APPENDIX XXXI
Conversion Tables

CONVERSIONS AND EQUIVALENTS

AREA- (s=statute, n=nautical)		
Multiply	by	to derive
meters^2	10.76	feet^2
feet^2	0.0929	meters^2
kilometers^2	0.386	s. miles^2
s. miles^2	2.59	kilometers^2
s. miles^2	0.7548	n. miles^2
n. miles^2	1.325	s. miles^2
kilometers^2	0.2916	n. miles^2
n. miles^2	3.430	kilometers^2

TEMPERATURE-	
Calculate	To derive
5/9(°F-32°)	°C
9/5°C+32°	°F

VOLUME		
multiply	by	to derive
barrels	42	gallons
barrels	5.615	feet^3
barrels	158.9	liters
barrels	0.1589	meters^3
feet^3	7.481	gallons
gallons	3.785	liters

WEIGHT-		
multiply	by	to derive
kilograms	2.205	pounds
metric tons	0.984	long tons
metric tons	1,000	kilograms
metric tons	2,205	pounds
long tons	1,016	kilograms
long tons	2240	pounds
short tons	907.2	kilograms
short tons	2,000	pounds

DENSITY ESTIMATIONS-

	Barrels/Long Ton		Notes:
	Range	Average	
Crude Oils	6.7 - 8.1	7.4	• 1 Long Ton equals 2,200 lbs.
Aviation Gasolines	8.3 - 9.2	8.8	• As a general approximation, use 7 bbl. (300 U.S. gallons) per metric ton of oil.
Motor Gasolines	8.2 - 9.1	8.7	• 6.4 barrels/long ton is neutrally buoyant in fresh water. Open ocean neutral buoyancy values are generally in the 6.21-6.25 barrels/long ton range.
Kerosenes	7.7 - 8.3	8.0	
Gas Oils	7.2 - 7.9	7.6	
Diesel Oils	7.0 - 7.9	7.5	
Lubricating Oils	6.8 - 7.6	7.2	
Fuel Oils	6.6 - 7.0	6.8	
Asphaltic Bitumens	5.9 - 6.5	6.2	

Specific Gravity of 1 or an API of 10 equals the density of fresh water.
Specific Gravity < 1 or an API > 10 indicates product is lighter than fresh water.
API Gravity = (141.5/Specific Gravity) – 131.5

Weight of Fresh Water: pounds/gallon	8.3	Note: Exact weight depends on temperature and salinity.
Weight of Sea Water: pounds/gallon	8.5	

OIL THICKNESS ESTIMATIONS-

Standard Term	Approx. Film Thickness		Approx. Quantity of Oil in Film	
	Inches	Mm		
Barely Visible	0.0000015	0.00004	25 gals/mile^2	44 liters/km^2
Silvery	0.000003	0.00008	50 gals/mile^2	88 liters/km^2
Slight Color	0.000006	0.00015	100 gals/mile^2	176 liters/km^2
Bright Color	0.000012	0.0003	200 gals/mile^2	351 liters/km^2
Dull	0.00004	0.001	666 gals/mile^2	1,168 liters/km^2
Dark	0.00008	0.002	1,332 gals/mile^2	2,237 liters/km^2

Thickness of light oils: 0.0010 inches to 0.00010 inches.
Thickness of heavy oils: 0.10 inches to 0.010 inches.

APPENDIX XXXI
Conversion Tables

COMMONLY-USED EQUATIONS-	
Circle: Area = 3.14 x radius^2 Circumference = 3.14 x diameter	Cylinder/Pipe/Tank Volume = 3.14 x radius^2 x length
Sphere/Tank Area = 4 x 3.14 x radius^2 Volume = 1.33 x 3.14 x radius^3	Rectangle/Square Area = length x width
	Cube/Block/Tank Volume = length x width x height