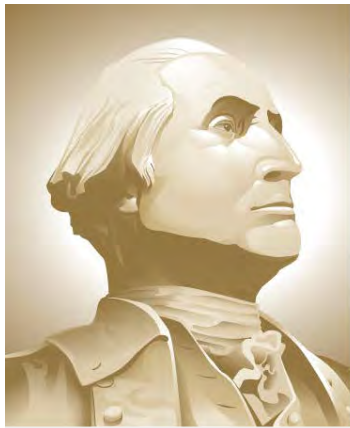


VTRA 2010 POTENTIAL COLLISION FREQUENCY BY ALL FV, CARGO – FV, TANK- FV AND WHAT-IF FV

Presentation by: J. Rene van Dorp



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CASE Q: Gateway + Bunkering Operations

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PRELIMINARY

Table. Focus Vessel (FV) Classification for the 26 VTOSS vessel type classification used in the GW/VCU MTS simulation model.

- NON – FV** : Those vessels that Interacting Vessels (IV) with Focus Vessels (FV)
- BASE CASE CARGO – FV** : Bulk Carriers, Container Vessels, Other Cargo Vessels that travel in VTRA 2010 Base Case
- BASE CASE TANK – FV** : Oil Barge, Oil Tankers, Chemical Carrier, ATB 's that travel in VTRA 2010 Base Case
- WHAT IF – FV** : CARGO AND TANK FV'S added to VTRA 2010 Base Case to model What-If Scenario

Note: Focus Vessels (FV's) are also considered as Interacting Vessels (IV's) when interacting with another Focus Vessel.

| # | VESSEL TYPE | FOCUS VESSEL? | # | VESSEL TYPE | FOCUS VESSEL? |
|----|-------------------|---------------|----|-------------------|---------------|
| 1 | BULKCARRIER | CARGO - FV | 14 | PASSENGERSHIP | NO |
| 2 | CHEMICALCARRIER | TANK - FV | 15 | REFRIGERATEDCARGO | CARGO-FV |
| 3 | CONTAINERSHIP | CARGO - FV | 16 | RESEARCHSHIP | NO |
| 4 | DECKSHIPCARGO | CARGO - FV | 17 | ROROCARGOSHIP | CARGO-FV |
| 5 | FERRY | NO | 18 | ROROCARGOCONTSHIP | CARGO-FV |
| 6 | FERRYNONLOCAL | NO | 19 | SUPPLYOFFSHORE | NO |
| 7 | FISHINGFACTORY | NO | 20 | TUGTOWBARGE | NO |
| 8 | FISHINGVESSEL | NO | 21 | UNKNOWN | NO |
| 9 | LIQGASCARRIER | TANK - FV | 22 | USCOASTGUARD | NO |
| 10 | NAVYVESSEL | NO | 23 | VEHICLECARRIER | CARGO-FV |
| 11 | OILTANKER | TANK - FV | 24 | YACHT | NO |
| 12 | OTHERSPECIALCARGO | CARGO - FV | 25 | ATB | TANK - FV |
| 13 | OTHERSPECIFICSERV | NO | 26 | OIL BARGE | TANK - FV |

IMPORTANT:

THE OPERATIVE WORD IN PRESENTING THESE ANALYSIS RESULTS IS THE USE OF THE WORD

POTENTIAL

TO INDICATE THAT THESE ANALYSIS RESULTS DO NOT FOLLOW FROM AN HISTORICAL DATA ANALYSIS, BUT THROUGH THE USE OF AN ANALYSIS TOOL THAT EVALUATES SUCH **POTENTIAL**.

THE 2010 YEAR IS CONSIDERED **THE BASE CASE YEAR** AND A BASE CASE YEAR POTENTIAL IS EVALUATED.

NEXT, **WHAT-IF SCENARIOS** ARE DEVELOPED FROM THE BASE CASE BY ADDING ADDITIONAL HYPOTHETICAL TRAFFIC AND A WHAT-IF POTENTIAL IS EVALUATED AND COMPARED **RELATIVE TO THE BASE CASE** TO INFORM **RISK MANAGEMENT**.

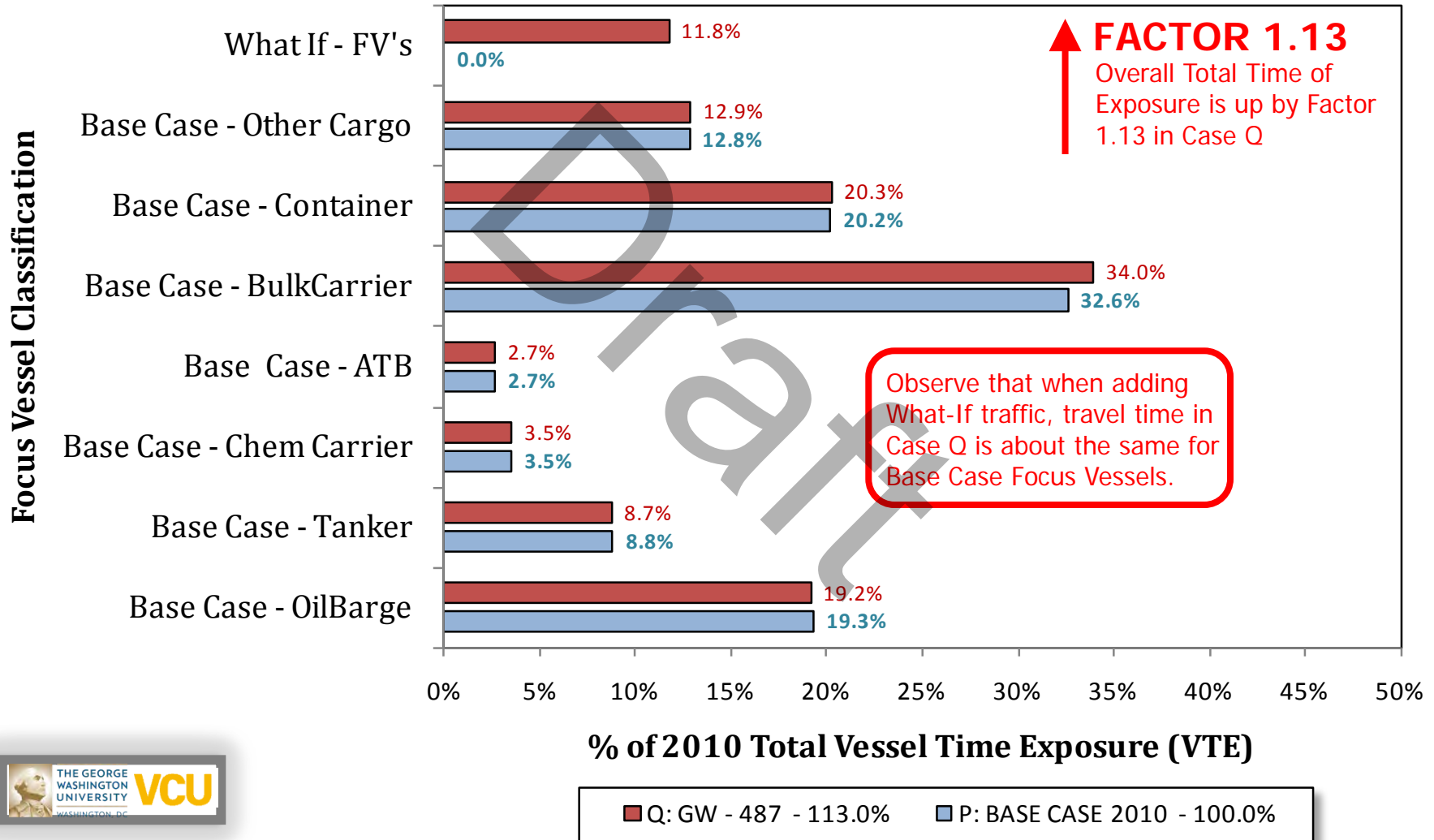
CASE Q: GW 487 + Bunkering Operations:

BASE CASE 2010 TRAFFIC WITH FOLLOWING WHAT-IF FOCUS VESSELS

487 Gateway Bulk Carriers + Bunkering Barges

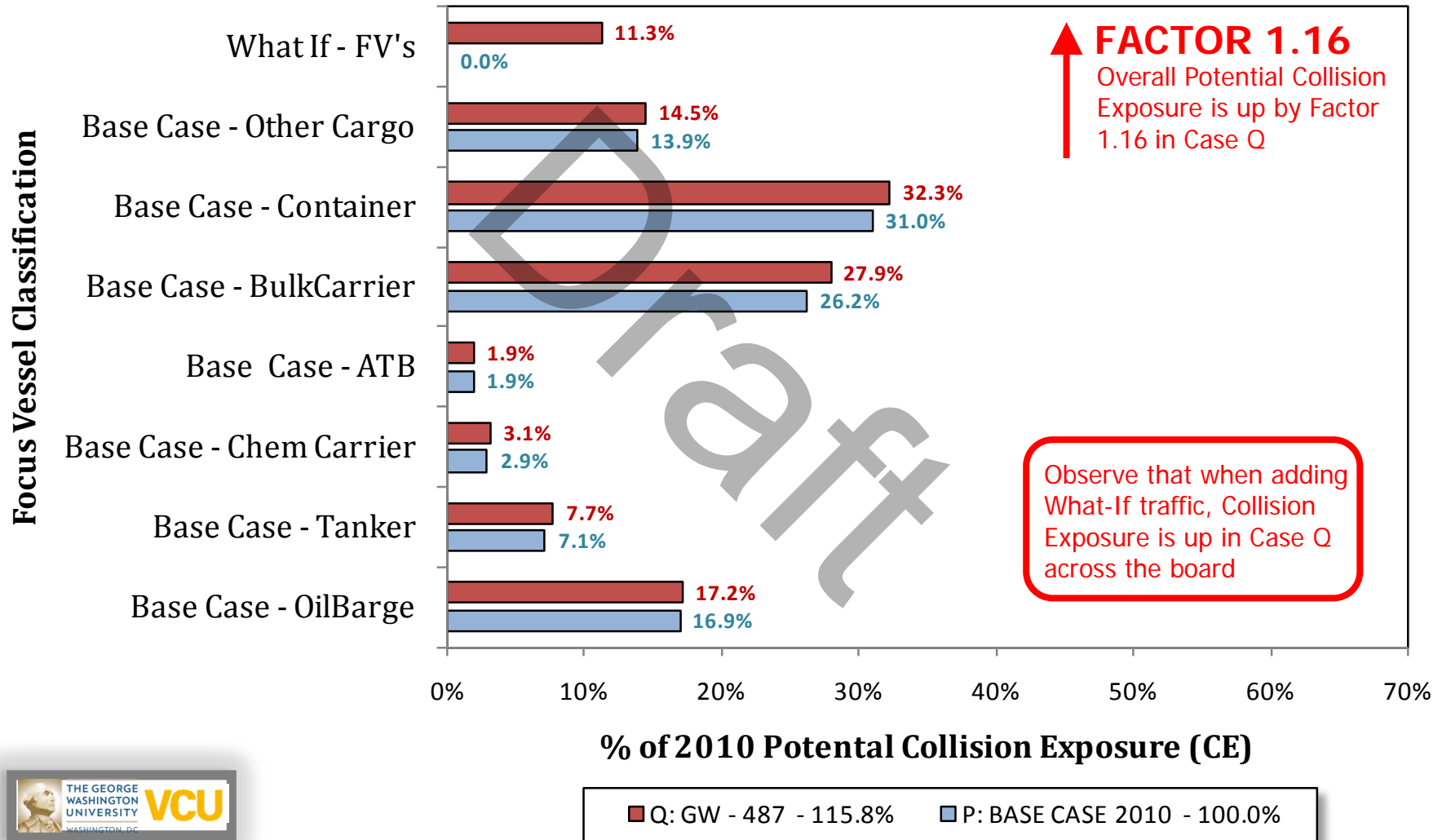
CASE Q: GW 487 + BUNKERING

VTRA 2010 - Total Vessel Time of Exposure (VTE)



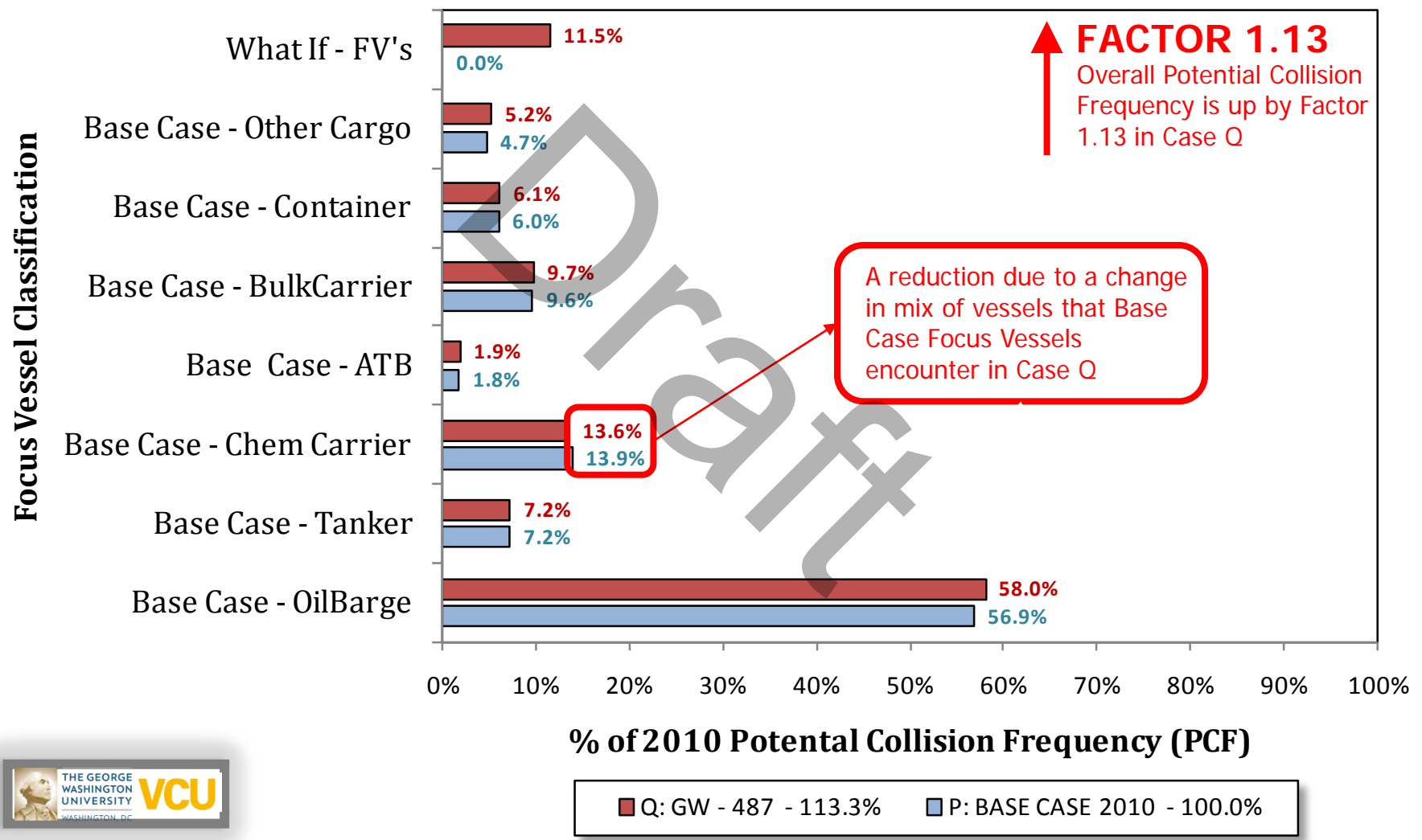
CASE Q: GW 487 + BUNKERING

VTRA 2010 - COLLISION EXPOSURE



CASE Q: GW 487 + BUNKERING

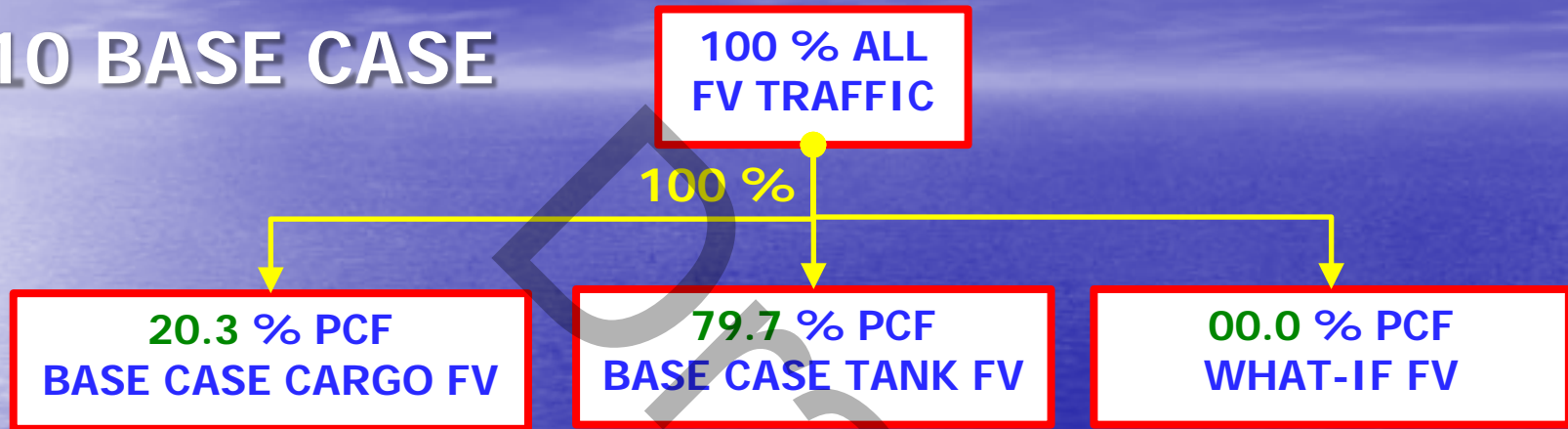
VTRA 2010 - COLLISION FREQUENCY



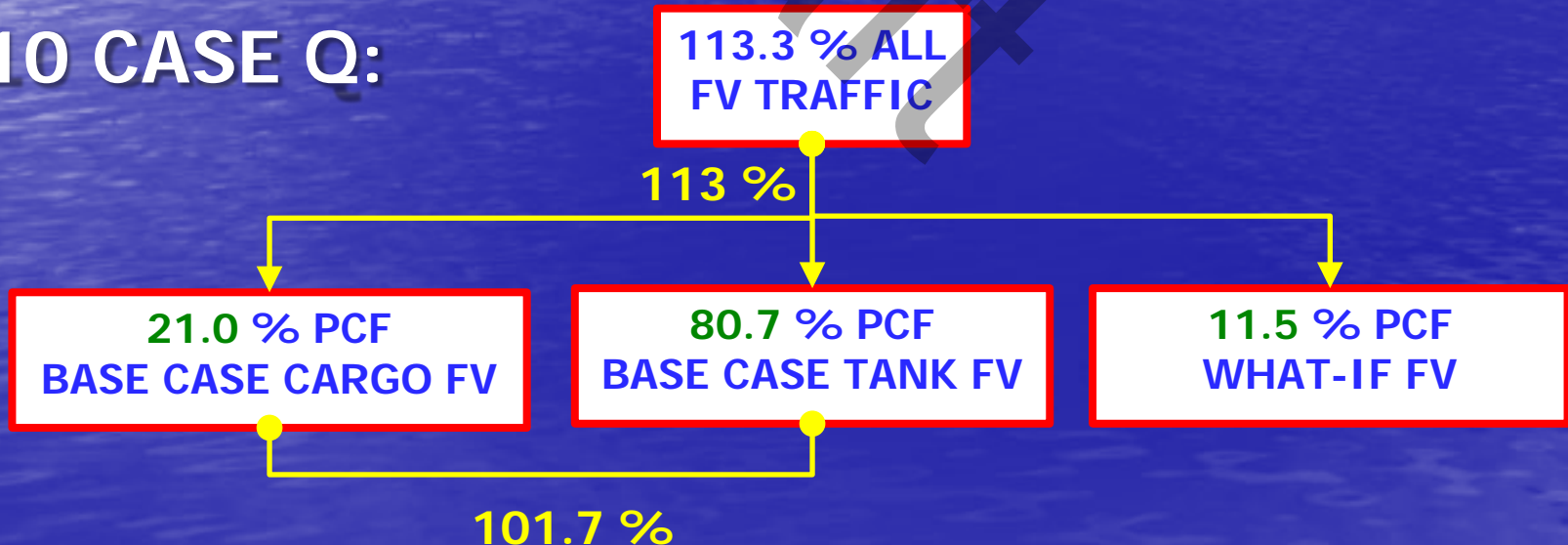
A TAXONOMY OF 2010 FOCUS VESSEL POTENTIAL ANNUAL COLLISION FREQUENCY

PCF : POTENTIAL COLLISION FREQUENCY - PER YEAR

2010 BASE CASE



2010 CASE Q:





P: ALL FV POTENTIAL COLL. FREQUENCY (PCF)

P: VTRA 2010 - BASE CASE - All FV

100%

70%

53%

Factor x Average
of Accidents

> 100.00
> 10.00
10.00
3.69
2.95
2.51
2.19
1.95
1.75
1.59
1.44
1.31
1.20
1.09
1.00
0.81
0.65
0.51
0.39
0.28
0.18
0.09
0.00

CASE P: POTENTIAL COLL. FREQ. (PCF)

20.3% - CARGO Focus Vessel
79.7% - TANK Focus Vessel
00.0% - WHAT-IF Focus Vessel

100.0% of 2010 Base Case
ALL FV - PCF

Q: ALL FV POTENTIAL COLL. FREQUENCY (PCF)

Q: VTRA 2010 - GATEWAY 487 - All FV

113%

80%

63%

Factor x Average
of Accidents

> 100.00
> 10.00
10.00
3.69
2.95
2.51
2.19
1.95
1.75
1.59
1.44
1.31
1.20
1.09
1.00
0.81
0.65
0.51
0.39
0.28
0.18
0.09
0.00

CASE Q: POTENTIAL COLL. FREQ. (PCF)

21.0% - CARGO Focus Vessel
80.7% - TANK Focus Vessel
11.5% - WHAT-IF Focus Vessel

— +
113.3% of 2010 Base Case
ALL FV - PCF

Q: WHAT-IF FV POTENTIAL COLLISION FREQUENCY (PCF)



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Q: VTRA 2010 - GATEWAY 487

12%

9%

9%

Factor x Average
of Accidents

> 100.00
> 10.00
10.00
3.69
2.95
2.51
2.19
1.95
1.75
1.59
1.44
1.31
1.18
1.09
1.00
0.81
0.65
0.51
0.39
0.28
0.18
0.09
0.00

CASE Q: POTENTIAL COLL. FREQ. (PCF)

1.8% - BULK CARGO
0.0% - CONTAINERSHIP
0.0% - TANKER
9.7% - OILBARGE

+
11.5% of 2010 Base Case
ALL FV - PCF

P: BASE CASE CARGO FV POTENTIAL COLLISION FREQUENCY (PCF)



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P: VTRA 2010 - BASE CASE - Cargo FV

20%

12%

8%

Factor x Average
of Accidents

> 100.00
> 10.00
10.00
3.69
2.95
2.51
2.19
1.95
1.75
1.59
1.44
1.31
1.18
1.09
1.00
0.81
0.65
0.51
0.39
0.28
0.18
0.09
0.00

CASE P: POTENTIAL COLL. FREQ. (PCF)

09.6% - BULK CARGO
06.0% - CONTAINERSHIP
04.7% - OTHERCARGO
00.0% - WHAT-IF FV

+
20.3% of 2010 Base Case
ALL FV - PCF

Q: CARGO FV POTENTIAL COLLISION FREQUENCY (PCF)



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Q: VTRA 2010 - GATEWAY 487 - Cargo FV

21%

12%

8%

Factor x Average
of Accidents

> 100.00
> 10.00
10.00
3.69
2.95
2.51
2.19
1.95
1.75
1.59
1.44
1.31
1.20
1.09
1.00
0.81
0.65
0.51
0.39
0.28
0.18
0.09
0.00

CASE Q: POTENTIAL COLL. FREQ. (PCF)

09.7% - BULK CARGO
06.1% - CONTAINERSHIP
05.2% - OTHERCARGO
00.0% - WHAT-IF FV

+
21.0% of 2010 Base Case
ALL FV - PCF

P: BASE CASE TANK FV POTENTIAL COLLISION FREQUENCY (PCF)



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P: VTRA 2010 - BASE CASE - TANK FV

80%

58%

45%

Factor x Average
of Accidents

> 100.00
> 10.00
10.00
3.69
2.95
2.51
2.19
1.95
1.75
1.59
1.44
1.31
1.20
1.09
1.00
0.81
0.65
0.51
0.39
0.28
0.18
0.09
0.00

CASE P: POTENTIAL COLL. FREQ. (PCF)

56.9% - OILBARGE
07.2% - OILTANKER
13.9% - CHEMICALCARRIER
01.8% - ATB
00.0% - WHAT-IF FV

+
79.7% of 2010 Base Case
ALL FV - PCF

Q: BASE CASE TANK FV POTENTIAL COLLISION FREQUENCY (PCF)



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Q: VTRA 2010 - GATEWAY 487 - TANK FV

81%

59%

46%

Factor x Average
of Accidents

> 100.00
> 10.00
10.00
3.69
2.95
2.51
2.19
1.95
1.75
1.59
1.44
1.31
1.20
1.09
1.00
0.81
0.65
0.51
0.39
0.28
0.18
0.09
0.00

CASE Q: POTENTIAL COLL. FREQ. (PCF)

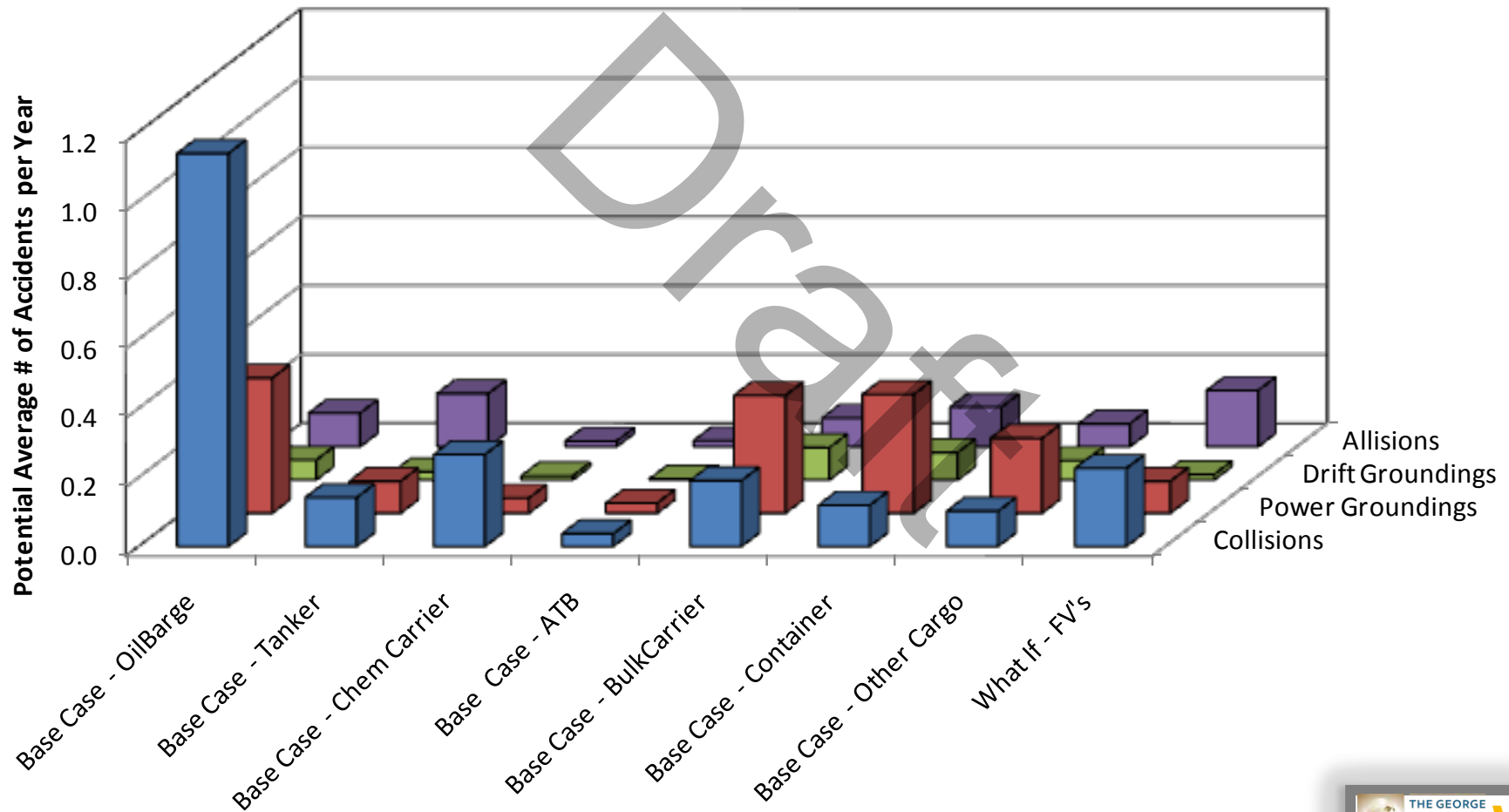
58.0% - OILBARGE
07.2% - OILTANKER
13.6% - CHEMICALCARRIER
01.9% - ATB
00.0% - WHAT-IF FV

+
80.7% of 2010 Base Case
ALL FV - PCF

A TAXONOMY OF 2010 FOCUS VESSEL POTENTIAL ACCIDENT FREQUENCY AND ACCIDENT TYPE

CASE Q: GW 487 + BUNKERING

Q - VTRA 2010 : Potential Average # of Accidents per Year



Q - VTRA 2010 : Potential Average # of Accidents per Year

| Focus Vessel | Collisions | Power Groundings | Drift Groundings | Allisions | Total |
|------------------------------|------------|------------------|------------------|-----------|--------|
| Base Case - OilBarge | 58.0% | 26.4% | 17.6% | 17.8% | 39.0% |
| Base Case - Tanker | 7.2% | 6.2% | 7.1% | 28.1% | 9.5% |
| Base Case - Chem Carrier | 13.6% | 3.0% | 3.6% | 2.9% | 7.8% |
| Base Case - ATB | 1.9% | 2.0% | 1.0% | 3.2% | 2.0% |
| Base Case - All Tank FV's | 80.7% | 37.6% | 29.3% | 52.0% | 58.4% |
| Base Case - BulkCarrier | 9.7% | 23.0% | 28.4% | 15.2% | 16.4% |
| Base Case - Container | 6.1% | 23.2% | 24.1% | 21.0% | 15.2% |
| Base Case - Other Cargo | 5.2% | 14.6% | 17.2% | 12.2% | 10.2% |
| Base Case - All Cargo FV's | 21.0% | 60.9% | 69.7% | 48.3% | 41.9% |
| Base Case - All FV's | 101.7% | 98.5% | 99.0% | 100.4% | 100.2% |
| What If - FV's | 11.5% | 6.2% | 4.8% | 29.8% | 11.5% |
| Total - Base Case + What- IF | 113.3% | 104.7% | 103.8% | 130.2% | 111.7% |

Q - VTRA 2010 : Potential Average # of Accidents per Year

| Focus Vessel | Collisions | Power Groundings | Drift Groundings | Allisions | Total |
|------------------------------|------------|------------------|------------------|-----------|-------|
| Base Case - OilBarge | 1.14 | 0.39 | 0.06 | 0.10 | 1.68 |
| Base Case - Tanker | 0.14 | 0.09 | 0.02 | 0.15 | 0.41 |
| Base Case - Chem Carrier | 0.27 | 0.04 | 0.01 | 0.02 | 0.34 |
| Base Case - ATB | 0.04 | 0.03 | 0.00 | 0.02 | 0.09 |
| Base Case - All Tank FV's | 1.58 | 0.56 | 0.10 | 0.28 | 2.52 |
| Base Case - BulkCarrier | 0.19 | 0.34 | 0.09 | 0.08 | 0.71 |
| Base Case - Container | 0.12 | 0.34 | 0.08 | 0.11 | 0.66 |
| Base Case - Other Cargo | 0.10 | 0.22 | 0.06 | 0.07 | 0.44 |
| Base Case - All Cargo FV's | 0.41 | 0.90 | 0.23 | 0.26 | 1.81 |
| Base Case - All FV's | 1.99 | 1.46 | 0.33 | 0.55 | 4.33 |
| What If - FV's | 0.23 | 0.09 | 0.02 | 0.16 | 0.50 |
| Total - Base Case + What- IF | 2.22 | 1.55 | 0.34 | 0.71 | 4.82 |