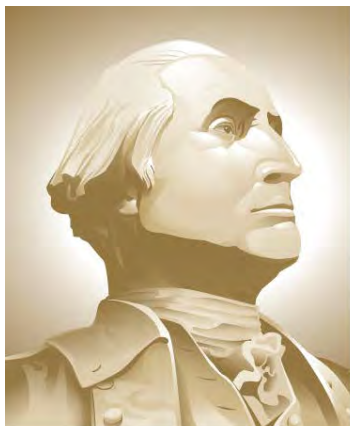


VTRA 2010 POTENTIAL COLLISION OIL FUEL AND CARGO LOSSES BY ALL FV, CARGO – FV and TANK- FV

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VCU

2010 BASE CASE

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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 are only considered as Interacting Vessels (IV) with Focus Vessels (FV) in this study

CARGO – FV : Bulk Carriers, Container Vessels, Other Cargo Vessels

TANK – FV : Oil Barge, Oil Tankers, Chem-Carrier, ATB

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

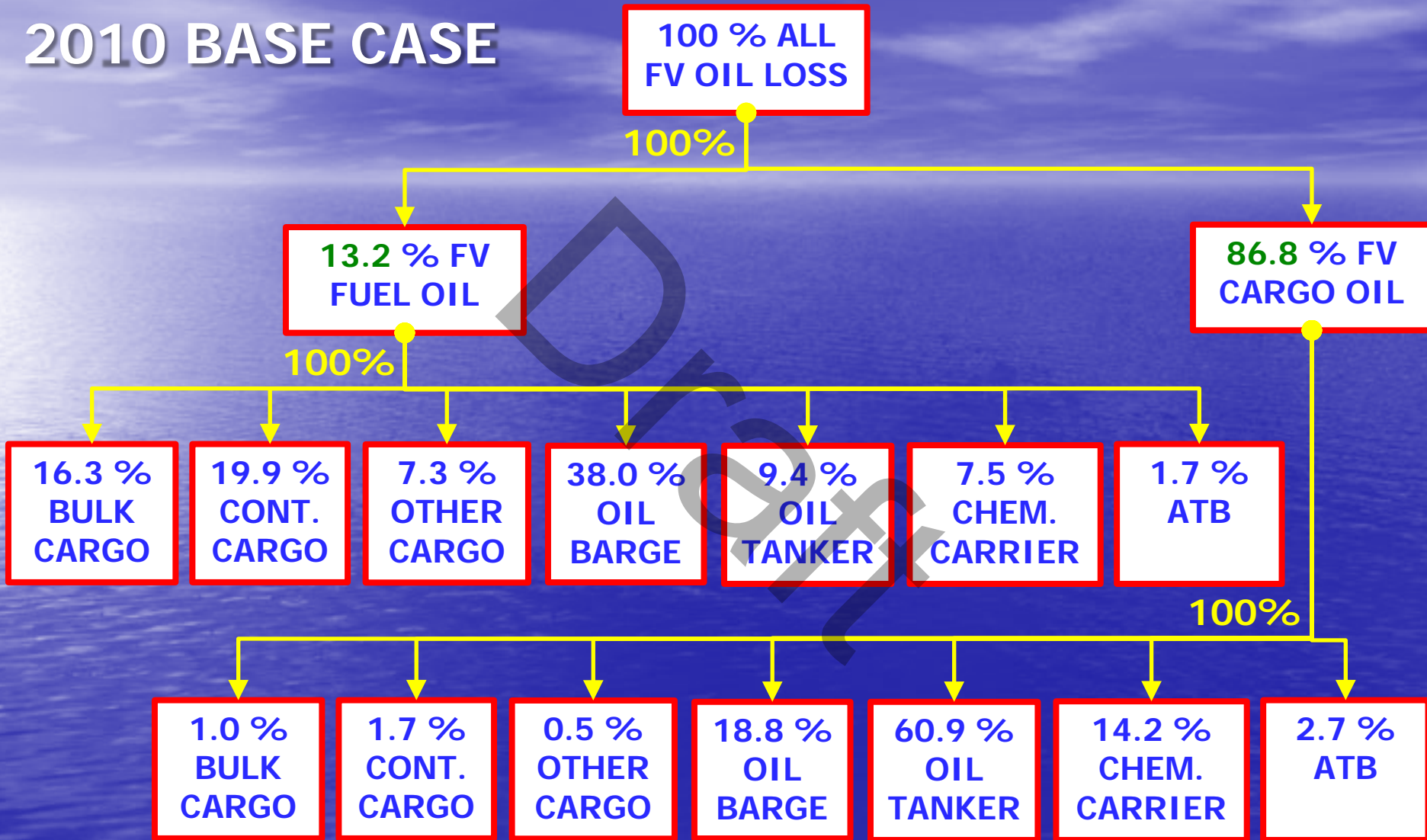
TO INDICATE THAT THESE ANALYSIS RESULTS DO NOT FOLLOW FROM AN HISTORICAL DATA ANALYSIS, BUT THROUGH THE USE OF AN ANALYSIS TOOL THAT EVALUATES SUCH **POTENTIAL**.

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**.

A TAXONOMY OF 2010 FOCUS VESSEL POTENTIAL ANNUAL COLLISION OIL LOSS

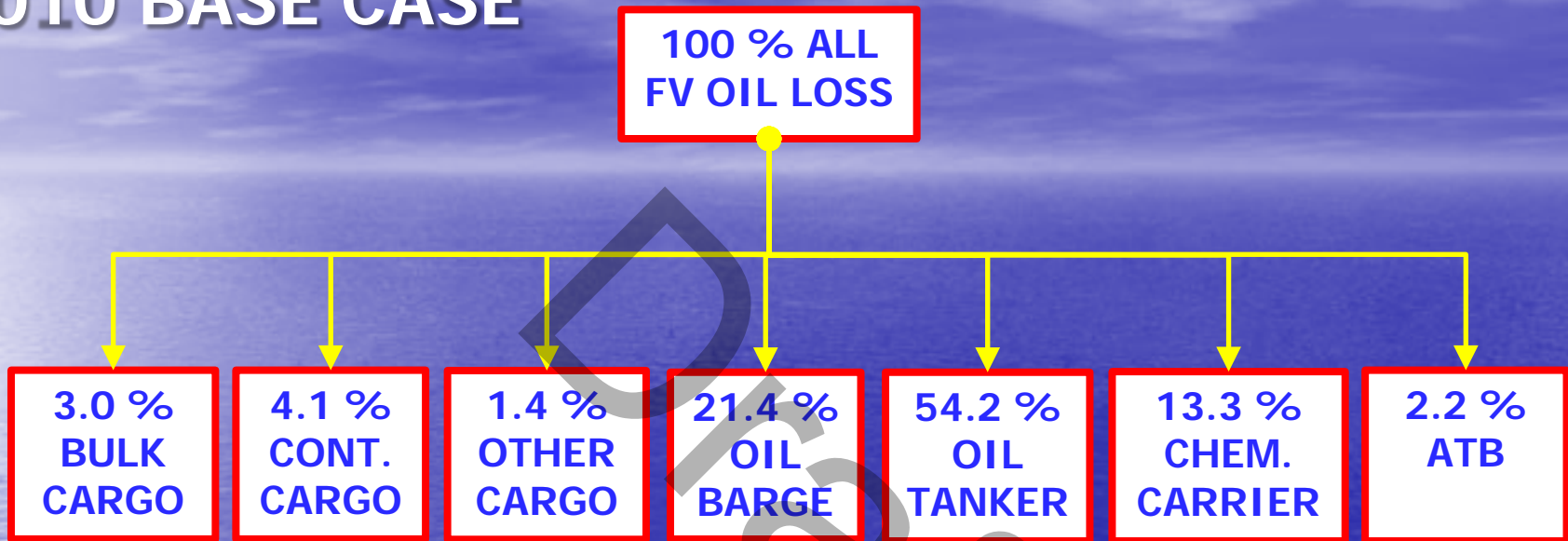
2010 BASE CASE



PCF : POTENTIAL COLLISION FREQUENCY - PER YEAR

A TAXONOMY OF 2010 FOCUS VESSEL POTENTIAL ANNUAL COLLISION OIL LOSS

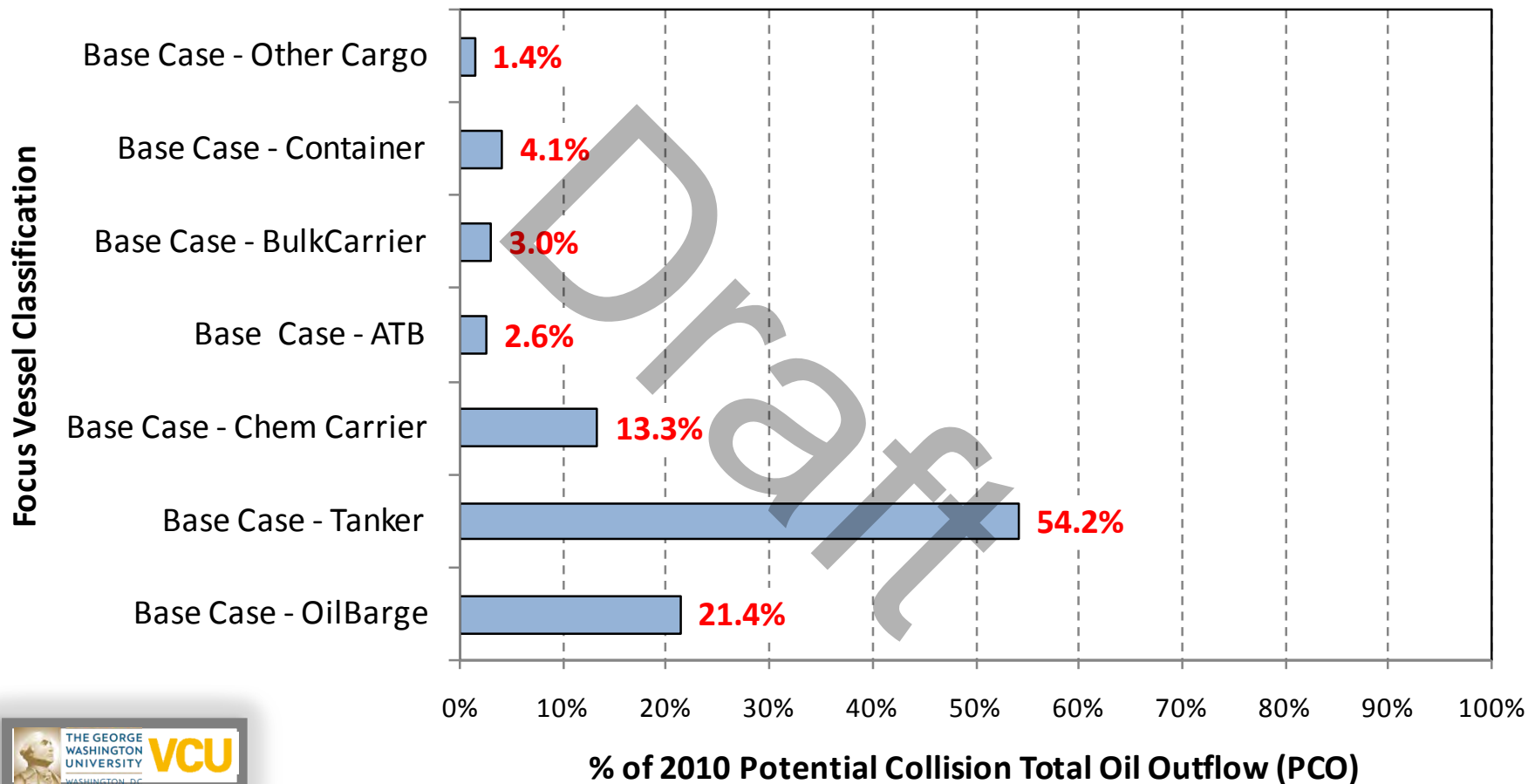
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PCO : POTENTIAL COLLISION OIL LOSSES - PER YEAR

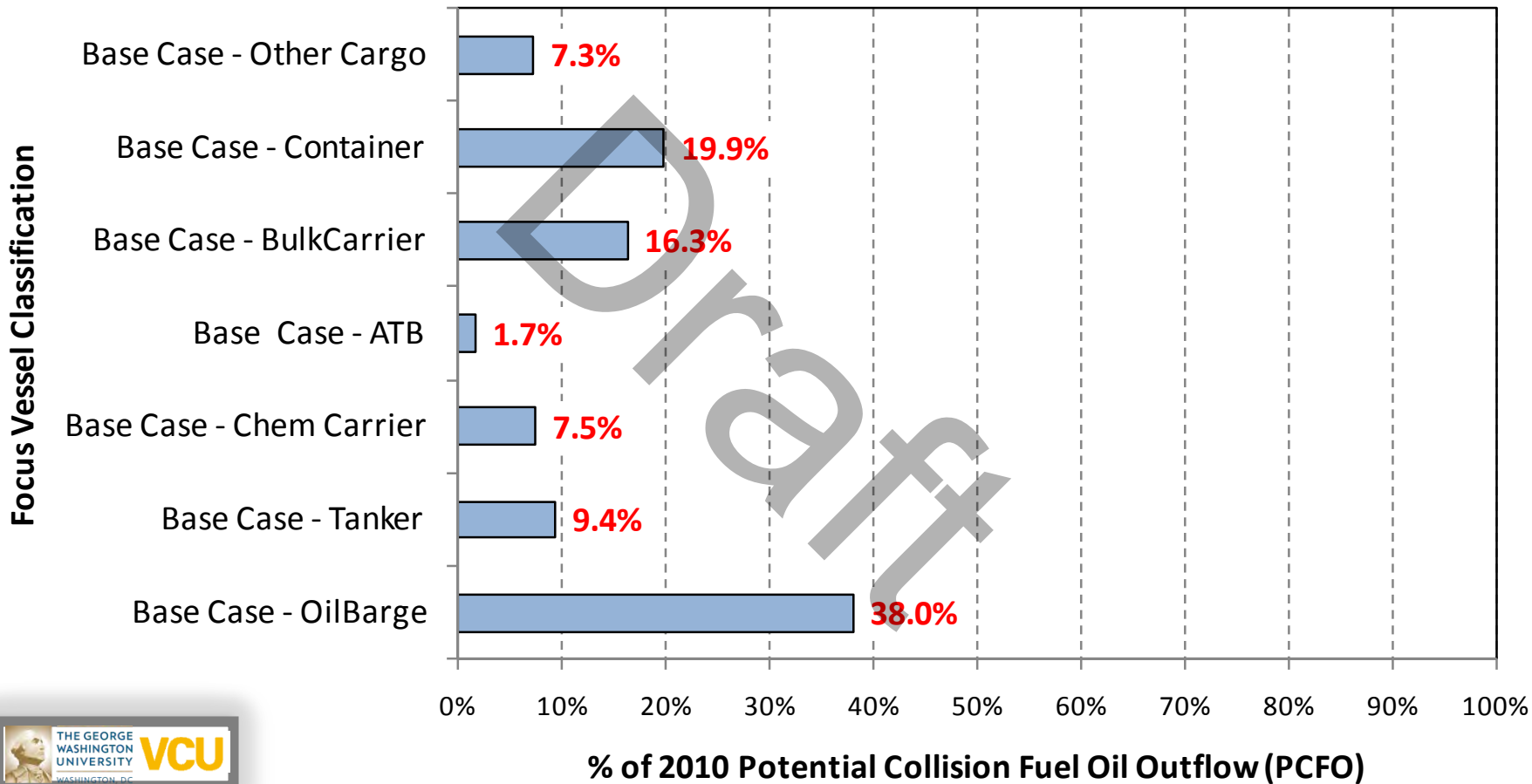
2010 BASE CASE

VTRA 2010 - COLLISION OIL LOSS (CARGO + FUEL)



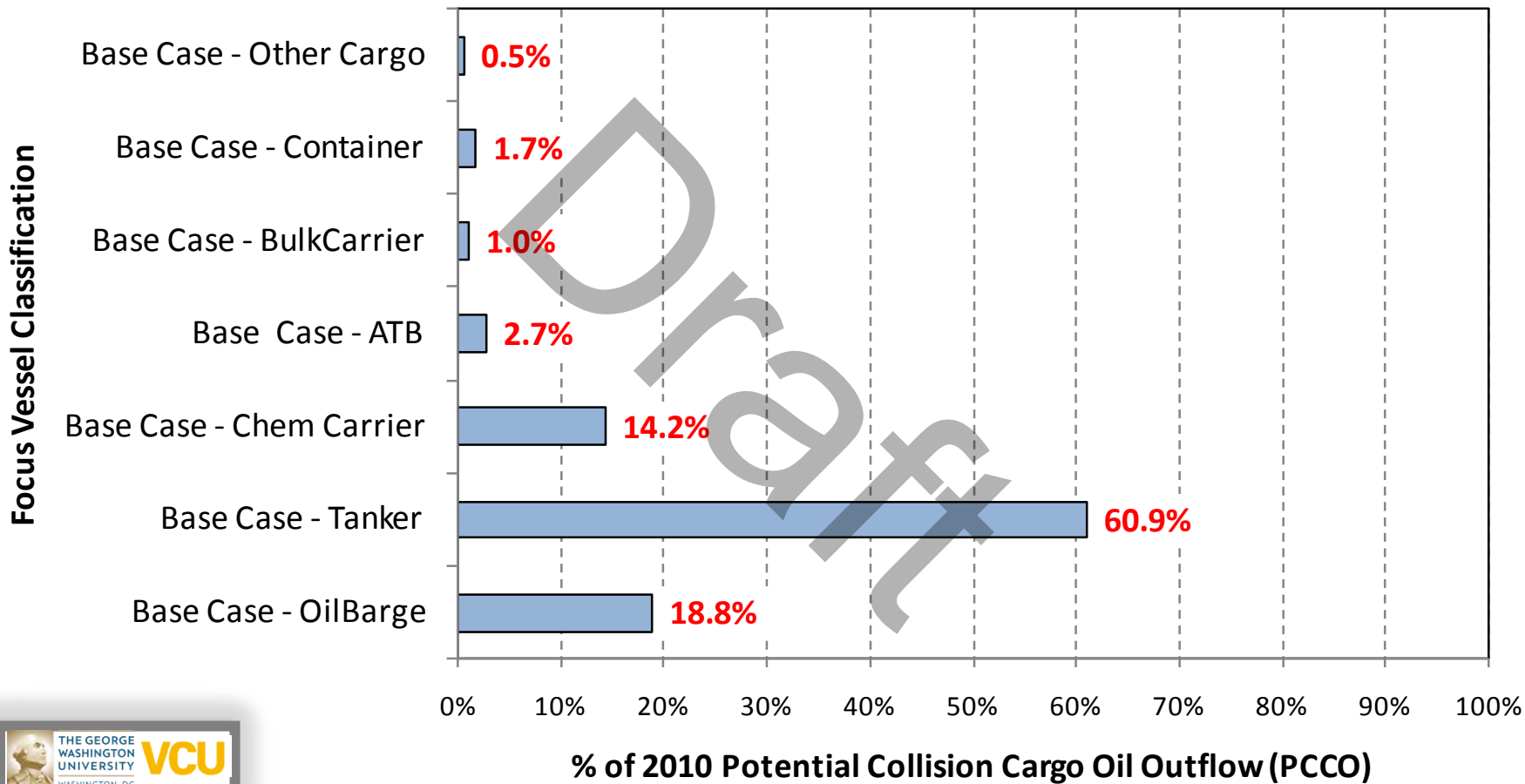
2010 BASE CASE

VTRA 2010 - COLLISION FUEL OIL LOSS



2010 BASE CASE

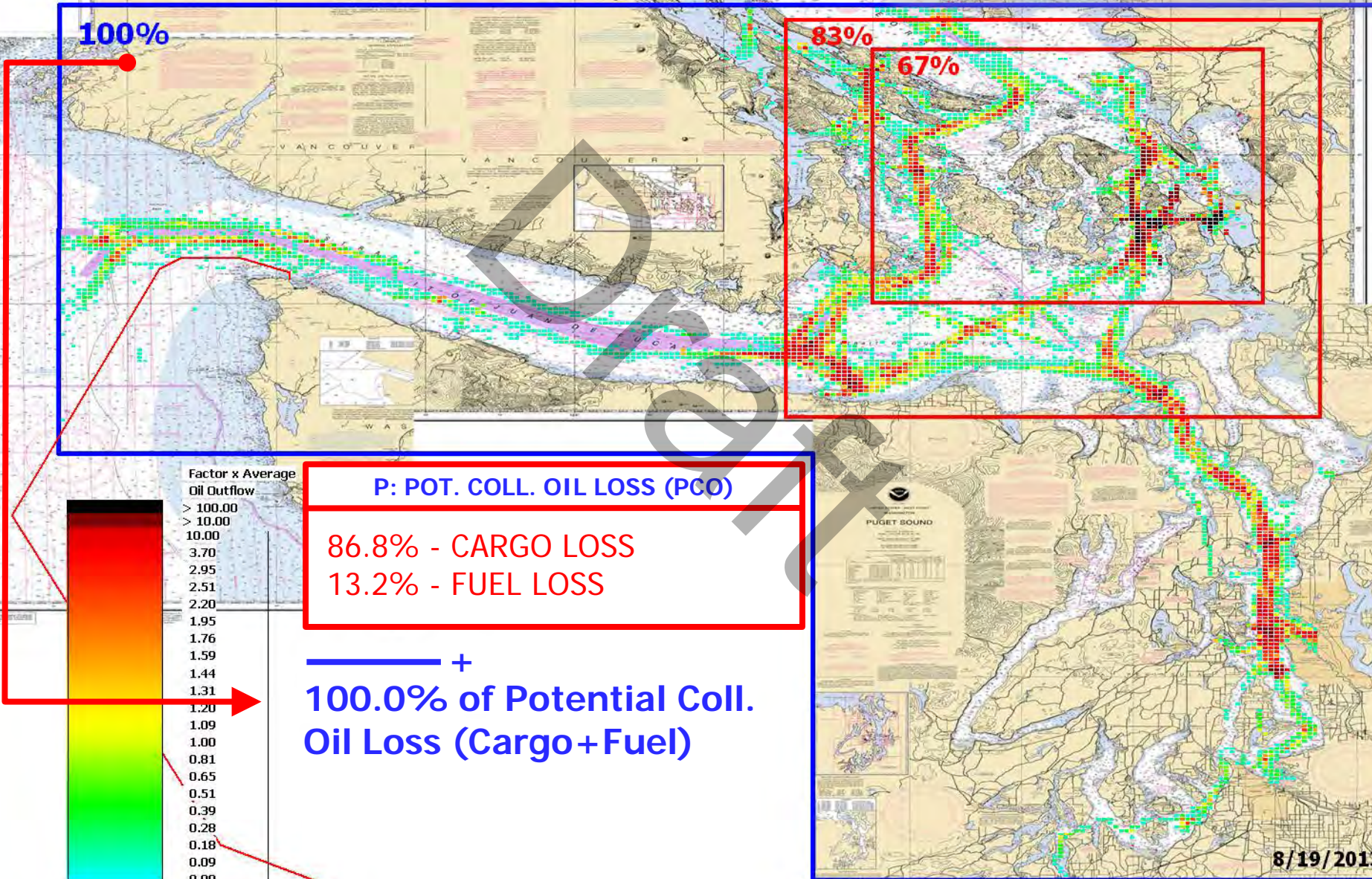
VTRA 2010 - COLLISION CARGO OIL LOSS



P: All FV Potential COLLISION OIL LOSS (PCO)



P: VTRA 2010 - BASE CASE - All FV



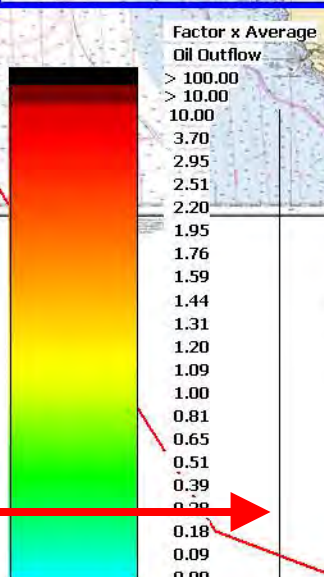
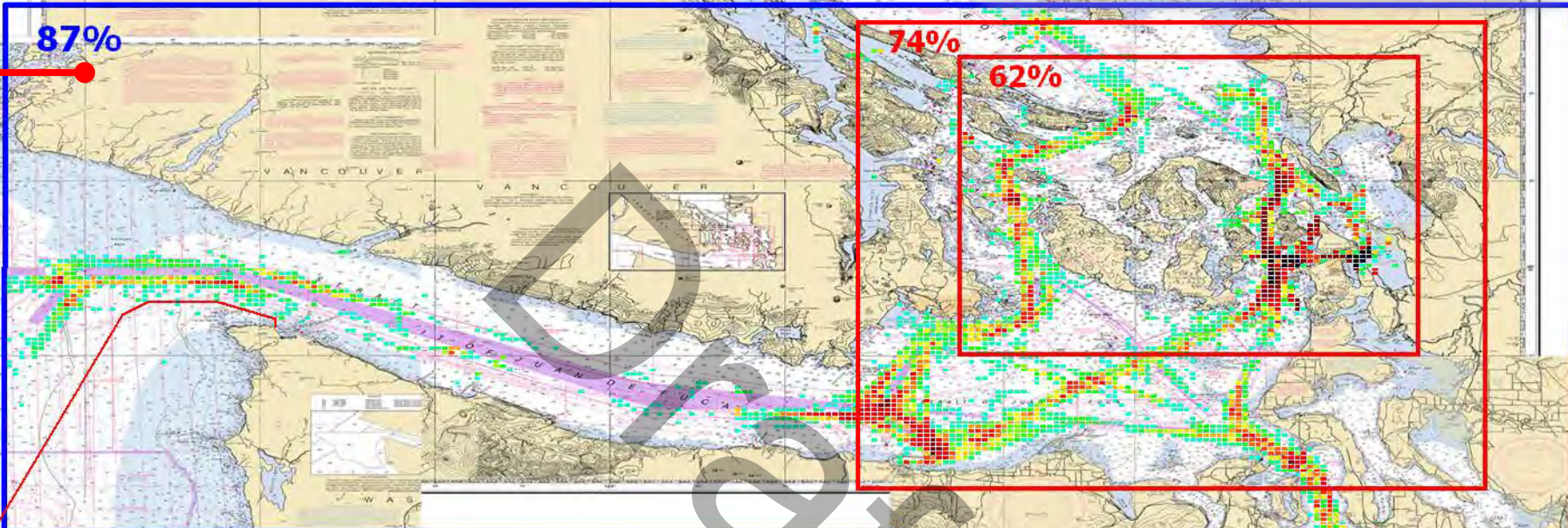
P: POT. COLL. OIL LOSS (PCO)
 86.8% - CARGO LOSS
 13.2% - FUEL LOSS

— +
 100.0% of Potential Coll.
 Oil Loss (Cargo + Fuel)

P: All FV POT. COLL. CARGO OIL LOSS (PCCO)



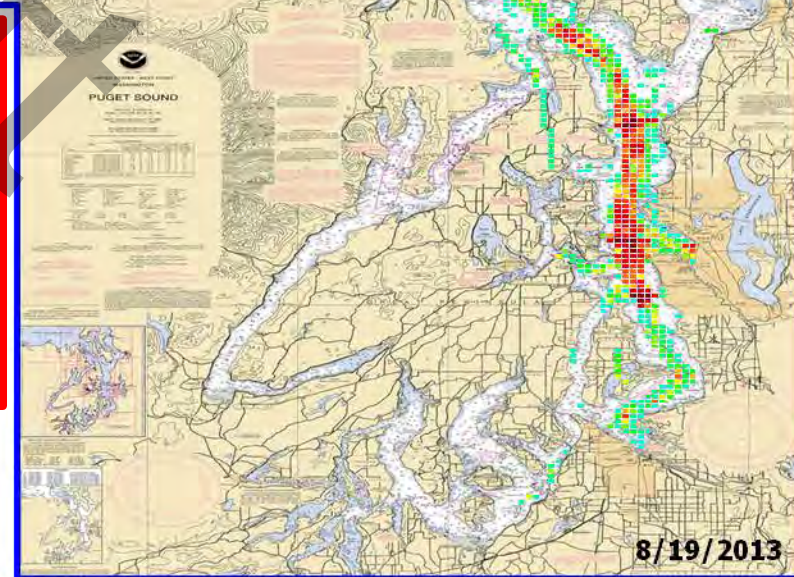
P: VTRA 2010 - BASE CASE



P: POT. COLL. CARGO OIL (PCCO)

- 00.9% - BULK CARGO
- 01.5% - CONTAINERSHIP
- 00.5% - OTHER CARGO
- 16.3% - OIL BARGE
- 52.9% - TANKER
- 12.4% - CHEMICAL CARRIER
- 02.3% - ATB

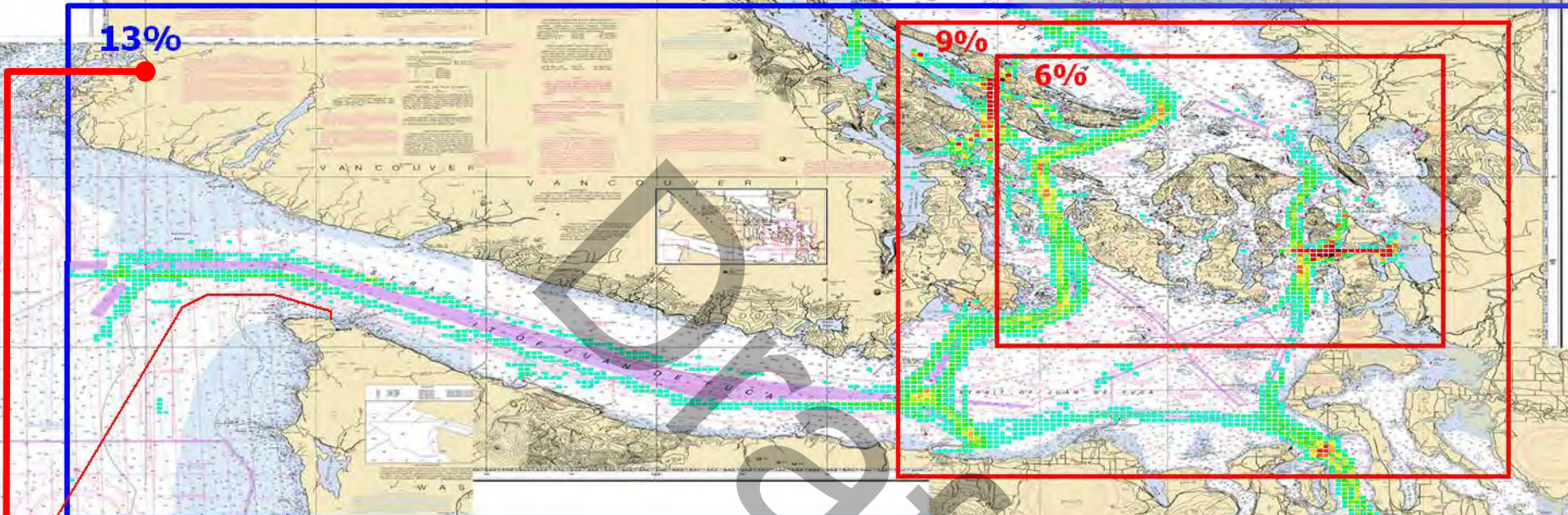
+
86.8% of Potential Coll. Oil Loss (Cargo+Fuel)



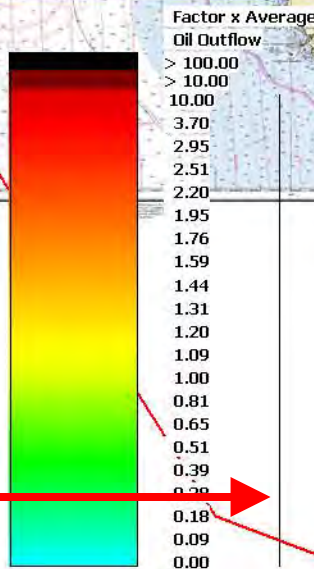
P: All FV POT. COLL. FUEL OIL LOSS (PCFO)



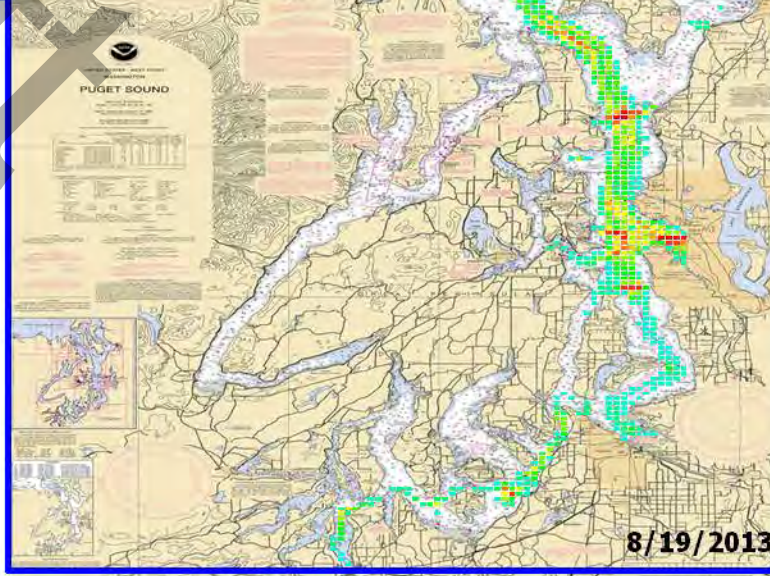
P: VTRA 2010 - BASE CASE



- P: POT. COLL. FUEL OIL (PCFO)**
- 2.1% - BULK CARGO
 - 2.6% - CONTAINERSHIP
 - 1.0% - OTHER CARGO
 - 5.0% - OIL BARGE
 - 1.2% - TANKER
 - 1.0% - CHEMICAL CARRIER
 - 0.2% - ATB



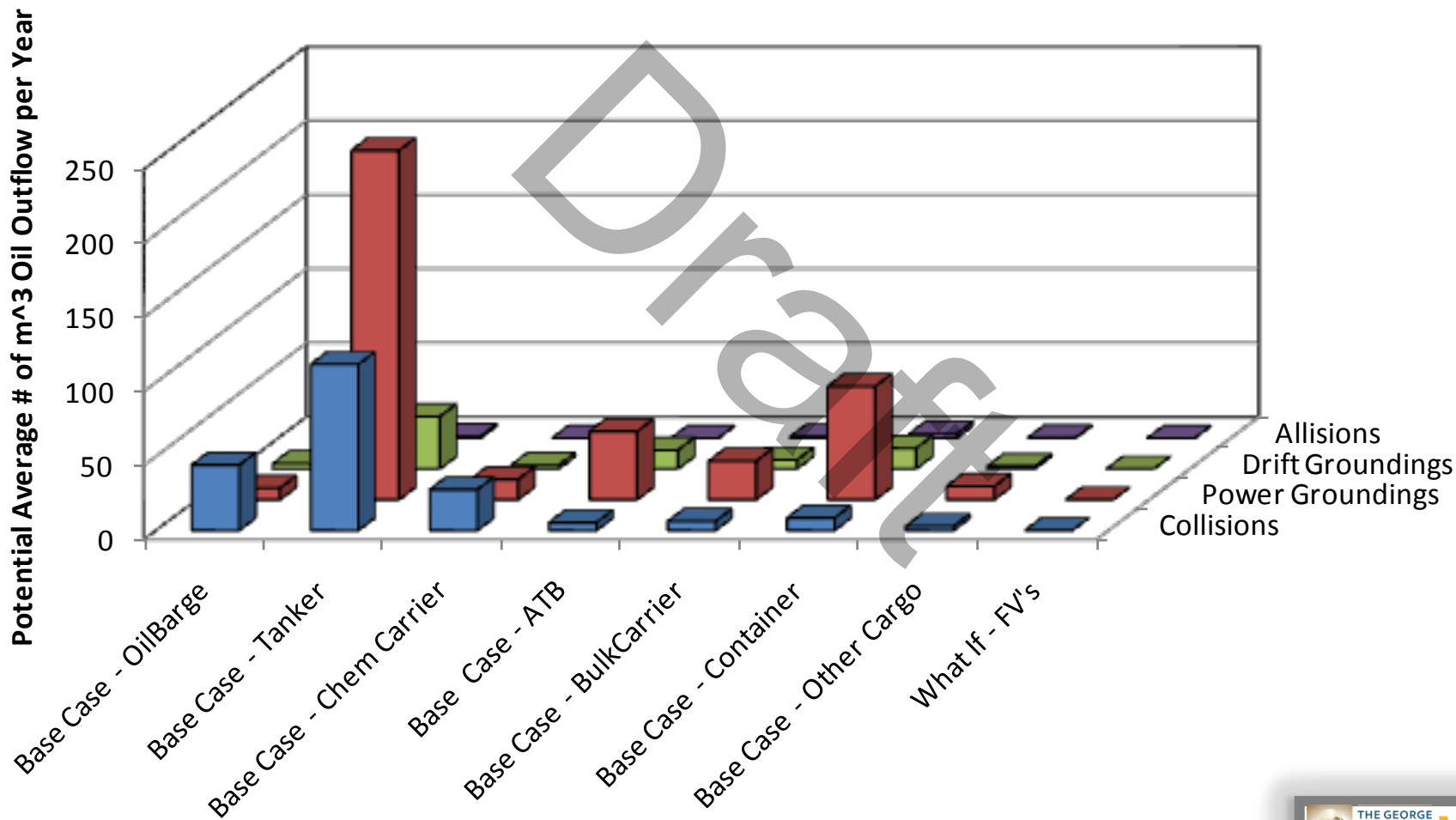
**+
13.2% of Potential Coll.
Oil Loss (Cargo+Fuel)**



A TAXONOMY OF 2010 FOCUS VESSEL POTENTIAL OIL LOSSES BY FOCUS VESSEL AND ACCIDENT TYPE

2010 BASE CASE

P - VTRA 2010 : Potential Average # of m³ Oil Outflow per Year



2010 BASE CASE

P - VTRA 2010 : Potential Average # of m³ Oil Outflow per Year

Focus Vessel	Collisions	Power Groundings	Drift Groundings	Allisions	Total
Base Case - OilBarge	21.4%	1.9%	4.9%	0.0%	7.9%
Base Case - Tanker	54.2%	56.8%	46.3%	22.8%	54.6%
Base Case - Chem Carrier	13.3%	3.3%	3.4%	0.0%	6.2%
Base Case - ATB	2.6%	11.1%	16.7%	0.0%	9.1%
Base Case - All Tank FV's	91.4%	73.1%	71.3%	22.8%	77.9%
Base Case - BulkCarrier	3.0%	6.3%	8.0%	16.8%	5.6%
Base Case - Container	4.1%	18.4%	18.3%	51.2%	14.5%
Base Case - Other Cargo	1.4%	2.2%	2.4%	9.2%	2.0%
Base Case - All Cargo FV's	8.6%	26.9%	28.7%	77.2%	22.1%
Base Case - All FV's	100.0%	100.0%	100.0%	100.0%	100.0%

P - VTRA 2010 : Potential Average # of m³ Oil Outflow per Year

Focus Vessel	Collisions	Power Groundings	Drift Groundings	Allisions	Total
Base Case - OilBarge	44.2	7.8	3.7	0.0	55.8
Base Case - Tanker	112.1	235.9	35.4	1.3	384.7
Base Case - Chem Carrier	27.6	13.7	2.6	0.0	43.9
Base Case - ATB	5.3	46.1	12.8	0.0	64.2
Base Case - All Tank FV's	189.3	303.5	54.5	1.3	548.6
Base Case - BulkCarrier	6.3	26.2	6.1	1.0	39.5
Base Case - Container	8.5	76.5	14.0	2.9	102.0
Base Case - Other Cargo	3.0	9.1	1.9	0.5	14.4
Base Case - All Cargo FV's	17.7	111.8	21.9	4.4	155.8
Base Case - All FV's	207.1	415.3	76.4	5.7	704.4