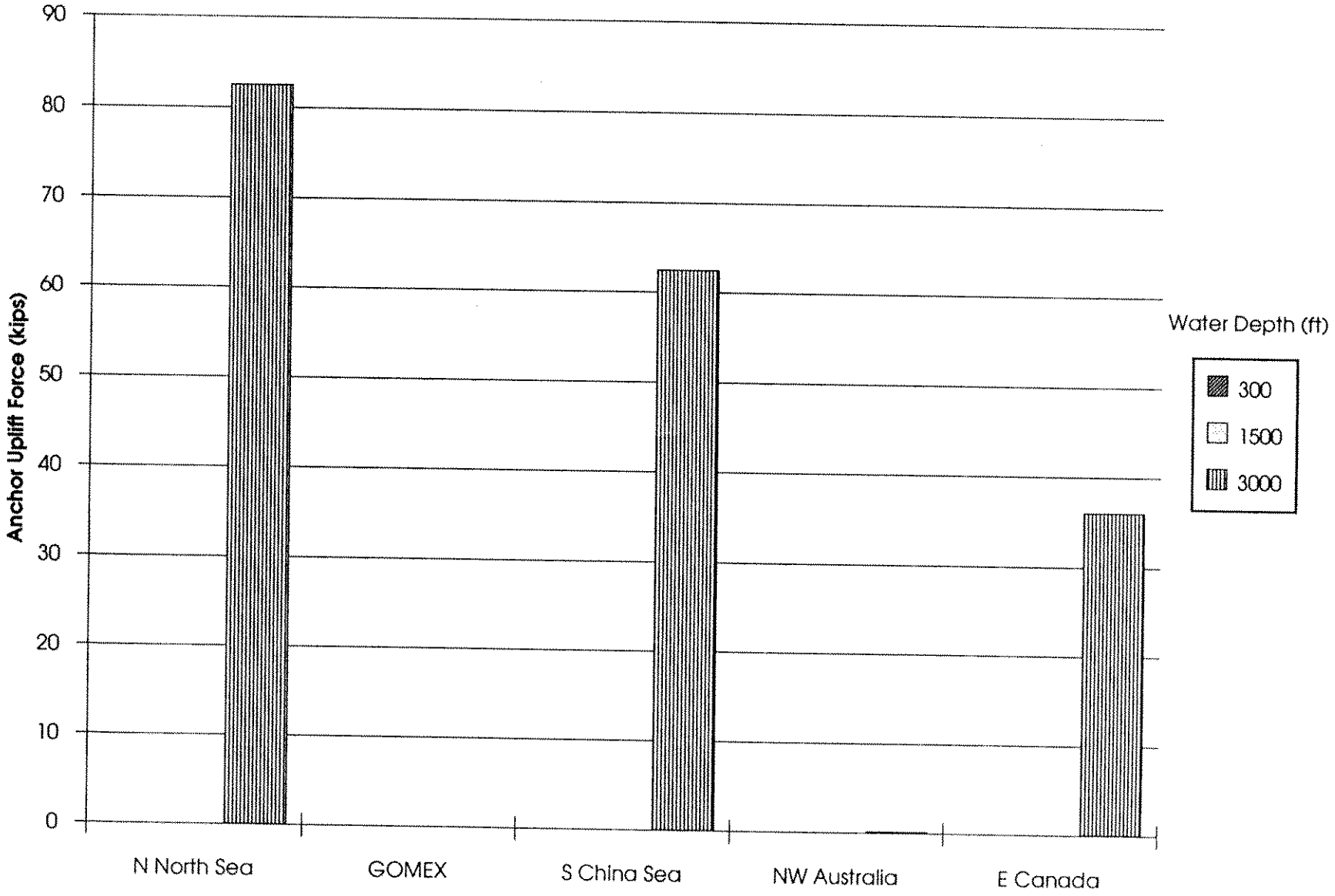
API New Code, 10-Year Return Storm, Near Other Installations
Zapata Yorktown



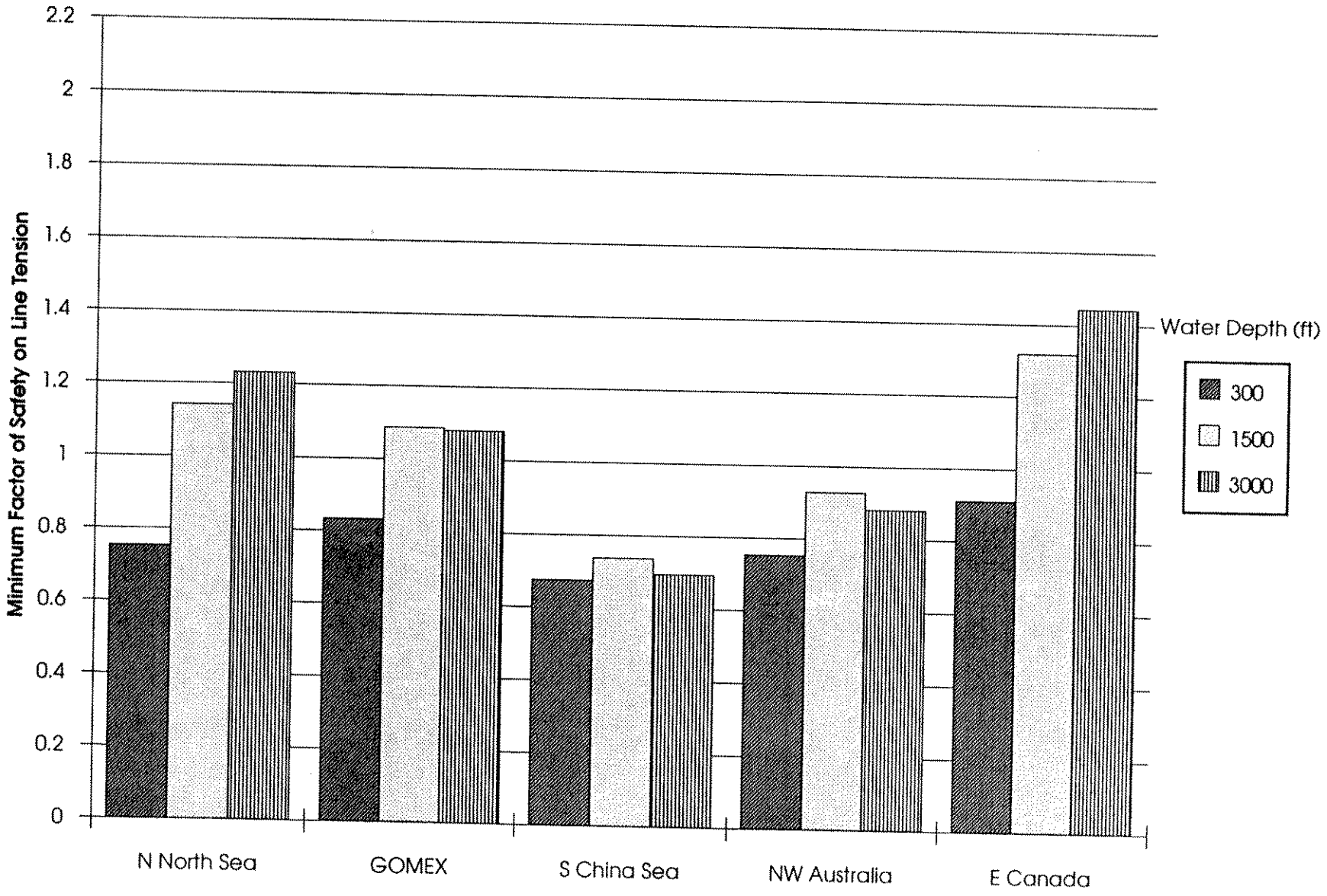
API New Code, 5-Year Return Storm, Far from Other Installations
Zapata Yorktown

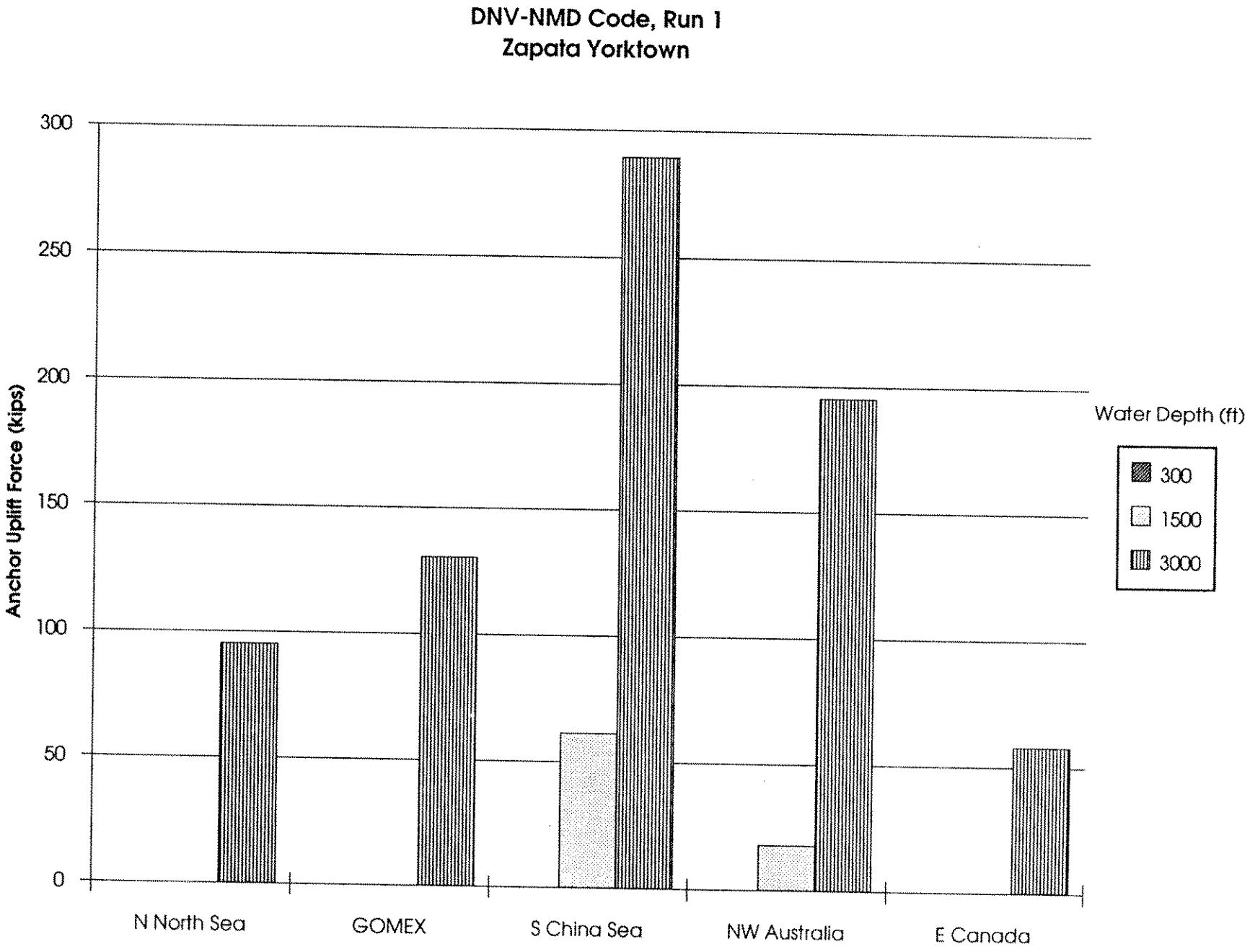


API New Code, 5-Year Return Storm, Far from Other Installations
Zapata Yorktown

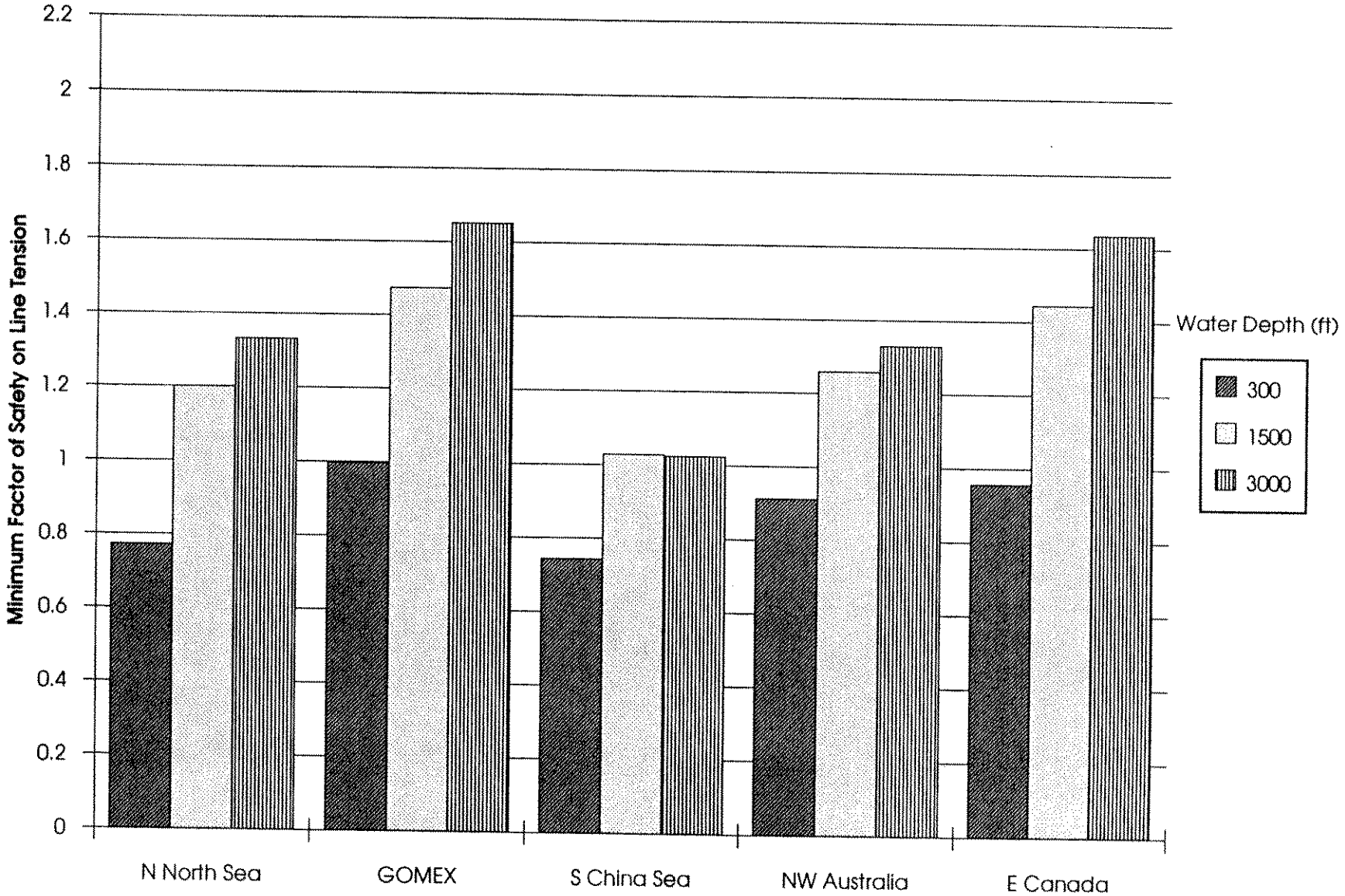


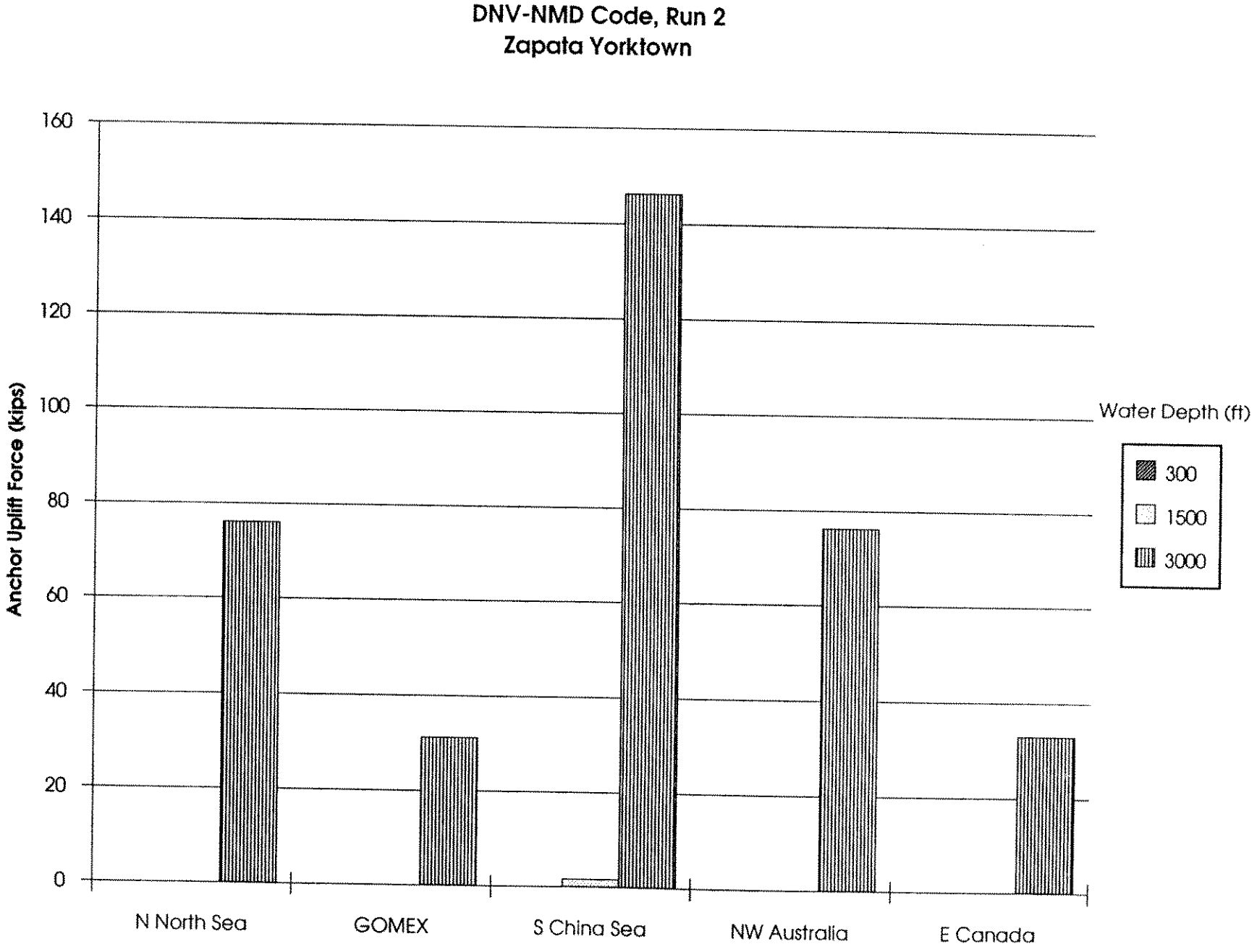
DNV-NMD Code, Run 1
Zapata Yorktown



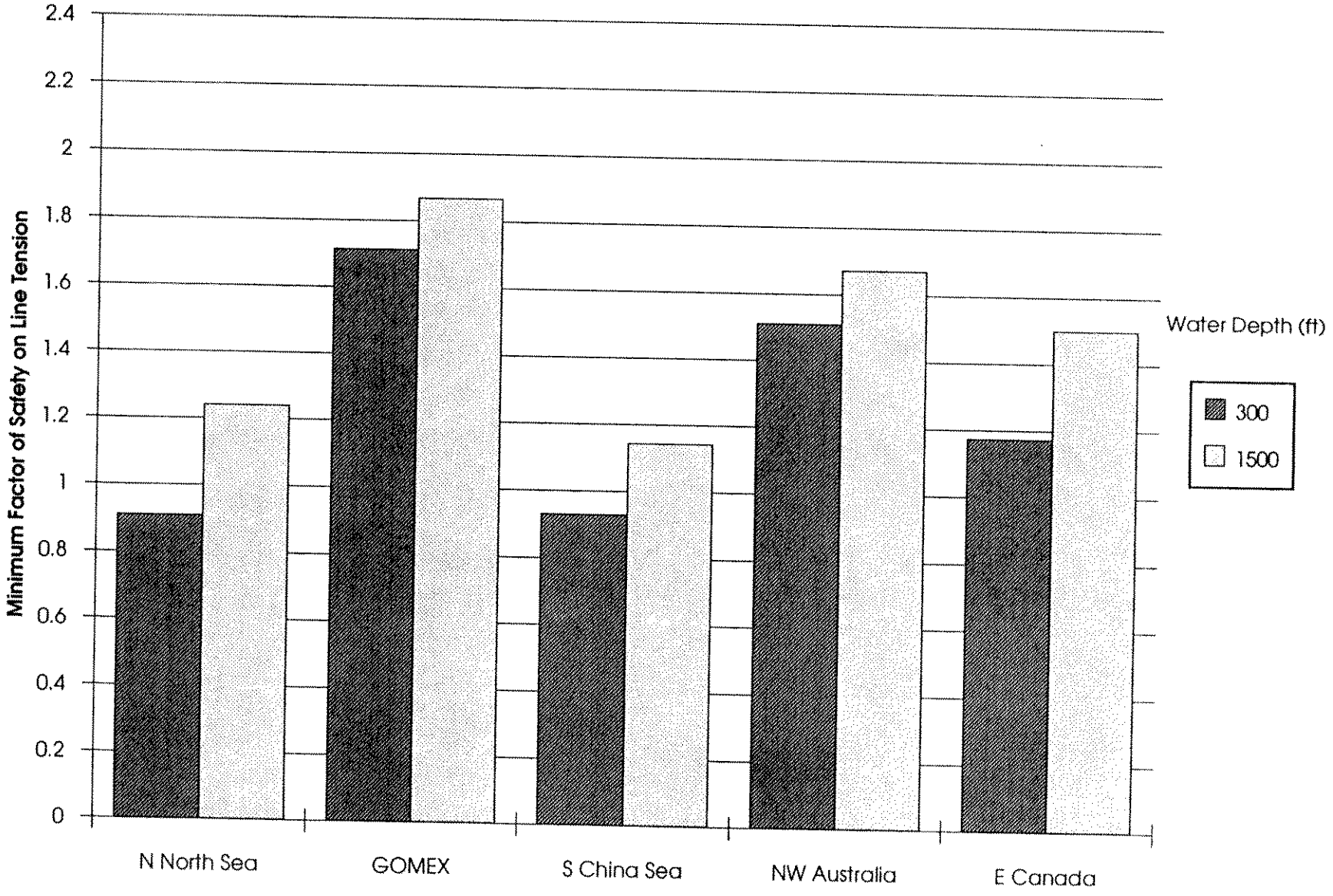

DNV-NMD Code, Run 1
Zapata Yorktown
Anchor Uplift Force (kips)
300
250
200
150
100
50
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500
3000

DNV-NMD Code, Run 2
Zapata Yorktown

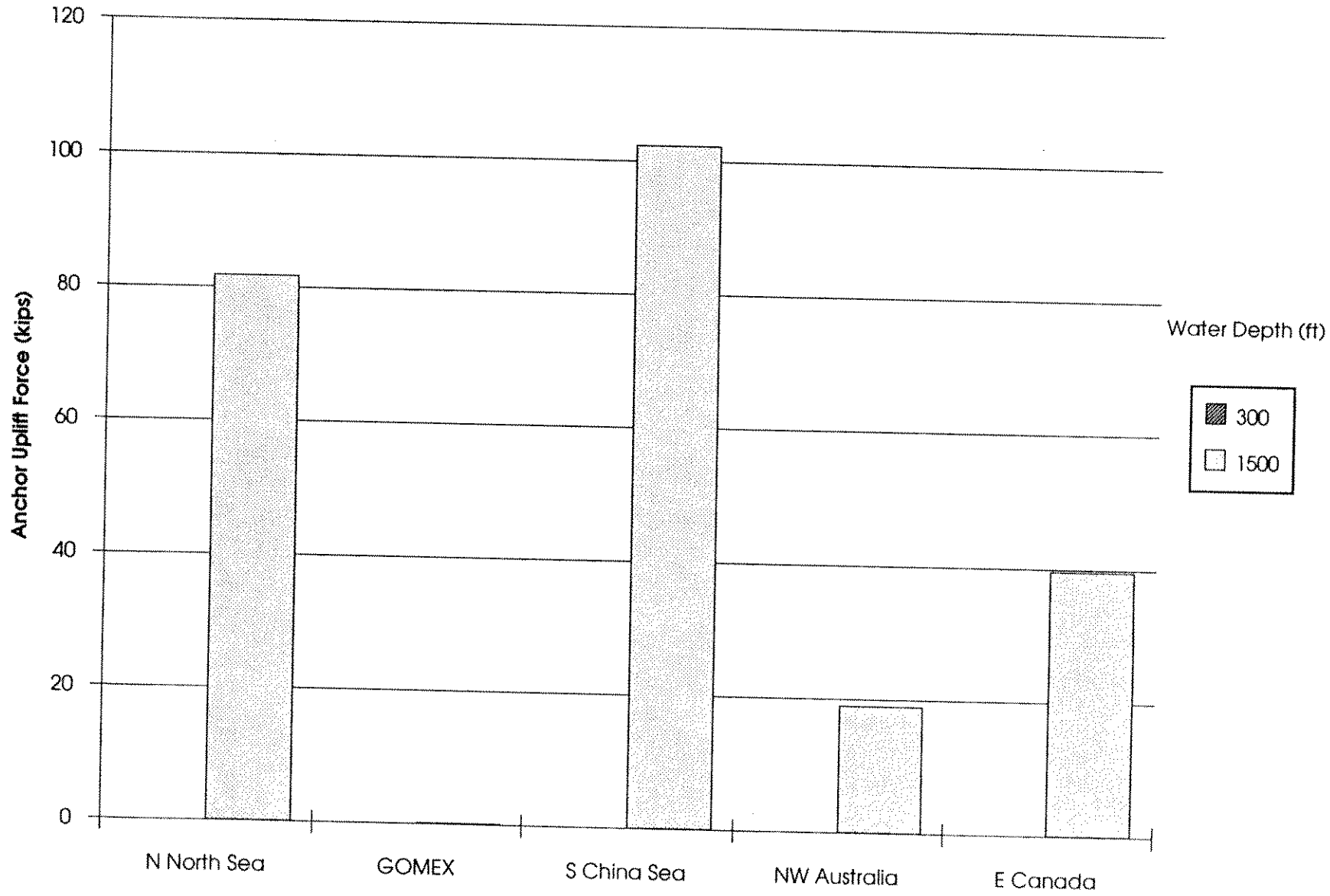



DNV-NMD Code, Run 2
Zapata Yorktown
Anchor Uplift Force (kips)
160
140
120
100
80
60
40
20
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500
3000

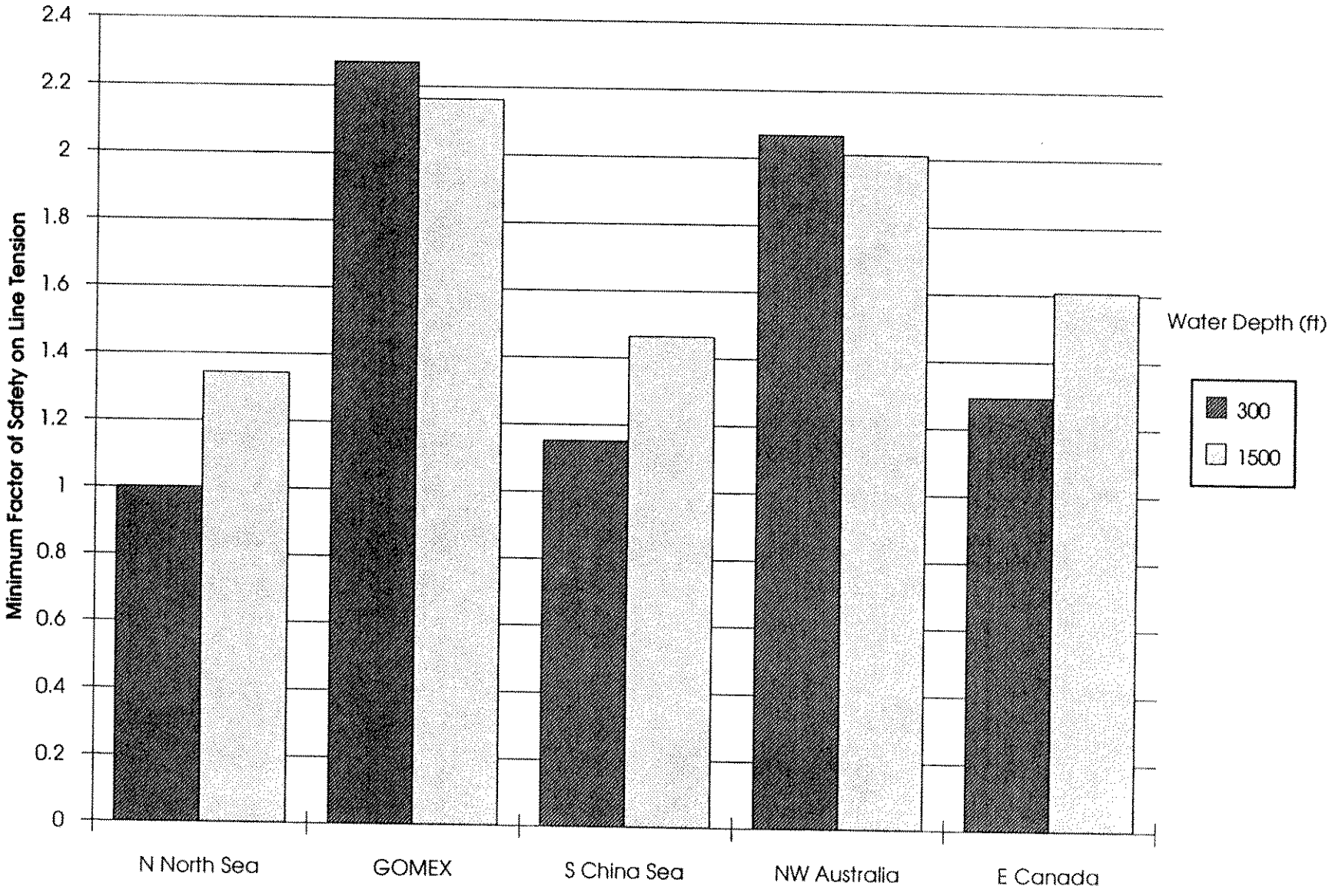
API New Code, 10-Year Return Storm, Near Other Installations
Diamond M Epoch



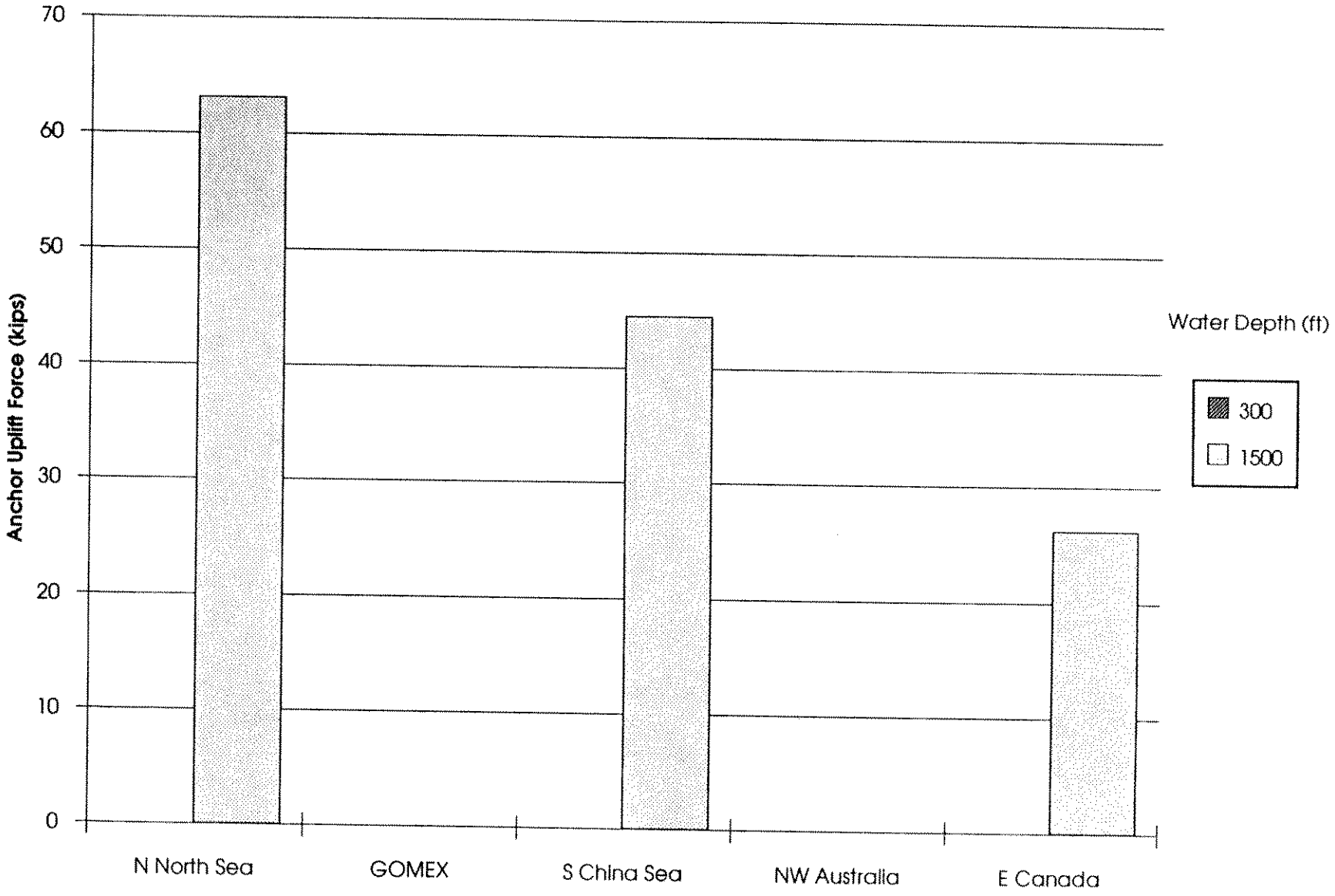
API New Code, 10-Year Return Storm, Near Other Installations
Diamond M Epoch



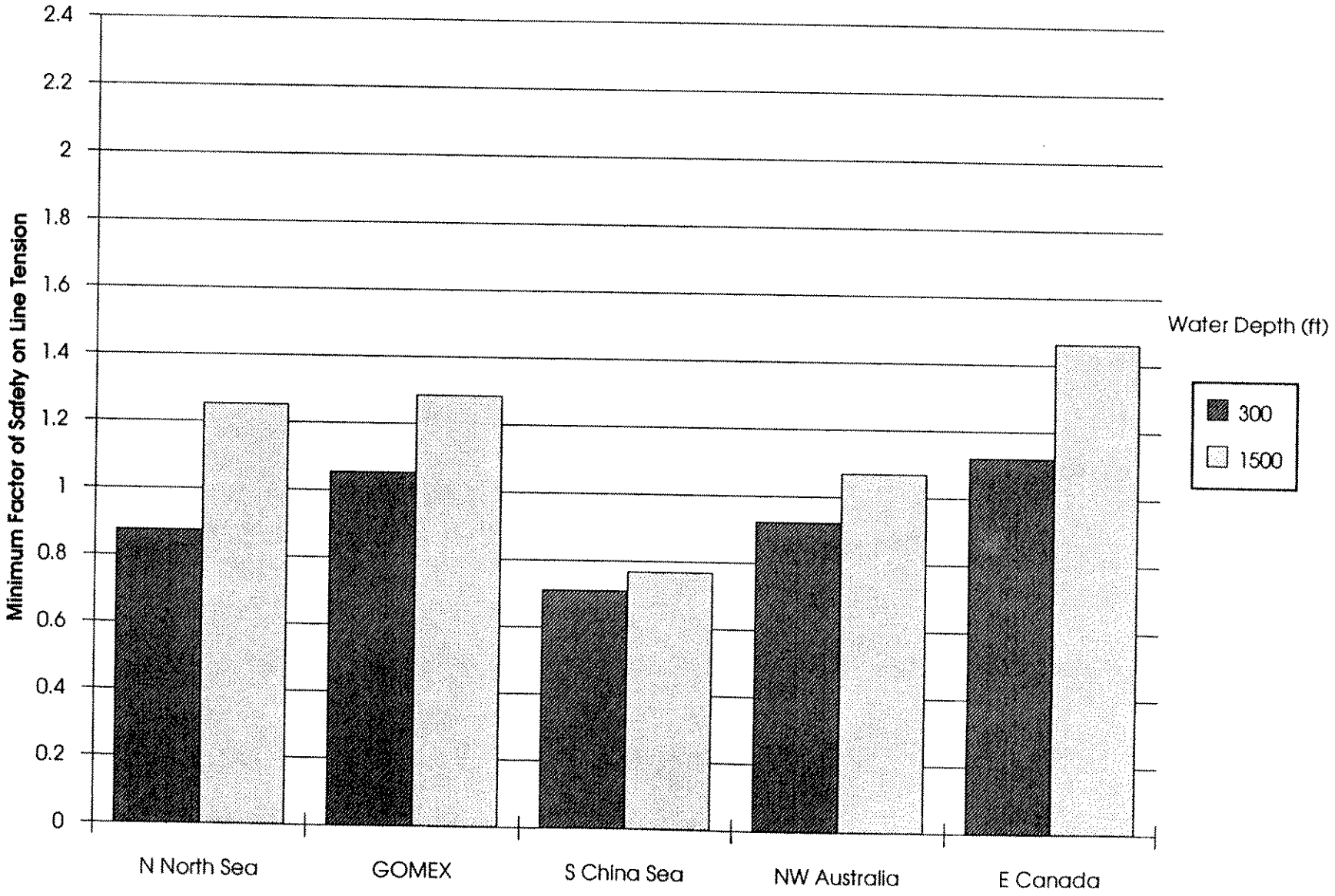
API New Code, 5-Year Return Storm, Far from Other Installations
Diamond M Epoch



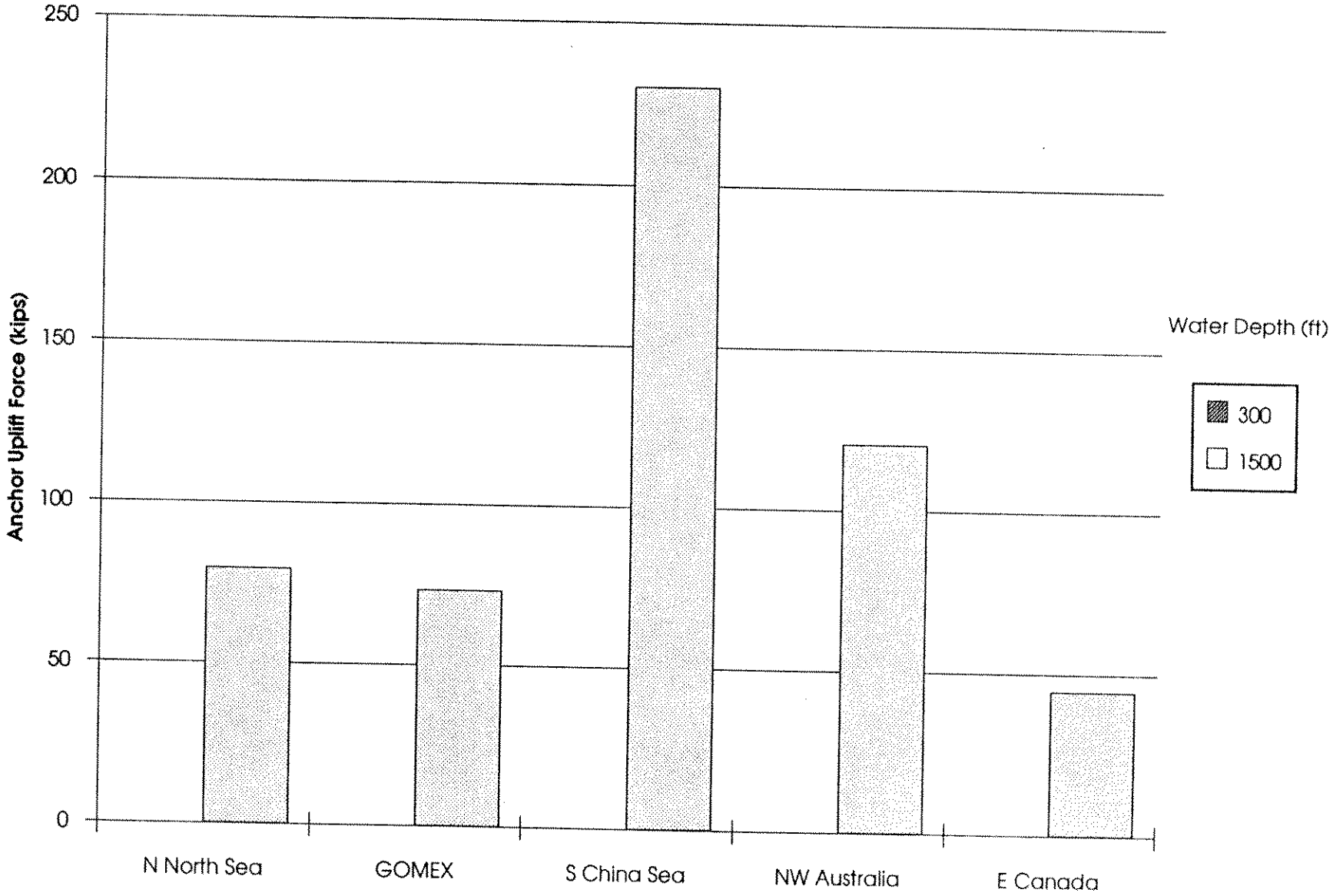
API New Code, 5-Year Return Storm, Far from Other Installations
Diamond M Epoch



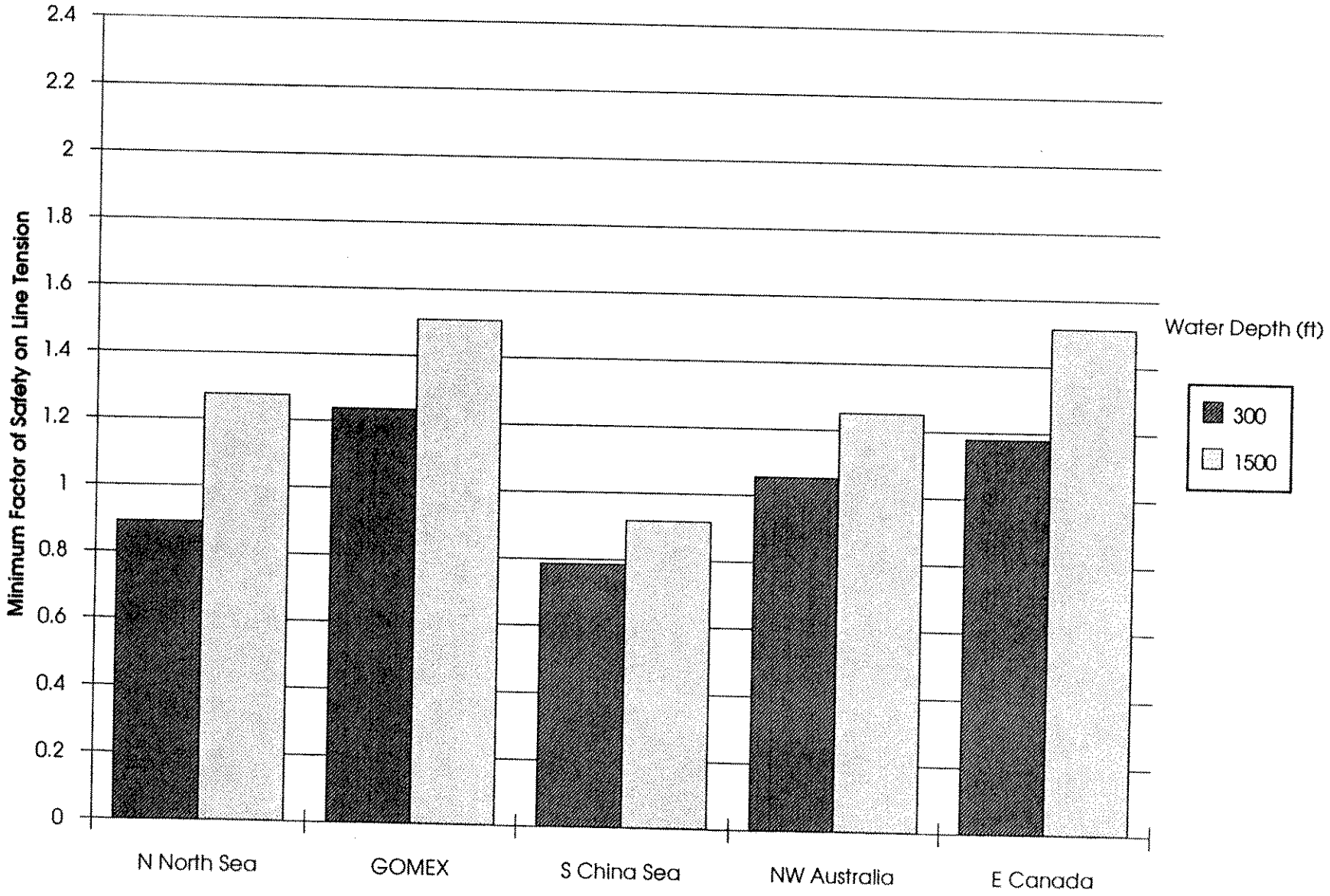
DNV-NMD Code, Run 1
Diamond M Epoch

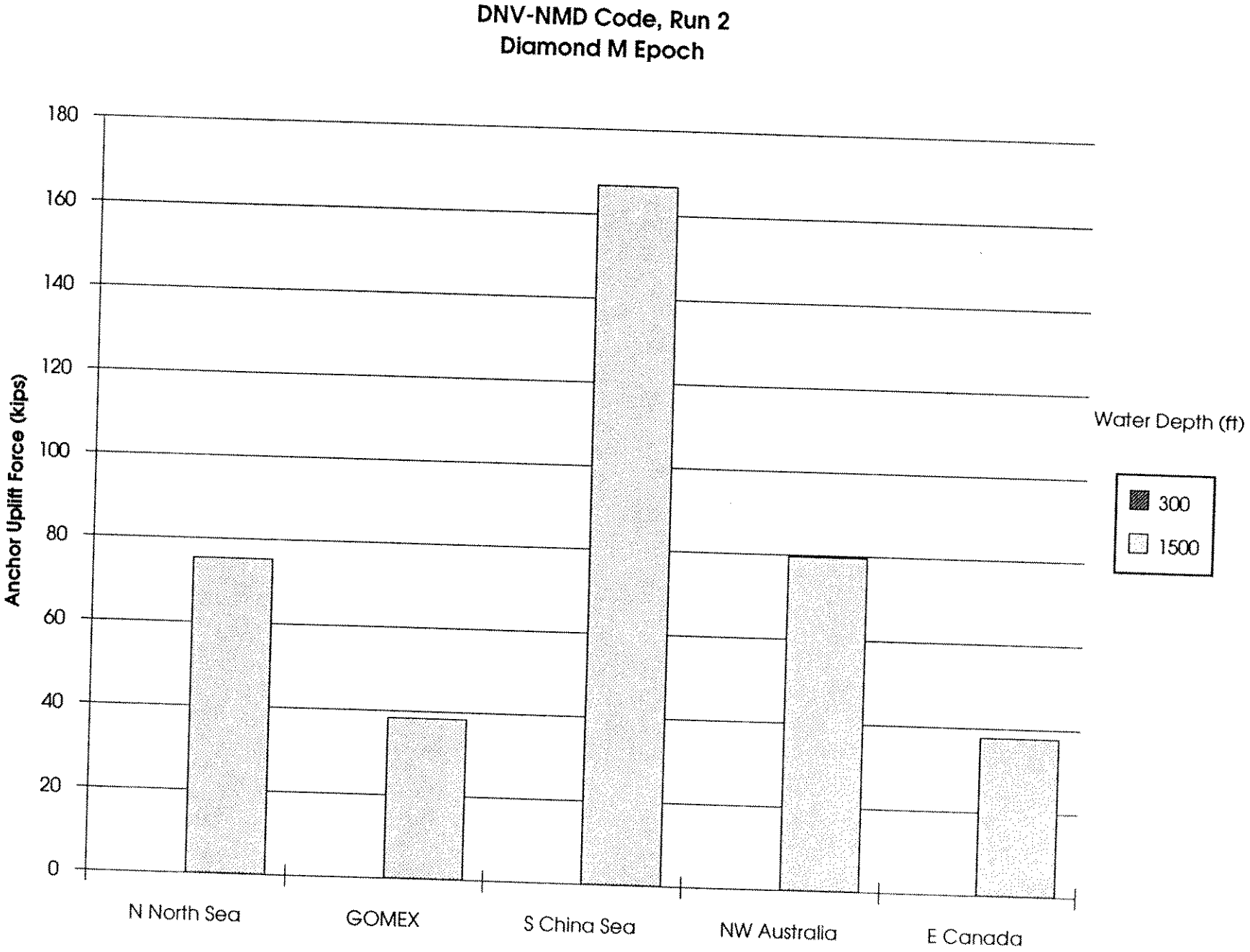


DNV-NMD Code, Run 1
Diamond M Epoch

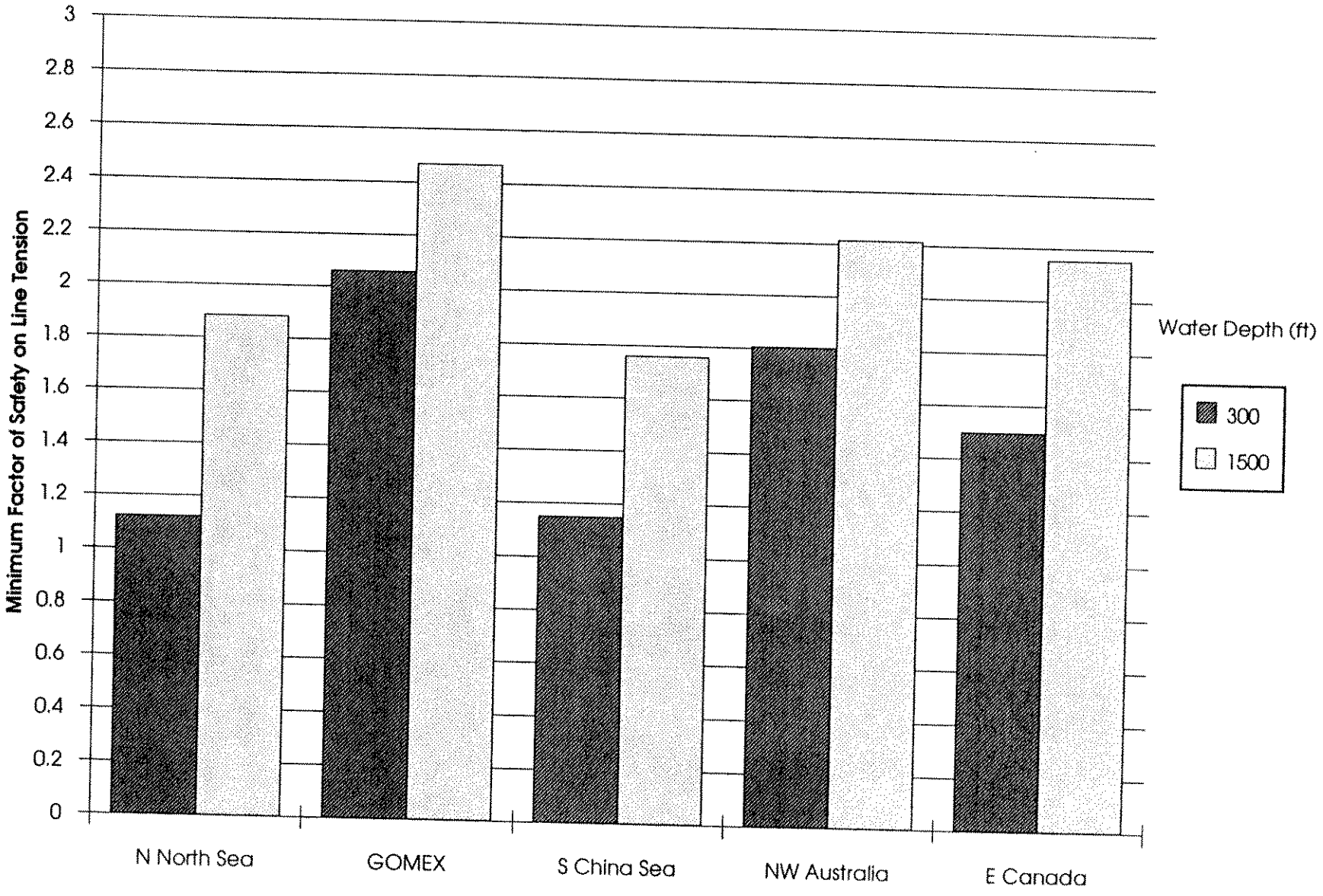


DNV-NMD Code, Run 2
Diamond M Epoch

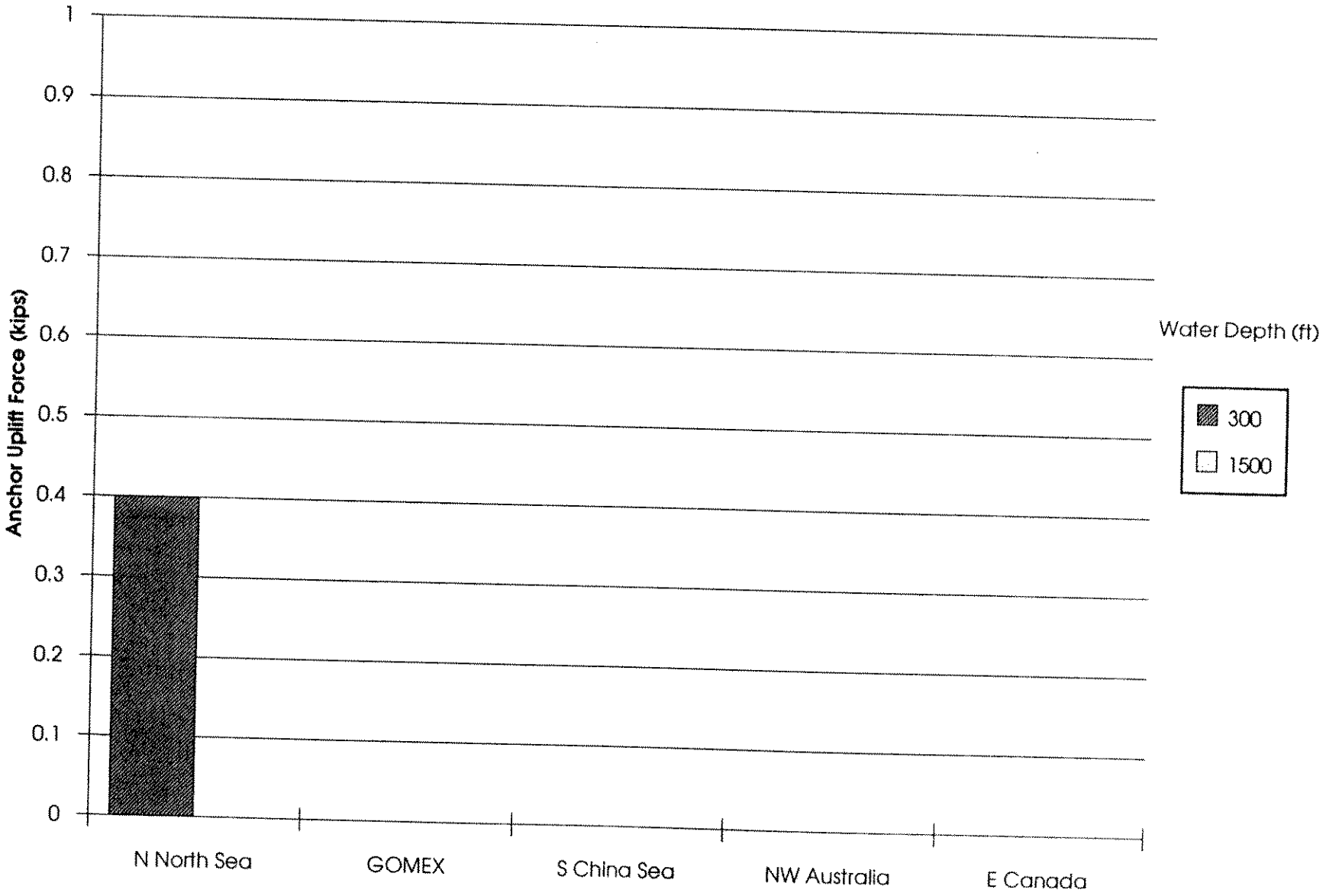



DNV-NMD Code, Run 2
Diamond M Epoch
Anchor Uplift Force (kips)
180
160
140
120
100
80
60
40
20
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500

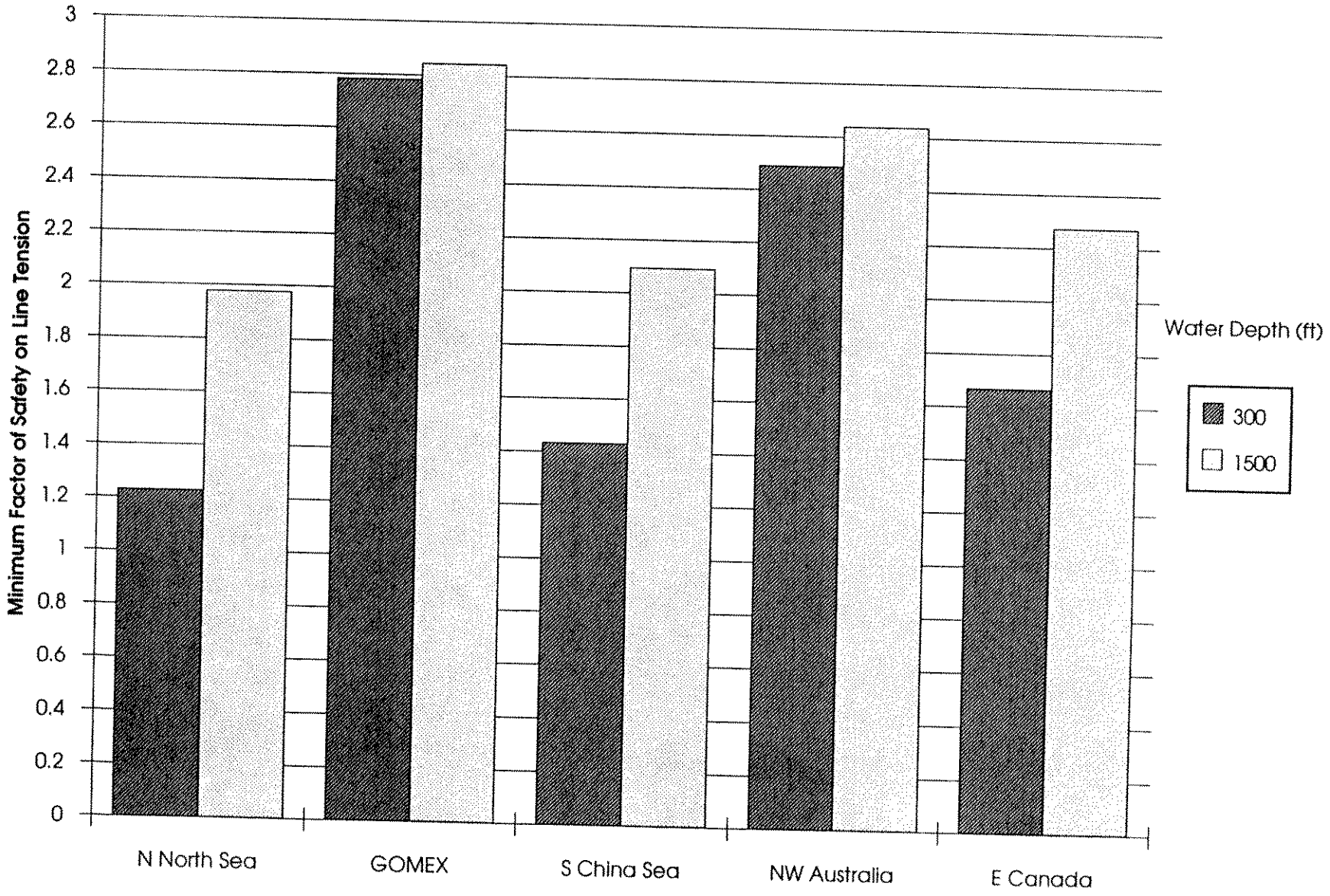
API New Code, 10-Year Return Storm, Near Other Installations
Benreoch



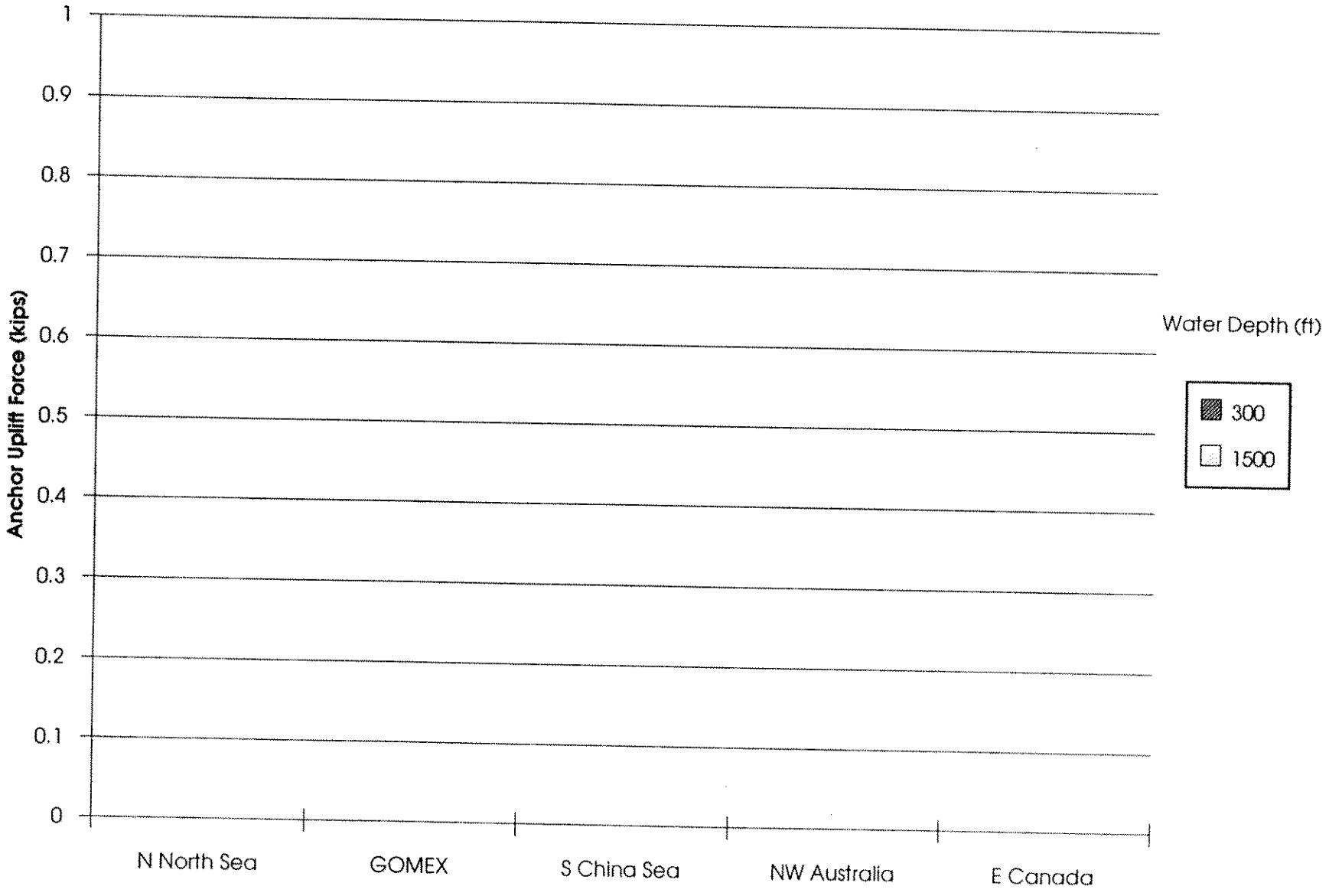
API New Code, 10-Year Return Storm, Near Other Installations
Benreoch

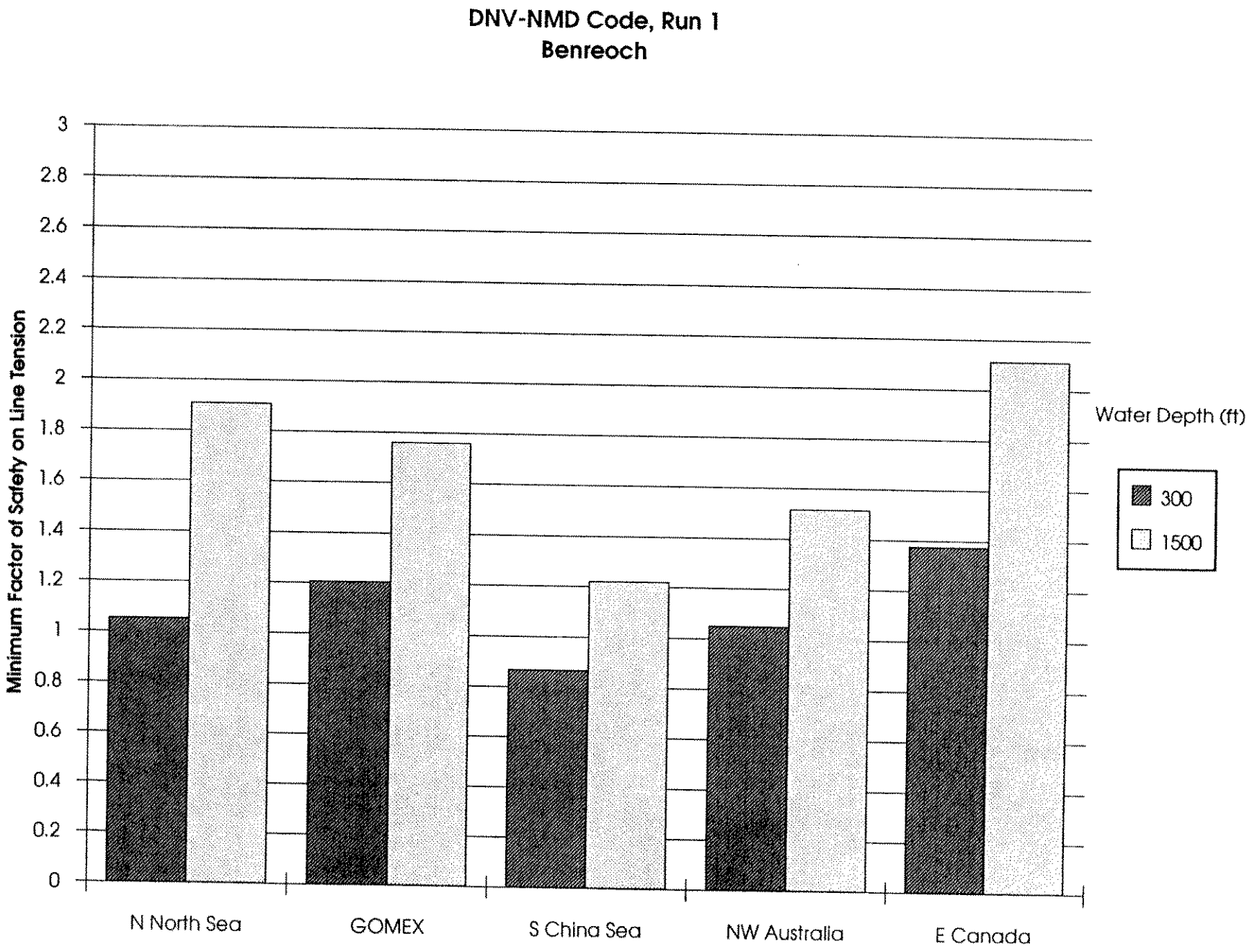


API New Code, 5-Year Return Storm, Far from Other Installations
Benreoch

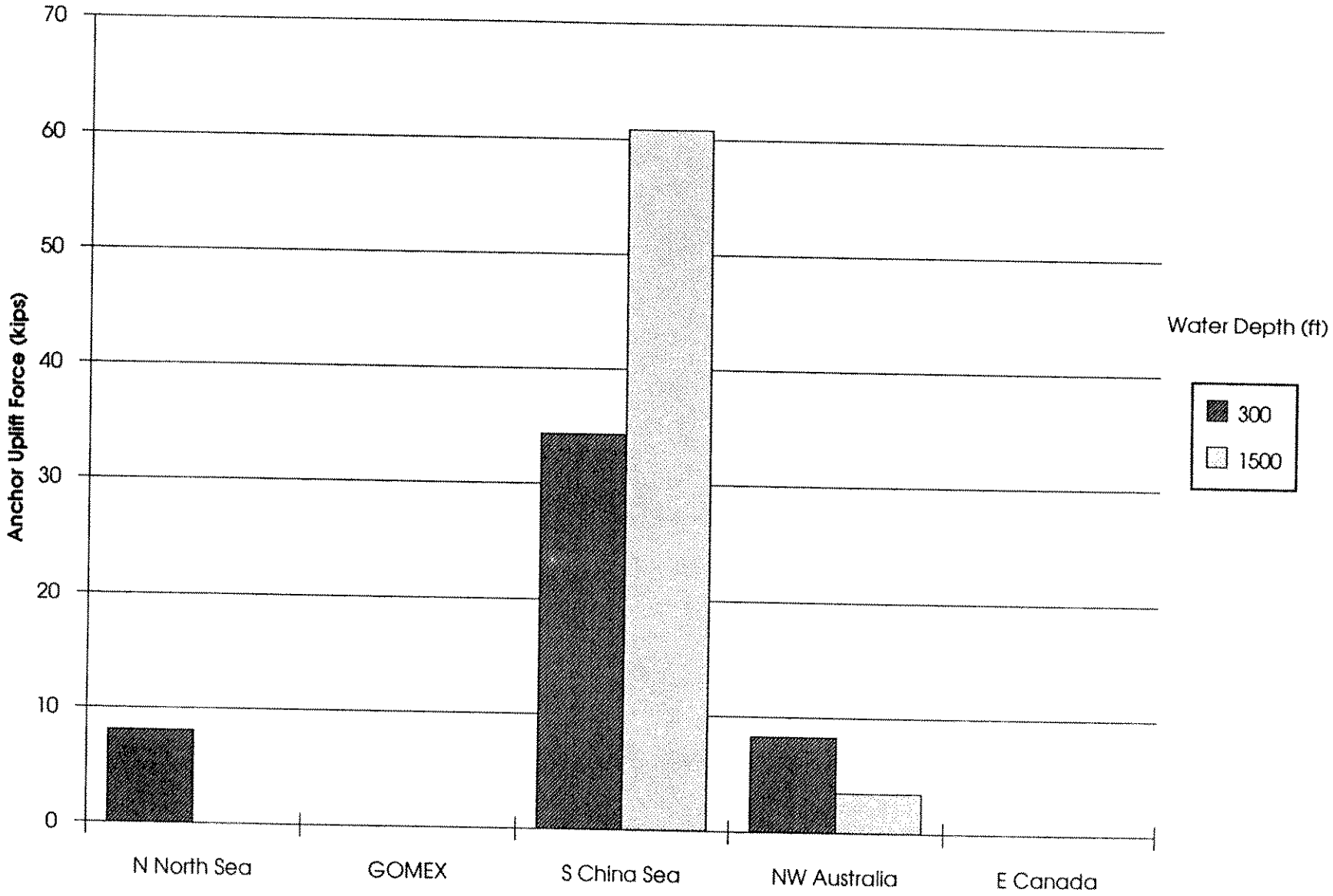


API New Code, 5-Year Return Storm, Far from Other Installations
Benreoch

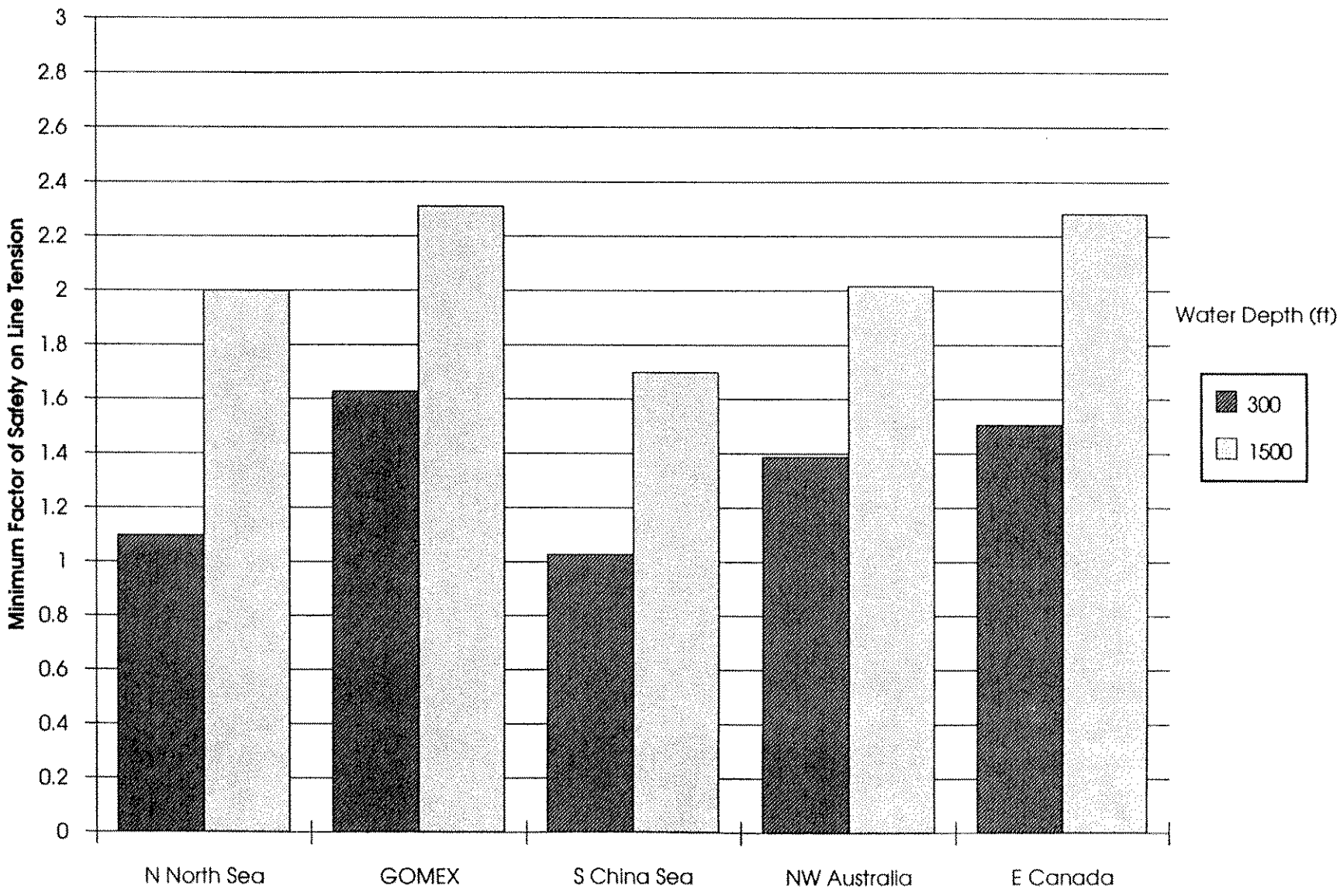


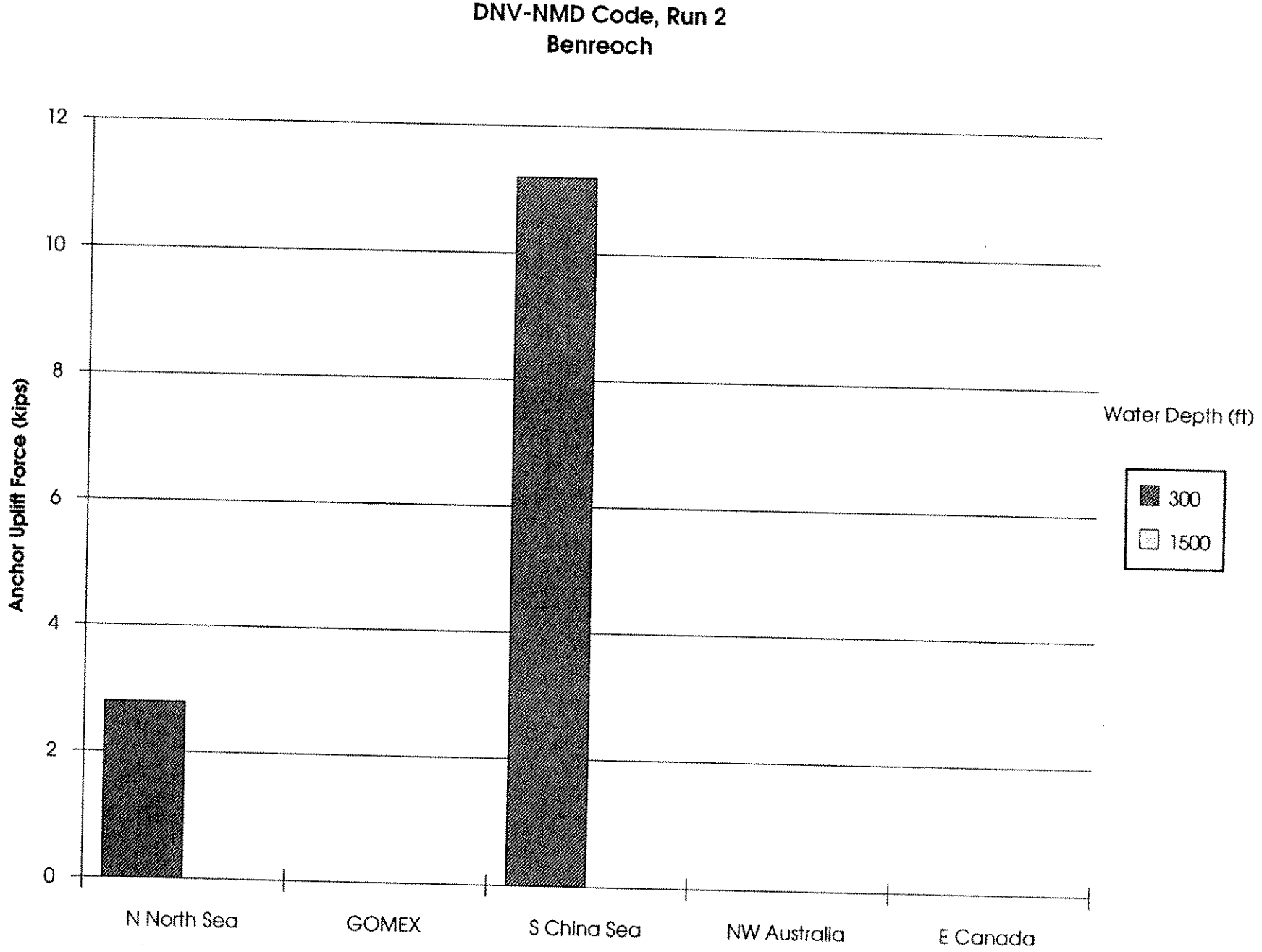

DNV-NMD Code, Run 1
Benreoch
Minimum Factor of Safety on Line Tension
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500

DNV-NMD Code, Run 1
Benreoch



DNV-NMD Code, Run 2
Benreoch




DNV-NMD Code, Run 2
Benreoch
Anchor Uplift Force (kips)
12
10
8
6
4
2
0
N North Sea
GOMEX
S China Sea
NW Australia
E Canada
Water Depth (ft)
300
1500

5. EFFECTS OF LINE DYNAMICS (FREQUENCY-DOMAIN)

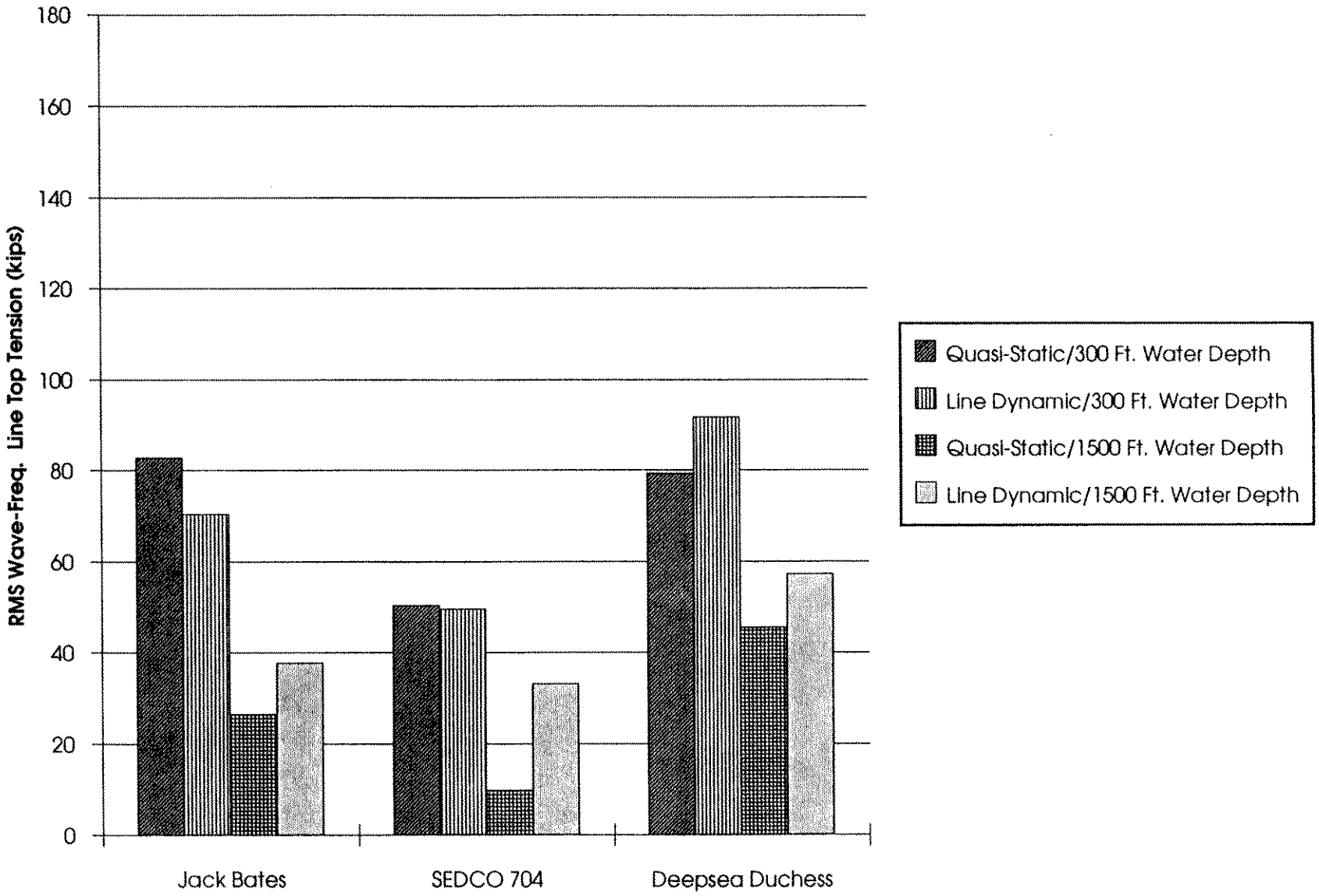
RMS Dynamic Tension Comparison with Quasi-Static Results for:

- 3 Drilling Rigs
  - "JACK BATES" and "SEDCO 704" Semis
  - "DEEPSEA DUCHESS" Drillship

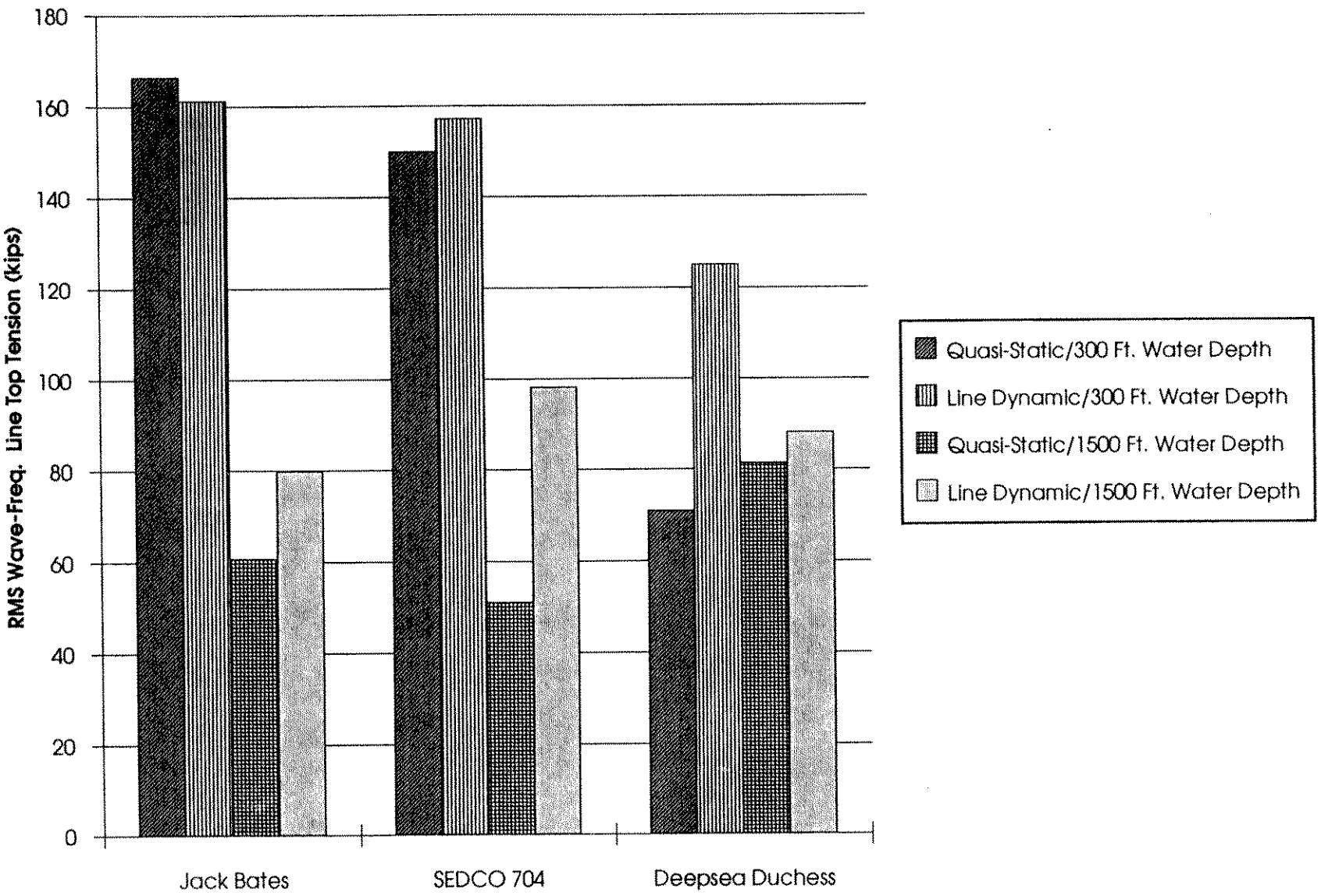
- 2 Sites:
  - GOMEX
  - N North Sea

- 2 Water Depths:
  - 300 Ft.
  - 1500 Ft.

Wave Frequency Dynamic Line Tension Comparison
GOMEX (per API New/10-YR Code)



Wave Frequency Dynamic Line Tension Comparison
N North Sea (per API New/10-YR Code)



6. CONCLUSIONS AND RECOMMENDATIONS

- Design Weather Criteria of various codes are more sensitive to the Geographic Areas affected by Tropical Cyclones such as GOMEX, S. China Sea and NW Australia.

- Peak Spectral Period of a Design Sea Sate is an important factor determining the magnitudes of Low-Frequency Motions and Mean Wave Drift Forces.

- Mooring System Pretensions and, especially, Payout Lengths will significantly affect the Dynamic Line Tension in shallow water. More payout lengths may be required in order to meet the code requirements of meeting Safety Factor on Line Tension and prevent Anchor Uplift.

- Effects of Low-Frequency Motions are more significant to large Semisubmersibles and Drillships.

- Maximum Dynamic Offsets derived based on API's combinations are generally 20% more than those of DnVs.

- API New Code/10-Year Criteria is slightly more conservative than DnV/NMD Code (100-Year Wave and Wind + 10-Year Current) when they are applied to the Extra-Tropical Cyclone Areas such as North Sea and Eastern Canada.

- Line Dynamics effect is more important for Drillship than for Semisubmersible.