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Regulatory Assessment and Final Regulatory Flexibility Analysis for the Interim Final Rule

Photo by James R. Tourtellotte

Importer Security Filing and Additional Carrier Requirements

Cost, Benefit, and Feasibility Study as Required by Section 203(c) of the SAFE Port Act

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prepared for:

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PREFACE

This Regulatory Assessment has been prepared for the Interim Final Rule Importer Security Filing and Additional Carrier Requirements. This interim final rule requires both importers and carriers to submit additional information pertaining to cargo to U.S. Customs and Border Protection (CBP) before the cargo is brought into the United States by vessel. This information must be submitted to CBP by way of a CBP-approved electronic data interchange system. The required information is reasonably necessary to improve CBP's ability to identify high-risk shipments so as to prevent smuggling and ensure cargo safety and security.

This interim final rule requires Importer Security Filing (ISF) Importers, as defined in these regulations, or their agents, to transmit an Importer Security Filing to CBP, for cargo other than foreign cargo remaining on board (FROB). The Importer Security Filing must consist of 10 elements, unless an element is specifically exempted. The manufacturer (or supplier), country of origin, and commodity Harmonized Tariff Schedule of the United States (HTSUS) number must be linked to one another at the line item level. The 10 elements are as follows: (1) Seller; (2) Buyer; (3) Importer of record number / Foreign trade zone applicant identification number; (4) Consignee number(s); (5) Manufacturer (or supplier); (6) Ship to party; (7) Country of origin; (8) Commodity HTSUS number; (9) Container stuffing location; and (10) Consolidator (stuffer).

In order to provide the trade sufficient time to adjust to the new requirements and in consideration of the business process changes that may be necessary to achieve full compliance, CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. This policy will last for twelve months after the effective date and will apply to all aspects of the filing rule.

In addition, this rule provides flexibility with respect to certain elements of the Importer Security Filings. This flexibility falls into two categories:

- Two elements of the Importer Security Filings will be subject to flexibility as to timing. These elements are the Container stuffing location and Consolidator (stuffer). The ISF Importer must submit these elements as early as possible, and in any event no later than 24 hours prior to arrival in a U.S. port (or upon lading at the foreign port if that is later than 24 hours prior to arrival in a U.S. port).
- Four elements will be subject to flexibility as to interpretation. These elements are the Manufacturer (or supplier), Ship to party, Country of origin, and Commodity HTSUS number. There is no special timing flexibility for these elements; they must be filed 24 hours prior to lading. However, CBP has added flexibility by allowing ISF Importers, in their initial filing, to provide a range of acceptable responses based on facts available to the importer at the time, in lieu of a single specific response (which may become known to the importer only at a

later time). ISF Importers will be required to update their filings with respect to these elements as soon as more precise or more accurate information is available, in no event later than 24 hours prior to arrival at a U.S. port (or upon lading at the foreign port if that is later than 24 hours prior to arrival in a U.S. port). For example, 24 hours prior to lading:

- The ISF Importer could identify the manufacturer as being one of three typically used manufacturers, with more precision to be provided in subsequent ISF updates.
- The ISF Importer could submit the identity of the importer, consignee, or the facility where the goods will be unladen in the event that the ship to party is unavailable (e.g., "to order" shipments).
- If the ISF Importer is, in good faith, unable to determine whether the country where the final stage of production of an article took place is the country of origin, the ISF Importer may provide the country where the final stage of production of the article took place in lieu of the country of origin, and update the ISF submission as soon as more accurate data are available.

The purpose of these flexibilities is to allow CBP to conduct a structured review of the elements, including an evaluation of any specific compliance difficulties that the trade may be encountering with respect to these elements. CBP may gather information by conducting reviews of particular importers to determine whether submission of all 10 data elements 24 hours prior to lading was in fact feasible and, if not, what barriers the importer encountered. The structured review will cover a range of enterprises, from small to large, and will include both integrated and nonintegrated supply chains.

The structured review will further be enhanced by comments filed in response to this publication. Although the rule is now final, CBP invites comments on the 6 data elements for which CBP is providing some type of flexibility (Container stuffing location, Consolidator (stuffer), Manufacturer (or supplier), Ship to party, Country of origin, and Commodity HTSUS number). These comments are due by June 1, 2009.

The structured review will also be enhanced by feedback provided in CBP's formal outreach program, described below. The information gathering phase of the structured review will end on June 1, 2009. All comments must be submitted to CBP by that date. We note, again, that CBP is not reopening the proposed rule in this action for comment; rather CBP is seeking comment on the requirements discussed in section 149.2 (b) and (f) of this rule and the revised Regulatory Assessment.

On the basis of information obtained during the structured review and public comments, the Department of Homeland Security (DHS) will undertake an analysis of the elements subject to flexibilities discussed in this section. The analysis will examine compliance costs for various industry segments, the impact of the flexibilities, the barriers to submitting these data 24 hours prior to lading, and the benefits of collecting these data. Based on that analysis, DHS, in coordination with other parts of the Executive Branch, will determine whether to eliminate, modify, or leave unchanged these requirements.

Because the data and information do not exist to conduct an analysis of the impacts of the delayed compliance period and flexibilities, CBP has estimated the costs of the rule assuming that all affected entities are fully compliant upon the *effective* date of the rule, which likely overstates costs. This means that the analysis assumes that all 10 Importer Security Filing elements will be collected and submitted to CBP no later than 24 hours before cargo is laden aboard a vessel destined to the United States.

Additionally, our analysis presents a low and high cost estimate. The costs for the high scenario incorporate potential supply chain delay impacts of 1 to 3 days. We analyzed the potential for supply chain delays based on our interviews with trade representatives and comments to the January 2, 2008, Notice of Proposed Rulemaking (73 FR 90). CBP is committed to ensuring that its trade partners are positioned to successfully implement the requirements of this rule and will work with the trade during the delayed compliance period and thereafter. Based on the magnitude of the impact of potential delay in the high-cost scenario, estimated at billions of dollars annually, CBP has determined that a 12-month delayed compliance period for the rule and flexible requirements 6 of the 10 Importer Security Filing elements are prudent and necessary steps to minimize the delay costs that could result from the rule and to ensure that these high costs are not, in fact, realized. CBP believes that the direct result of these modifications and the extensive outreach initiative will be a positive downward pressure on supply chain delay costs, and the true impacts of this rule are much more likely to be reflected in the low-cost scenario presented, where no supply chain delays are assumed.

CBP is requesting comments on this rule, the Regulatory Assessment, and the Final Regulatory Flexibility Act analysis. Comments must be received on or before June 1, 2009.

Although this analysis attempts to mirror the terms and wording of the interim final rule, no attempt is made to precisely replicate the regulatory language and readers are cautioned that the actual finalized regulatory text, not the text of this assessment, is binding.

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LIST OF ACRONYMS

10+2 Strawman	U.S. Customs and Border Protection, *CBP Proposal for Advance Trade Data Elements*, 2007
24-Hour Rule	24-Hour Advance Vessel Manifest Rule
AAEI	American Association of Exporters and Importers
ABI	Automated Broker Interface
ACE	Automated Commercial Environment
ANSI	American National Standards Institute
ATDI	Advanced Trade Data Initiative
ATS	Automated Targeting System
BAPLIE	Bayplan/Stowage Plan Occupied and Empty Locations Message
BOL	bill of lading
CDC	Centers for Disease Control and Prevention
CHB	Customs House Broker
COAC	Departmental Advisory Committee on Commercial Operations of U.S. Customs and Border Protection and Related Homeland Security Functions
CBP	U.S. Customs and Border Protection
CSM	Container Status Message
DHS	U.S. Department of Homeland Security
EDI	Electronic Data Interface
EO	Executive Order
FROB	Foreign Cargo Remaining on Board
FTP	File Transfer Protocol
FRFA	Final Regulatory Flexibility Analysis
FTZ	Foreign Trade Zone
GDP	Gross Domestic Product
HTS	Harmonized Tariff Schedule
HTSUS	Harmonized Tariff Schedule of the United States
ICST	International Classification of Ships by Type
IE	Immediate Exportation
ILWU	International Longshore and Warehouse Union
IMO	International Maritime Organization
IRFA	Initial Regulatory Flexibility Analysis
ISF	Importer Security Filing
ISO	International Organization for Standardization
IT	Immediate Transport or In-Transit
MARAD	U.S. Department of Transportation Maritime Administration
MID	Manufacturer identification
MTO	marine terminal operator
NAICS	North American Industrial Classification System
NAM	National Association of Manufacturers
NVOCC	Non-Vessel Operating Common Carrier
OECD	Organization for Economic Co-operation and Development
OMB	U.S. Office of Management and Budget
PIERS	Port Import Export Reporting Service
PMA	Pacific Maritime Association
RFA	Regulatory Flexibility Act of 1980

Ro-Ro	roll-on/roll-off cargo
SAFE Port Act	Security and Accountability for Every Port Act of 2006
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act of 1996
SCAC	Standard Carrier Abbreviation Code
sFTP	secure File Transfer Protocol
T&E	Transportation and Exportation
TEU	20-foot equivalent unit
UMRA	Unfunded Mandate Reform Act of 1995
UN EDIFACT	United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport
USACOE	U.S. Army Corps of Engineers
Vessel AMS	Vessel Automated Manifest System
VSL	value of statistical life
VOCC	Vessel Operating Common Carrier

EXECUTIVE SUMMARY

U.S. Customs and Border Protection (CBP) of the U.S. Department of Homeland Security (DHS) is developing regulations that require the electronic reporting of additional security filing data elements for cargo destined for the United States by vessel.[1] Importer Security Filing (ISF) Importers (or their designated authorized agents) are responsible for transmitting Importer Security Filings, which consist of as many as 10 importer data elements. For purposes of this interim final rule, ISF Importers are defined as "the party causing goods to arrive within the limits of a port in the United States." For shipments other than foreign remaining on board (FROB) cargo, immediate exportation (IE) and transportation and exportation (T&E) in-bond shipments, and goods to be delivered to a foreign trade zone (FTZ), the ISF Importer will be the goods' owner, purchaser, consignee, or agent such as a licensed customs broker. For FROB cargo, the ISF Importer will be the carrier. For IE and T&E in-bond shipments, and goods to be delivered to an FTZ, the ISF Importer will be the party filing the IE, T&E, or FTZ documentation. Carriers are responsible for transmitting Additional Carrier Requirements (Vessel Stow Plans and Container Status Messages (CSMs)). The primary benefit of this rule is to improve the high-risk targeting of cargo destined for the United States by CBP's Automated Targeting System (ATS). CBP's ATS processes cargo manifest information to identify and evaluate the risk of smuggling weapons of mass effect through the use of oceangoing cargo, while, at the same time, enabling CBP to further expedite low-risk shipments following their arrival in the United States.

The security of the United States is a "public good" in that all residents of the United States benefit from security, and market forces alone are not sufficient to induce adequate and consistent protection. As a result, to address this market failure, the government is responsible for assuring that the international maritime cargo supply chain is secure, and that foreign cargo entering the United States be accompanied by adequate data and information that allow CBP to reliably identify and evaluate high-risk shipments.

The additional security filing data elements will help identify the entities involved in the supply chain of foreign goods imported into the United States, identify the entities' locations, as well as corroborate and provide potentially more precise descriptions of the goods being shipped to the United States. These data will significantly enhance the risk assessment process by enabling CBP to more efficiently separate higher-risk shipments from lower-risk shipments that should be afforded more rapid release decisions. In

[1] CBP is requesting public comment on these regulations, which will be issued as an interim final rule, as well as this revised Regulatory Assessment. For this report, "final rule" or "regulation" shall therefore be taken to mean "interim final rule."

addition, these additional data elements will enable CBP to make critical decisions during and immediately after elevated alert levels when business resumption is essential to the well being and security of the U.S. economy.

This report is intended to address the requirements of Executive Order (EO) 12866, "Regulatory Planning and Review," which requires Federal agencies to conduct a regulatory analysis for economically significant actions. In addition, it includes a Final Regulatory Flexibility Analysis (FRFA), as required by the Regulatory Flexibility Act (RFA) of 1980 (as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996). The FRFA evaluates the economic impacts of the regulation on small entities. Finally, this report responds to Section 203(c) of the SAFE Port Act of 2006, which requires DHS to consider the cost, benefit, and feasibility of this interim final rule.

ANALYTIC APPROACH

In this analysis, we first estimate current and future baseline conditions in the absence of the interim final rule using 2005 shipping data. In this baseline analysis, we characterize and estimate the number of unique importers, shipments, carriers, and vessel trips potentially affected by the interim final rule. We then identify the incremental measures that importers and carriers will take to meet the requirements of the interim final rule and estimate the costs of these activities, as well as the cost to CBP of implementing the rule. Next, relying on published literature, we identify hypothetical scenarios describing representative terrorist attacks potentially prevented by this regulation and estimate the economic costs (i.e., the consequences) of these events. We compare these consequences to the costs of the interim final rule and estimate the reduction in the probability of a successful terrorist attack resulting from the interim final rule that would be required for the benefits of the regulation to equal the costs of the regulation. Finally, we consider the distribution of costs to sensitive subgroups such as small entities and the energy sector.

Although this analysis attempts to mirror the terms and wording of the interim final rule, no attempt is made to precisely replicate the regulatory language and readers are cautioned that the actual finalized regulatory text, not the text of this assessment, is binding.

SUMMARY OF FINDINGS

As of January 1, 2009, the projected effective date of the regulation, we estimate that approximately 11 million import shipments conveyed by 1,000 different carrier companies operating 37,000 unique voyages or vessel trips for delivery to between 200,000 and 750,000 importers in the United States will be subject to the interim final rule. Exhibit ES-1 summarizes the results of the regulatory analysis. In accordance with EO 12866, we consider and evaluate the following four alternatives:

1. **Alternative 1 (the chosen alternative):** Importer Security Filings and Additional Carrier Requirements are required.[2] Bulk cargo is exempt from the Importer Security Filing requirements;
2. **Alternative 2:** Importer Security Filings and Additional Carrier Requirements are required. Bulk cargo is **not** exempt from the Importer Security Filing requirements;
3. **Alternative 3:** Only Importer Security Filings are required. Bulk cargo is exempt from the Importer Security Filing requirements; and
4. **Alternative 4:** Only the Additional Carrier Requirements are required.

[2] For each alternative, the Additional Carrier Requirements apply only to containerized cargo.

EXHIBIT ES-1 SUMMARY OF FINDINGS

DISCOUNT RATE	ANNUALIZED COSTS 2009 - 2018 (2008 DOLLARS)[1]	TERRORIST ATTACK SCENARIO	REQUIRED REDUCTIONS IN THE PROBABILITY OF A SUCCESSFUL TERRORIST ATTACK FOR THE BENEFITS OF THE REGULATION TO EQUAL ITS COSTS[2]		COMMENTS
			ABSOLUTE REDUCTION IN BASELINE RISK REQUIRED	NUMBER OF EVENTS AVOIDED REQUIRED	
ALTERNATIVE 1 (CHOSEN ALTERNATIVE): IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED[3] (BULK CARGO EXEMPT FROM IMPORTER SECURITY FILING REQUIREMENTS)					
3 Percent	$890 million to $6.6 billion	Actual West Coast Port Shutdown (12-days)	0.59 to 4.38	One event in 3 months to 2 years	**Preferred Alternative:** Most favorable combination of cost and stringency.
		Hypothetical Nuclear Attack	<0.01 to 0.02	One event in 60 to 500 years	
		Hypothetical Biological Attack	0.02 to 0.15	One event in 7 to 50 years	
7 Percent	$990 million to $7.0 billion	Actual West Coast Port Shutdown (12-days)	0.66 to 4.64	One event in 3 months to 2 years	
		Hypothetical Nuclear Attack	<0.01 to 0.02	One event in 60 to 400 years	
		Hypothetical Biological Attack	0.02 to 0.16	One event in 6 to 50 years	
ALTERNATIVE 2: IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO NOT EXEMPT					
3 Percent	$890 million to $6.6 billion	Actual West Coast Port Shutdown (12-days)	0.59 to 4.39	One event in 3 months to 2 years	More stringent than Alternative 1, but limited expected additional benefit for increased cost
		Hypothetical Nuclear Attack	<0.01 to 0.02	One event in 60 to 500 years	
		Hypothetical Biological Attack	0.02 to 0.15	One event in 7 to 50 years	
7 Percent	$990 million to $7.0 billion	Actual West Coast Port Shutdown (12-days)	0.66 to 4.65	One event in 3 months to 2 years	
		Hypothetical Nuclear Attack	<0.01 to 0.02	One event in 60 to 400 years	
		Hypothetical Biological Attack	0.02 to 0.16	One event in 6 to 50 years	

[3] For each alternative, the Additional Carrier Requirements apply only to containerized cargo.

EXHIBIT ES-1 SUMMARY OF FINDINGS (CONTINUED)

DISCOUNT RATE	ANNUALIZED COSTS 2009 - 2018 (2008 DOLLARS)[1]	TERRORIST ATTACK SCENARIO	REQUIRED REDUCTIONS IN THE PROBABILITY OF A SUCCESSFUL TERRORIST ATTACK FOR THE BENEFITS OF THE REGULATION TO EQUAL ITS COSTS[2]		COMMENTS
			ABSOLUTE REDUCTION IN BASELINE RISK REQUIRED	NUMBER OF EVENTS AVOIDED REQUIRED	
ALTERNATIVE 3: IMPORTER SECURITY FILINGS REQUIRED, BULK CARGO EXEMPT					
3 Percent	$890 million to $6.6 billion	Actual West Coast Port Shutdown (12-days)	0.59 to 4.37	One event in 3 months to 2 years	Similar cost to Alternative 1 with decreased effectiveness. Importer Security Filings and Additional Carrier Requirements are not working in tandem.
		Hypothetical Nuclear Attack	<0.01 to 0.02	One event in 60 to 500 years	
		Hypothetical Biological Attack	0.02 to 0.15	One event in 7 to 50 years	
7 Percent	$990 million to $7.0 billion	Actual West Coast Port Shutdown (12-days)	0.66 to 4.63	One event in 3 months to 2 years	
		Hypothetical Nuclear Attack	<0.01 to 0.02	One event in 60 to 400 years	
		Hypothetical Biological Attack	0.02 to 0.16	One event in 6 to 50 years	
ALTERNATIVE 4: ADDITIONAL CARRIER REQUIREMENTS ONLY					
3 Percent	$2 million to $11 million	Actual West Coast Port Shutdown (12-days)	<0.01 to 0.01	One event in 100 to 700 years	Least cost, but also least effective alternative. Does not meet the statutory requirements of Section 203 of the SAFE Port Act nor provide data on shipment history. Importer Security Filings and Additional Carrier Requirements are not working in tandem.
		Hypothetical Nuclear Attack	<0.01	One event in 40,000 to 200,000 years	
		Hypothetical Biological Attack	<0.01	One event in 4,000 to 20,000 years	
7 Percent	$2 million to $12 million	Actual West Coast Port Shutdown (12-days)	<0.01 to 0.01	One event in 100 to 600 years	
		Hypothetical Nuclear Attack	<0.01	One event in 30,000 to 200,000 years	
		Hypothetical Biological Attack	<0.01	One event in 4,000 to 20,000 years	

Notes:

[1] The annualized cost range presented in each cell results from varying assumptions about the estimated initial and transaction costs for Importer Security Filings, the potential for supply chain delays, and the estimated costs to transmit Vessel Stow Plans and CSMs to CBP.

[2] Results assume regulation reduces risk of one type of attack only. The interim final rule will most likely affect more than one type of risk simultaneously, and additional risk reduction scenarios involving combinations of lesser risk reductions may also achieve the break-even criterion.

We estimate costs separately for the Importer Security Filing requirements (up to 10 importer data elements) and the Additional Carrier Requirements (Vessel Stow Plans and CSMs).[4] The estimated costs for the Importer Security Filing requirements are developed on per-importer and per-shipment bases and applied to the estimated number of importers and shipments annually for a period of 10 years (2009 through 2018). In our opinion, the 10-year calculation reflects the maximum time frame that we could reasonably project trends in international shipping. In addition, we estimate the welfare losses to U.S. importers arising from potential delays in the supply chain that may result from having to meet the required filing deadline of 24 hours prior to lading at the foreign port. The estimated costs for the Additional Carrier Requirements are developed on per carrier and per vessel trip bases and applied to the estimated number of carriers and vessel trips in each year of the 10-year analysis period.

To estimate the full range of the total costs for complying with the interim final rule, for the four alternatives we develop a high cost scenario and a low cost scenario by assuming certain values for the key cost factors. Annualized costs for Alternatives 1 through 3 range from $890 million to $7.0 billion, depending on the discount rate applied, the cost scenario, whether or not bulk shipments are exempt, and whether or not the Additional Carrier Requirements are required. The annualized costs for Alternative 4 are substantially lower, ranging from $2 million to $12 million. However, this alternative is the least stringent and effective option because it only collects data on the conveyance of the shipment. Further, it does not meet the statutory requirements of Section 203 of the SAFE Port Act. Because costs are likely to exceed $100 million annually, the interim final rule represents an economically significant regulatory action as defined by EO 12866.

Ideally, the quantification and monetization of the benefits of this regulation would involve estimating the current level of risk of a successful terrorist attack, absent this regulation, and the incremental reduction in risk resulting from implementation of the interim final rule. We would then multiply the change by an estimate of the value individuals place on such a risk reduction to produce a monetary estimate of direct benefits. However, existing data limitations and a lack of complete understanding of the true risks posed by terrorists prevent us from establishing the incremental risk reduction attributable to this rule. As a result, we undertake a "break-even" analysis to inform

[4] The interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filing. However, because of data limitations, we cannot estimate the changes in cost attributable specifically to CBP's restraint in enforcing the rule during the initial 12 months or the flexibilities that the rule provides. We therefore estimate the incremental costs of the interim final rule assuming that importers will be fully compliant upon the *effective* date of the rule (i.e., ISF Importers or their designated agents will transmit all of their required Importer Security Filing data elements to CBP no later than 24 hours prior to lading at a foreign port), which likely overstates costs.

decision makers of the necessary incremental change in the probability of such an event occurring that would result in direct benefits equal to the costs of the interim final rule.

In the break-even analysis, we identify three types of terrorist attack scenarios that may be prevented by the regulation and obtain cost estimates of the consequences of these events from publicly available literature. The analysis compares the annualized costs of the regulation to the avoided costs of each event to estimate the reduction in the probability of such events (also presented in terms of "odds," e.g., a 0.25 reduction in the probability of an event occurring in a single year implies that one additional event must be avoided in a 4-year period) that must be achieved for the benefits of the regulation to equal the costs. The reduction in the odds of terrorist events are rough estimates that do not take into account changes in risk through time or factors that may affect willingness to pay to avoid the consequences of these events, such as changes in income.

For each attack scenario, Exhibit ES-1 indicates what would need to occur for the costs of each alternative to equal its benefits, *assuming the alternative only reduces the risk of a single event of that type of attack*. As summarized in Exhibit ES-1, the break-even risk reductions for Alternative 4 are significantly lower than the other three alternatives, reflecting the significantly lower costs associated with requiring only the Additional Carrier Requirements. The break-even results for the remaining three alternatives are similar because the costs of these options are not very different. For the most severe attack scenario (a hypothetical nuclear attack in a major city), the interim final rule must result in the avoidance of one such event in a time period of 60 to 500 years for the benefits of the regulation to equal the costs. For the least severe of the three hypothetical attack scenarios (costs of the actual 12-day West Coast port shutdown), the estimated costs of a single incident are closer in value to the annualized costs of the interim final rule. As a result, *if the rule only reduced the risk of a single attack on a port*, a shutdown would need to be avoided at a rate of once in 3 months to 2 years for the benefits of the rule to equal costs. The results expressed as absolute reductions in baseline risk also show higher reductions needed if port attacks only are mitigated (about 0.59 to 4.65) and lesser reductions associated with prevention of the more catastrophic events. We note that this analysis is highly sensitive to the chosen incident scenarios.

Total present value costs of the interim final rule are presented in Exhibit ES-2, based on the cost projections we estimate for the 10-year analysis period, 2009 through 2018. Applying a discount rate of 3 percent, the total costs of Alternatives 1, 2, and 3 are projected to range from $7.6 billion to $56 billion over 10 years depending on the cost scenario, whether or not bulk shipments are exempt, and whether or not Additional Carrier Requirements are required. If a discount rate of 7 percent is applied instead, total costs range from $7.0 billion to $49 billion. Under Alternative 2, which requires Importer Security Filings for both non-bulk cargo and bulk cargo, costs are not significantly higher because the number of bulk shipments is relatively small compared to the number of non-bulk shipments. Under Alternative 3, costs are not significantly lower because the estimated costs for the Additional Carrier Requirements are relatively small compared to the estimated costs for the Importer Security Filings. The present value

costs for Alternative 4 are significantly lower than the other three alternatives, ranging from $16 million to $95 million.

As a result, the relatively large difference in values between the lower end (e.g., present value cost of $7.6 billion at a discount rate of 3 percent) and higher end ($56 billion) of the estimated total cost range for Alternatives 1, 2, and 3 is due primarily to the cost scenario and not whether or not Importer Security Filings for bulk shipments or the Additional Carrier Requirements are required. The higher end of the estimated total cost range reflects the variations made for the high cost scenario, and more specifically, the assumption that delays in the supply chain would occur as a result of this interim final rule. For the high cost scenario, our present value estimate of the welfare loss to U.S. importers arising from delays in the supply chain is approximately $43 billion (at a discount rate of 3 percent). As discussed in our quantitative uncertainty analysis in Appendix C, we evaluate the uncertainties associated with the key assumptions used to estimate this welfare loss in the high cost scenario, namely the length of delay and the percentage of containers experiencing delay.

EXHIBIT ES-2 TOTAL PRESENT VALUE COSTS, 2009 - 2018 (2008 DOLLARS)

DISCOUNT RATE	PRESENT VALUE COSTS (2008 DOLLARS)
ALTERNATIVE 1 (CHOSEN ALTERNATIVE): IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO EXEMPT	
3 Percent	$7.6 billion to $56 billion
7 Percent	$7.0 billion to $49 billion
ALTERNATIVE 2: IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO NOT EXEMPT	
3 Percent	$7.6 billion to $56 billion
7 Percent	$7.0 billion to $49 billion
ALTERNATIVE 3: IMPORTER SECURITY FILINGS REQUIRED, BULK CARGO EXEMPT	
3 Percent	$7.6 billion to $56 billion
7 Percent	$7.0 billion to $49 billion
ALTERNATIVE 4: ADDITIONAL CARRIER REQUIREMENTS ONLY	
3 Percent	$0.02 billion to $0.1 billion
7 Percent	$0.02 billion to $0.09 billion

Note: The range presented in each cell results from varying assumptions about the estimated initial and transaction costs for Importer Security Filings, the potential for supply chain delays, and the estimated costs to transmit Vessel Stow Plans and CSMs to CBP.

As shown in Exhibit ES-3, the annual undiscounted costs increase from year-to-year over the 10-year analysis period. This increase reflects our projected annual increases in the

number of shipments, value of shipments, and vessel trips into the United States potentially affected by the interim final rule.

EXHIBIT ES-3 ANNUAL UNDISCOUNTED COSTS BY YEAR, 2009 - 2018 (2008 DOLLARS)

YEAR	ALTERNATIVE 1 (CHOSEN ALTERNATIVE) IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO EXEMPT (MILLION $, UNDISCOUNTED)	ALTERNATIVE 2 IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO NOT EXEMPT (MILLION $, UNDISCOUNTED)	ALTERNATIVE 3 IMPORTER SECURITY FILINGS REQUIRED, BULK CARGO EXEMPT (MILLION $, UNDISCOUNTED)	ALTERNATIVE 4 ADDITIONAL CARRIER REQUIREMENTS ONLY (MILLION $, UNDISCOUNTED)
2009	$1,900 to $11,000	$1,900 to $11,000	$1,900 to $11,000	$0.4 to $14
2010	1,900 to 7,100	1,900 to 7,100	1,900 to 7,100	0.4 to $14
2011	1,900 to 7,300	1,900 to 7,300	1,900 to 7,300	0.4 to $14
2012	290 to 4,600	290 to 4,600	290 to 4,600	0.3 to 7
2013	310 to 4,800	310 to 4,800	310 to 4,800	0.3 to 7
2014	320 to 5,100	330 to 5,100	320 to 5,100	0.3 to 7
2015	340 to 5,300	340 to 5,300	340 to 5,300	0.3 to 7
2016	360 to 5,600	360 to 5,600	360 to 5,600	0.3 to 7
2017	380 to 5,900	380 to 5,900	380 to 5,900	0.3 to 7
2018	400 to 6,200	400 to 6,300	400 to 6,200	0.4 to 7

Notes: The range presented in each cell results from varying assumptions about the estimated initial and transaction costs for Importer Security Filings, the potential for supply chain delays, and the estimated costs to transmit Vessel Stow Plans and CSMs to CBP.

The results indicate that Alternative 1 provides the most favorable combination of cost and stringency. While Alternative 2 might be considered more stringent because it does not exempt bulk cargo from the Importer Security Filing requirements, the impact of this is expected to be slight because the number of bulk shipments is relatively small compared to the number of non-bulk shipments. Alternative 3 is expected to have costs similar to Alternative 1, but will be less stringent because it only requires Importer Security Filings and does not include data that verify the information on the cargo manifest and identify and track the movement, location, and status of cargo (in particular, containerized cargo) from the time its transport is booked until its arrival in the United States. Without the Additional Carrier Requirements, CBP will not be able to assess the specific risks associated with the many individual movements and transfers involved in shipping cargo to the United States. Thus, an important element of CBP's layered, risk-based approach to cargo security would, consequently, be omitted.

Alternatives 3 and 4 are not chosen, in part, because it is CBP's judgment that neither of these options will be as effective as the selected option. Specifically, the Importer Security Filing requirements and the Additional Carrier Requirements should work in tandem. The Additional Carrier Requirements focus on the conveyance of the goods and are distinct from the Importer Security Filing elements, which are focused on the merchandise and the parties involved in the acquisition process. Specifically, Vessel Stow Plans will assist CBP in validating other advanced cargo information submissions by allowing CBP to, among other things, better detect unmanifested containers without relying on physical verification methods that are manpower intensive and costly. CSMs will provide CBP with additional transparency into the custodial environment through which inter-modal containers are handled and transported before arrival in the United States. Because CSMs are created independently of the manifest, CBP can utilize them to corroborate other advanced data elements, including Importer Security Filings and those elements related to container and conveyance origin. This corroboration with other advanced data messages, including Importer Security Filings, and an enhanced view into the international supply chain will contribute to the security of the United States and the international supply chain through which containers and imported cargo are shipped to U.S. ports.

Based on this analysis of alternatives, CBP has determined that Alternative 1 provides the most favorable balance between security outcomes and impacts to maritime transportation. As summarized in Exhibit ES-4, the incremental costs of this regulation, on a per shipment basis, is a small fraction of the value of a shipment. The relatively high cost of the rule over 10 years is driven by the large volume of shipments rather than high per-transaction costs. Shipment data indicate that the median value of a shipment of goods imported into the United States is approximately $38,000. As shown in Exhibit ES-4, the impacts will range from $48 to $390 per shipment, depending on the discount rate applied, the cost scenario, and whether or not bulk shipments are exempt. The added costs of this regulation are estimated to be only 0.13 percent to 1.03 percent of the median value of $38,000 per shipment. [5]

[5] Note that the per shipment costs combine direct compliance costs (i.e., expenditures) and consumer surplus losses. They are compared to the median value per shipment to emphasize that the number of shipments significantly influences the magnitude of total costs.

EXHIBIT ES-4 COSTS PER SHIPMENT, MEDIAN VALUE OF SHIPMENT, VESSEL TRIP, AND CARRIER (2008 DOLLARS)

	3 PERCENT DISCOUNT RATE[1]	7 PERCENT DISCOUNT RATE[1]
IMPORTER SECURITY FILING COSTS: ALTERNATIVES 1 AND 3 (BULK CARGO EXEMPT)		
Total present value cost	$7.5 billion to $56 billion	$6.9 billion to $49 billion
Number of shipments (10-year total)	144 million	144 million
Equivalent per shipment cost[2]	$52 to $390	$48 to $341
Median value per shipment	$37,900	$37,900
Cost per median value of shipment	0.14 percent to 1.03 percent	0.13 percent to 0.90 percent
IMPORTER SECURITY FILING COSTS: ALTERNATIVE 2 (BULK CARGO NOT EXEMPT)		
Total present value cost	$7.6 billion to $56 billion	$7.0 billion to $49 billion
Number of shipments (10-year total)	145 million	145 million
Equivalent per shipment cost[2]	$52 to $388	$48 to $339
Median value per shipment	$38,200	$38,200
Cost per median value of shipment	0.14 percent to 1.02 percent	0.13 percent to 0.89 percent
VESSEL STOW PLAN COSTS: ALTERNATIVES 1, 2, AND 4		
Total present value cost	$3 million to $27 million	$2 million to $23 million
Number of container vessel trips, small and large carriers (10-year total)	294,000	294,000
Equivalent per vessel trip cost	$9 to $90	$8 to $78
CONTAINER STATUS MESSAGE COSTS: ALTERNATIVES 1, 2, AND 4		
Total present value cost	$0.3 million to $54 million	$0.3 million to $48 million
Number of container carriers, large	74	74
Equivalent per carrier cost[3]	$3,900 to $730,000	$3,700 to $650,000

Notes:
[1] The range presented in each cell results from varying assumptions about the estimated initial and transaction costs for Importer Security Filings, the potential for supply chain delays, and the estimated costs to transmit Vessel Stow Plans and CSMs to CBP.
[2] Per shipment cost includes both direct expenditures resulting from collecting and providing the required information to CBP and consumer surplus losses resulting from delays.
[3] We assume that the large carriers (those that made more than 100 vessel trips to the United States in 2005) already collect and maintain CSM data and therefore would be required to comply with the CSM requirements.

For the incremental costs of providing Vessel Stow Plans to CBP, we estimate that the total number of container vessel trips affected is approximately 294,000. As shown in Exhibit ES-4, the increase in costs of a vessel trip will range from $8 to $90, depending on the discount rate and cost scenario.

For the incremental costs of providing CSMs to CBP, we estimate that the total number of large carriers importing containerized cargo affected is 74. As shown in Exhibit ES-4,

the increase in the total costs per carrier for the 10-year analysis period will range from $3,700 to $730,000, depending on the discount rate and cost scenario.

The interim final rule may increase the time shipments are in transit, particularly for shipments conveyed in containers. Especially for shipments consolidated in containers, the supply chain is generally more complex and the importer has less control of the flow of goods and exchange of associated security filing information. Foreign cargo consolidators may be consolidating multiple shipments from one or more shippers in a container destined for one or more buyers or consignees. In order to ensure that the security filing data is provided by the shippers to the ISF Importers (or their designated agents) and is then transmitted to and accepted by CBP in advance of the 24-hour deadline, carriers and consolidators may advance their cut-off times for receipt of shipments and associated Importer Security Filing data.

These advanced cut-off times would help prevent a carrier or consolidator from having to unpack or unload a container in the event the security filing for one of the shipments contained in the container is inadequate or not accepted by CBP. For example, carriers or consolidators may require shippers to submit, transmit, and/or obtain CBP acceptance of their security filing data before their shipment(s) are stuffed in the container, before the container is sealed, or before the container is delivered to the port for lading. In such cases, importers may experience additional delays in their supply chain to accommodate these advanced cut-off times imposed by their carriers or consolidators. The costs associated with these delays include: (1) higher inventory carrying costs; (2) the need to hold larger buffer-stock inventories to accommodate variation in arrival time; (3) depreciation in shipment value; (4) costs of storage at the manufacturer, freight forwarder, consolidator, or port; and (5) costs for additional security to protect the freight from tampering. To capture all of these costs in our estimate of the impact of time delays, we estimate the welfare loss to U.S. importers by relying on an estimate of the willingness to pay for reducing transit time. The high end of the cost ranges presented in Exhibit ES-4 assumes an initial supply chain delay of 3 days (consolidated container shipments) or 2 days (unconsolidated or full container shipments) for the first year of implementation (2009) and a delay of 1 day for years 2 through 10 (2010 - 2018).

In response to the requirements of the RFA of 1980, as amended by the SBREFA of 1996 and EO 13272, entitled “Proper Consideration of Small Entities in Agency Rulemaking,” Federal agencies must consider the potential distributional impact of rules on small businesses, small governmental jurisdictions, and small organizations during the development of their rules. The analysis finds that a substantial number of small entities, namely small importers and small carriers, are likely to be directly affected by the interim final rule. We find that the impact to small carriers is unlikely to be significant. However, due to data limitations, we are uncertain whether the impact will be significant on a per-entity basis for the small importers. Therefore, at this time, CBP cannot certify that the interim final rule will not have a significant impact on a substantial number of small importer entities. As a result, this report includes a FRFA.

Title II of the Unfunded Mandate Reform Act of 1995 (UMRA) requires agencies to assess the effects of their regulatory actions on State, local, and tribal governments and

the private sector. The interim final rule is exempt from these requirements under 2 U.S.C. 1503 (Exclusions) which states that UMRA "shall not apply to any provision in a bill, joint resolution, amendment, motion, or conference report before Congress and any provision in a proposed or final Federal regulation that is necessary for the national security or the ratification or implementation of international treaty obligations."[6]

Federal agencies are also required to consider whether the regulation will result in a significant energy action as required by EO 13211, entitled "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use." The interim final rule will not have a significant adverse effect on the supply, distribution, and use of energy. The interim final rule will not affect fuel supply or production and will require little additional energy use.

KEY SOURCES OF UNCERTAINTY

Our estimates of the total costs and welfare losses to importers and carriers and the benefits of the final regulation are subject to substantial uncertainty. Below, we describe the key issues. More complete discussions of uncertainty are provided at the conclusion of each chapter. Also, we provide the results of a quantitative uncertainty analysis in Appendix C.

- **The identification, characterization, and quantification of unique importers, carriers, shipment, and vessel trips affected by this rule.** As described in Chapter 3, we analyze data extracted from the Vessel Automated Manifest System (Vessel AMS) and the Port Import Export Reporting Service (PIERS) databases in order to determine the baseline number and characteristics of entities (importers and carriers), shipments, and vessel trips affected by this rule. The key source of uncertainty is reporting error in the database, which includes misspelled importer and vessel names, missing bill of lading (BOL) numbers, missing wholesale values, and unrealistically high and low wholesale values. In addition, a number of importers have been redacted from the PIERS database for which we cannot quantify or characterize. Finally, a series of simplifying assumptions are necessary to develop a useful, more complete set of numbers that would allow us to estimate total costs and welfare losses for each year of the analysis period (2009 – 2018). For example, because our PIERS data sample set contains data for only part of the year (96 days), we use various assumptions and factors to approximate the total number of affected importers and shipments for the entire baseline year (2005).
- **The estimated initial, one-time costs for complying with the Importer Security Filing requirements.** We assume an initial cost of $25,000 per importer, based on an estimate provided in a comment to the proposed rule.[7] However, we assume

[6] "Unfunded Mandates Reform Act of 1995 (UMRA)," 2 U.S.C. 1503.

[7] This comment can be reviewed in its entirety at www.regulations.gov. Comment number USCBP-2007-0077-0046. Note that while this comment was submitted by the Chair of the Departmental Advisory Committee on the Commercial Operations of U.S. Customs and Border Protection and Related Homeland Security Functions (COAC), the author submitted it as an individual and not on behalf of COAC.

that the most infrequent importers (i.e., those that import only one shipment per year) would choose not to incur these estimated initial costs, given that they are likely to be much higher than the total value of their imported goods, and would instead seek alternative sources for their goods or cease importing altogether. We assume the costs associated with this switch are de minimis relative to the total costs of this rule. Available data do not allow for development of a more precise estimate of the extent to which importers would actually choose to continue importing (and incur initial costs) or cease importing and of the amount of their applicable initial or cessation costs as a result of this interim final rule.

- **The projected growth in importers and shipments during the 10-year analysis period.** We assume no year-to-year growth in the number of affected importers, given the lack of data to make such projections. We do assume that containerized and non-containerized shipments will grow at an annual rate of 5.4 percent and 1.4 percent, respectively (from the U.S. Army Corps of Engineers (USACOE) study). As discussed in Chapter 3, these growth rates are the best available projections that we could find. The USACOE study was prepared in 2003. Recent economic developments, including the decline of the dollar relative to other currencies, however, would indicate that these projected growth rates might be overly optimistic. However, use of these optimistic growth estimates produces a conservative analysis that most likely overstates the incremental costs.

- **The potential for and magnitude of supply chain delays and associated welfare losses to U.S importers.** For the high cost scenario, we assume a supply chain delay of 2 or 3 days for the first year of the analysis period and 1 day for the subsequent 9 years of the analysis period. The supply chain parties we interviewed as well as public comment to the proposed rule provided estimates of supply chain delays ranging from no delay to as many as 7 days. Because CBP is adopting a "Structured Review and Flexible Enforcement Period" during which CBP will work with the trade following the effective date of the interim final rule to assist them in achieving compliance with minimal disruption, this analysis likely overstates the welfare losses. However, if problems with implementation and compliance occur beyond the first year and importers and suppliers continually experience a delay of more than 1 day to meet the requirements of the interim final rule (or those requirements imposed by their carriers or consolidators), then our analysis may understate welfare losses.

  Furthermore, the economic parameters (developed by Dr. Hummels of Purdue University) by which we estimate welfare losses are based on a sample of traded goods that may be more valuable and time sensitive relative to the universe of imports transported by vessel. As a result, the transfer of these parameters to the shipments that are the focus of this analysis may overstate importers' willingness to pay to receive shipments 1 day earlier. We also assume that the impacts increase proportionately with each additional day of delay. In reality, threshold levels likely exist above which additional delay has little additional impact and below which importers are indifferent to additional time savings. The direction of

bias resulting from this assumption is unknown. Additionally, the analysis does not account for lower-cost compliance options available to some importers, such as changing to another mode of shipping to reduce delay. While imposing costs, the impact is unlikely to be as great as the welfare loss associated with continuing to use ocean transit. Finally, second order effects, where a decrease in trade for imported goods prompts increased demand for domestically produced goods, or decreased domestic production in industries relying on intermediate goods manufactured overseas, has not been accounted for in the analysis.

We assume that potential supply chain delays primarily affect containerized cargo. We did not include other shipments that could be affected by supply chain delays such as bulk or break-bulk cargo. As a result, our analysis may understate welfare losses due to supply chain delays experienced by parties importing non-containerized cargo.

Additionally, to estimate the projected growth in total shipment value, we assume that the value per shipment remains constant throughout the 10-year analysis period and apply the projected annual increase in the number of shipments estimate of 5.4 percent. In other words, we assume that the total value of affected shipments increases at the shipment growth rate of 5.4 percent. If the total value of affected shipments increases at a different rate, then our analysis may understate or overstate welfare losses. In addition, as described in Chapter 3, there is uncertainty in the shipment values provided in the PIERS data as some values appear to be unrealistically high.

Finally, the potential supply chain delays may increase the susceptibility of cargo tampering, theft, damage, or loss while containers await transmittal and CBP approval of security filing data before lading at the foreign port. However, we cannot quantify the increased likelihood or risk, if any, of such tampering, which will vary from container to container and port to port and is based on many factors such as container content, type, condition, location, and routing; existing and planned security measures; and the care and vigilance of the various supply chain parties involved in container handling and transportation. We assume that the supply chain parties will implement the necessary security measures to protect their cargo from the increased risk, if any, of such tampering as a result of the potential delay. Our estimate of the welfare losses using the Hummels parameters that measure the willingness to pay for reducing transit time should generally account for these additional security costs among other delay costs such as inventory carrying and holding costs, depreciation, and storage costs.

- **The types, probabilities, and consequences of the terrorist attacks used to evaluate the benefits of the interim final rule.** Due to the low frequency with which terrorist attacks occur in U.S. territory, significant uncertainty exists regarding the selection of consequence scenarios and the economic valuation of these consequences, the simultaneous threat of multiple types of attacks, the analysis' focus on the interim final rule's ability to reduce the probability of attacks rather than the consequences of those attacks, the baseline probability that

such an attack might occur, and the unquantified ancillary benefits of the interim final rule.

Consequence scenarios: We select the consequence scenarios applied in the break-even analysis based on available literature describing container-related terrorist threats and economic evaluations of the impact of related events. These scenarios may not capture the full range of attack modes or targets affected by the regulation. If the consequences of events prevented by this regulation are smaller than those estimated in the three scenarios, the break-even probability reduction is understated. Conversely, if the consequences of avoided events are larger than estimated in this analysis, then the break-even probability reduction is overstated.

Valuation of consequences: We rely on the cost estimates provided in the available literature for our consequence scenarios. If the total cost of the consequence scenarios is underestimated, then the break-even analysis likely overstates the probability reduction required for the benefits of the regulation to equal the costs of the regulation. In addition, we make no attempt to adjust the costs of certain elements of terrorist attack consequences estimated in the literature, such as the value of fatalities. Adjustments to the available cost estimates could result in increases or decreases in the incremental probabilities estimated in our break-even analysis.

Simultaneous threat of multiple attacks: The break-even analysis compares the consequences of a single attack to the annualized costs of the interim final rule, which only identifies the break-even probability reduction in the risk of one type of attack. In reality, the rule likely affects the risk of multiple types of attacks simultaneously; thus, even if the rule only partially achieved each of the targets in Exhibit ES-1, it might still break even if the sum of the monetized risk-reduction benefits across all events equaled its cost. Ultimately, it is difficult to predict the direction of bias of the results of our break-even analysis without knowing more about the specific types of attack scenarios affected and whether and how the terrorists will shift their focus from one type of attack to another.

Focus on probability rather than consequences: As discussed in Chapter 5, this regulation has the potential to affect both the probability that particular types of attacks will be attempted and successful, as well as the consequences of attacks. For example, if the rule prevents nuclear material from entering the United States via ocean shipments, terrorists may be forced to use weapons with less destructive power. The effect of this focus on probability to the exclusion of changes in consequences is unknown.

Baseline probability unknown: This approach does not provide the decision maker with any information about the baseline probability that these types of attacks will occur. As a result, the decision maker is expected to use his or her judgment to determine whether the break-even risk reductions are feasible. For example, given that no attacks shutting down West Coast ports have occurred, we cannot say whether it is possible that a similar event will be attempted, and

thwarted, by the interim final rule once every 2 years. In other cases where required baseline frequencies may be higher, break-even judgments may be clearer.

Unquantified ancillary benefits: Our interviews with potentially affected entities and supply chain experts suggest that the supply chain clarity provided by implementation of the interim final rule will likely have ancillary benefits to importers, particularly those who currently have little insight into the process. For example, importers will be able to more effectively allocate security resources by identifying points along the supply chain where their cargo is most susceptible to theft. The data may also assist in tracing contraband cargo, such as counterfeit versions of well-known designer goods, manufactured overseas and sold illegally in the United States. At this time, we are unable to quantify or monetize ancillary benefits associated with the interim final rule. To the extent that such benefits exist, our break-even analysis overstates the probability reduction necessary for the benefits of the regulation to equal the costs of the regulation.

CHAPTER 1 | INTRODUCTION AND OVERVIEW

U.S. Customs and Border Protection (CBP) in the U.S. Department of Homeland Security (DHS) is developing regulations governing the security screening of shipments destined to the United States by vessel, requiring additional security filing data elements be submitted to CBP, including up to 10 data elements by importers, and additional data requirements, namely Vessel Stow Plans and Container Status Messages (CSMs), by carriers.[8]

This introductory chapter provides background information on the interim final rule, discussing the need for the rule and summarizing its components. It then describes requirements for the economic analysis of Federal regulations and presents an overview of the analytic approach followed in this report. The subsequent chapters discuss the analytic approach, as well as the results and limitations, in more detail.

NEED FOR THE RULE

A notable threat to global security in the maritime environment today is the potential for terrorists to use the international maritime system to smuggle terrorist weapons, or terrorist operatives, into a targeted country, such as the United States. The exposure from international maritime cargo requires a security strategy to detect, identify, and deter this threat at the earliest point in the international supply chain before the cargo arrives at a seaport in the United States.

Section 203(b) of the Security and Accountability for Every Port Act (SAFE Port Act) of 2006 states that the Secretary of Homeland Security "shall require the electronic transmission to the Department of additional data elements for improved high-risk targeting, including appropriate elements of entry data…to be provided as advanced information with respect to cargo destined for importation into the United States prior to loading of such cargo on vessels at foreign ports." The information required is that which is reasonably necessary to enable high-risk shipments to be identified so as to prevent smuggling and ensure cargo safety and security pursuant to the laws enforced and administered by CBP. In addition, section 343(a) of the Trade Act of 2002 states that the Secretary of Homeland Security "shall promulgate regulations providing for the transmission … of information pertaining to cargo destined for importation into the United States."

[8] CBP is requesting public comment on these regulations, which will be issued as an interim final rule, as well as this revised Regulatory Assessment. For this report, "final rule" or "regulation" shall therefore be taken to mean "interim final rule."

The interim final rule, which was developed by CBP in coordination with the trade, including consultation with the Departmental Advisory Committee on Commercial Operations of U.S. Customs and Border Protection and Related Homeland Security Functions (COAC), represents an important component of DHS's evolving layered strategy for securing the cargo supply chain from terrorist-related activities. The rule is designed to extend security measures out beyond the physical borders of the United States so that domestic ports and borders are not the first line of defense, with the objective of having more and better detailed information about all cargo as close as possible to their ports of lading for departure to the United States. The principal security benefit of the new rule will be more precise identification of at-risk shipments. This information will allow for better targeting and will support a more robust admissibility decision before the cargo arrives in the United States.

SUMMARY OF FINAL RULE

CBP is developing regulations that require the electronic reporting of additional security filing data elements. The interim final rule requires Importer Security Filings, which consist of as many as 10 security filing data elements, 24 hours prior to lading at the foreign port. Exhibit 1-1 summarizes these 10 security filing data elements. For shipments that are classified as Foreign Cargo Remaining on Board (FROB) and "in-bond" as Immediate Exportation (IE) or Transportation and Exportation (T&E) cargo, five security filing data elements would be required. These data elements are summarized in Exhibit 1-2. The specific elements and timing of submittal required for each type of shipment and security filing data element are discussed in detail in Chapter 2. [9]

[9] The interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings (see Chapter 2).

EXHIBIT 1-1 10 SECURITY FILING DATA ELEMENTS GENERALLY REQUIRED FROM IMPORTERS

DATA ELEMENT
Manufacturer (or Supplier)
Seller
Buyer
Ship to Party
Container Stuffing Location
Consolidator (Stuffer)
Importer of Record/Foreign Trade Zone (FTZ) Applicant Identification Number
Consignee Number(s)
Country of Origin
Commodity Harmonized Tariff Schedule of the United States (HTSUS) Number

EXHIBIT 1-2 FIVE SECURITY FILING DATA ELEMENTS REQUIRED FROM OTHER IMPORTERS

DATA ELEMENT
Booking Party
Foreign Port of Unlading
Place of Delivery
Ship to Party
HTSUS Number

CBP's interim final rule requires carriers to submit Vessel Stow Plans and CSMs, as shown in Exhibit 1-3. Receipt of a Vessel Stow Plan would generally be required 48 hours after departure from the last foreign port. Receipt of CSMs would be required for certain events no later than 24 hours after the message is entered into the carrier's equipment tracking system. As discussed in detail in Chapter 2, the carrier requirements for Vessel Stow Plans and CSMs apply only to containerized cargo.

EXHIBIT 1-3 ADDITIONAL CARRIER REQUIREMENTS

REQUIREMENT
Vessel Stow Plan
Container Status Messages

Our analysis evaluates the following four alternatives to consider changes in the filing requirements:

1. **Alternative 1 (the chosen alternative):** Importer Security Filings and Additional Carrier Requirements are required.[10] Bulk cargo is exempt from the Importer Security Filing requirements;
2. **Alternative 2:** Importer Security Filings and Additional Carrier Requirements are required. Bulk cargo is **not** exempt from the Importer Security Filing requirements;
3. **Alternative 3:** Only Importer Security Filings are required. Bulk cargo is exempt from the Importer Security Filing requirements; and
4. **Alternative 4:** Only the Additional Carrier Requirements are required.

[10] For each alternative, the Additional Carrier Requirements apply only to containerized cargo.

REQUIREMENTS AND GUIDELINES FOR REGULATORY ANALYSIS

The following are brief descriptions of a number of Federally published requirements and guidelines to be followed in the course of this regulatory analysis.[11]

EXECUTIVE ORDER 12866

Executive Order 12866 requires Federal agencies to conduct economic analyses of significant regulatory actions as a means to improve regulatory decision making. Significant regulatory actions include those that may "(1) [h]ave an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) [c]reate a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) [m]aterially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) [r]aise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order."[12]

OFFICE OF MANAGEMENT AND BUDGET'S CIRCULAR A-4

Circular A-4 provides guidance to Federal agencies on the development of regulatory analysis as required under section 6(a)(3)(c) of Executive Order 12866. As outlined in the U.S. Office of Management and Budget (OMB) guidance, analyses of these actions should be designed to provide information for decision makers on the potential benefits to society of alternative regulatory and non-regulatory approaches to risk management compared to potential costs, recognizing that not all benefits and costs can be described in monetary or even in quantitative terms. The guidance also focuses on ensuring that decisions are based on the best available scientific, technical, and economic information. The specific topics addressed include determining whether Federal regulation is warranted, examining alternative regulatory and non-regulatory approaches, and assessing the benefits, costs, and other impacts of the alternatives.

SAFE PORT ACT OF 2006

Section 203(c) of the SAFE Port Act states that the Secretary of Homeland Security "shall consider the cost, benefit, and feasibility of A) requiring additional nonmanifest documentation; B) reducing the time period allowed by law for revisions to a container cargo manifest; C) reducing the time period allowed by law for submission of certain elements of entry data, for vessel or cargo; and D) such other actions the Secretary considers beneficial for improving the information relied upon for the Automated

[11] CBP is not required to examine the impact of the interim final rule under the Unfunded Mandates Reform Act of 1995 (UMRA) because this interim final rule falls under an exclusion in the UMRA language. Namely, Section 4.5 states, in part, that "This Act shall not apply to any provision in a bill, joint resolution, amendment, motion, or conference report before Congress and any provision in a proposed or final Federal regulation that is necessary for the national security…" ("Unfunded Mandates Reform Act of 1995." Public Law 104-4. March 22, 1995).

[12] "Executive Order 12866 of September 30, 1993: Regulatory Planning and Review," Federal Register, Vol. 58, No. 190, October 4, 1993, Section 3(f).

Targeting System and any successor targeting system in furthering the security and integrity of the international supply chain."[13]

In addition, the requirements noted above discuss the need for analysis of distributional impacts and equity concerns. Consideration of these types of concerns is also required by several statutes and Executive Orders, including the following:[14]

THE REGULATORY FLEXIBILITY ACT OF 1980, AS AMENDED BY THE SMALL BUSINESS REGULATORY ENFORCEMENT FAIRNESS ACT OF 1996 (RFA/SBREFA)

RFA/SBREFA requires agencies to evaluate the impacts of the reporting, record-keeping, and other compliance requirements imposed on small entities and to consider regulatory alternatives and other measures that can minimize these impacts while accomplishing the stated objectives of the applicable statutes. Analysts may first conduct a screening analysis to determine if effects on small entities are significant. A detailed analysis is not required if the agency can certify that the rule "will not, if promulgated, have a significant economic impact on a substantial number of small entities."[15] If the agency cannot certify the proposed rule, then it must complete an Initial Regulatory Flexibility Analysis (IRFA), consider comments, and complete a Final Regulatory Flexibility Analysis (FRFA).

IMPACTS ON ENERGY SUPPLY, DISTRIBUTION, OR USE

Pursuant to Executive Order 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions."[16] The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."[17] OMB provides guidance for implementing this order that outlines the outcomes that may constitute "a significant adverse effect" of a regulatory action under consideration.

We discuss each of these sets of requirements in more detail later in Chapters 6 and 7 of this report.

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[13] This language, along with some language from the following paragraphs, is derived from the Security and Accountability for Every Port Act (SAFE Port Act) of 2006.

[14] These and other statutes and Executive Orders also include requirements that apply to the regulatory development process (e.g., for consultation with representatives of the groups of concern). The discussion in this section focuses on the requirements for economic analysis.

[15] Regulatory Flexibility Act, U.S.C. 601 et seq.

[16] "Executive Order 13211 of May 18, 2001: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," Federal Register, Vol. 66, No. 98, May 21, 2001, p. 28355.

[17] U.S. Office of Management and Budget, The Executive Office of the President, "Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing EO 13211, M-01-27," July 13, 2001.

GENERAL APPROACH

The analysis described in this report addresses the requirements for regulatory analysis outlined above. In this report, we provide estimates of the incremental costs associated with the interim final rule. We also evaluate our ability to quantify benefits derived from the interim final rule and conduct a "break-even analysis" to characterize the point at which direct benefits equal or exceed costs. We present information on the available data sources we rely upon and the analytic methodologies we employ and discuss the implications of limitations in the analysis. Finally, as required by various statutes and administrative orders, we address the distributional effects of the interim final rule.

The basic steps we undertake in this report include the following:

- **Estimate baseline conditions:** This step involves estimating current and future conditions in the absence of the interim final rule. It requires characterizing current and future shipments to the United States and identifying and characterizing the potentially affected universe of importers and carriers subject to the interim final rule.
- **Predict responses to the new regulations:** The second step in the analysis involves predicting the responses of the regulated community to the new rule. Typically, analysts assume that regulated entities will select the least-cost compliance option.
- **Estimate changes in costs:** The third step is to determine the total incremental (i.e., relative to the baseline) social costs attributable to the new regulations. The conceptually correct approach to estimating these costs includes consideration of market impacts (e.g., decreases in container shipments due to the increased costs). In cases where market effects are likely to be small (like the present interim final rule), however, analysts often simply sum compliance costs.
- **Assess the probability that benefits equal or exceed costs:** The fourth step in an analysis involves assessing the benefits of the new regulation and quantifying and monetizing those benefits to the extent possible. In the absence of quantifiable benefits, the regulatory guidance recommends undertaking a "break-even" analysis to inform decision makers of the magnitude of non-quantified benefits required for the benefits to equal or exceed the costs of the regulation.
- **Assess distributional impacts:** While the previous two steps focus on the net effects of the regulation, decision makers and stakeholders are also interested in the effects of the regulations on specific groups, such as small businesses or governments. As discussed earlier, analyses of these concerns are required by statute and administrative order. These distributional analyses consider the costs and the benefits of the regulations for the groups of concern.

The analysis in the chapters that follow address each of these components in detail. Chapter 2 provides an overview of the shipping industry and the current shipping process. In addition, the requirements of the interim final rule are discussed in detail. Chapter 3 describes our analysis of shipping data and includes our derivation of an estimate of the number of shipments, importers, and carriers. This provides the basis for our estimate of

the baseline scenario (i.e., the current and projected future state of the shipping industry absent the interim final rule).

In Chapter 4, we estimate the direct costs of the interim final rule. In Chapter 5, we assess the potential security benefits of the regulatory alternatives. Chapter 6 presents the regulatory flexibility analysis, and Chapter 7 evaluates the impacts as required by Executive Order 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use."

Although this analysis attempts to mirror the terms and wording of the interim final rule, no attempt is made to precisely replicate the regulatory language and readers are cautioned that the actual finalized regulatory text, not the text of this assessment, is binding.

CHAPTER 2 | CURRENT PRACTICES

To improve high-risk targeting, the U.S. Customs and Border Protection (CBP) in the U.S. Department of Homeland Security (DHS) is developing regulations that require the electronic reporting of additional security filing data elements for cargo destined for the United States. Although ISF Importers, as defined for purposes of these regulations, (or their designated authorized agents) are responsible for transmitting Importer Security Filings, which consist of as many as 10 importer data elements, and carriers are responsible for transmitting Vessel Stow Plans and Container Status Messages (CSMs), this interim final rule would likely affect and require the assistance from, and cooperation of, a broad range of parties involved in the "supply chain," or the logistical process and steps by which goods are shipped from foreign points of origin (e.g., foreign manufacturers and suppliers) to the United States.[18] These parties include importers, exporters, carriers, cargo consolidators, and customs brokers.

To better understand baseline conditions and the extent to which the interim final rule would affect these parties and the supply chain, this chapter describes the general process by which goods are imported by vessel into the United States. We first describe a related regulation called the 24-Hour Advance Vessel Manifest Rule (the "24-Hour Rule"), as we consider current compliance with the requirements of the 24-Hour Rule as part of baseline conditions. We then describe the specific types of cargo affected by the interim final rule, the specific data elements required by CBP to be reported for each of these cargo types, the current rate and future trends in trans-ocean shipments that are likely to be affected, the shipping process, and possible sources within the supply chain from which the additional security filing data elements can be obtained. The findings from this chapter support the development of baseline trends in Chapter 3 and the evaluation of costs associated with complying with the interim final rule in Chapter 4.

24-HOUR ADVANCE VESSEL MANIFEST RULE

Under the 24-Hour Rule, effective as of December 2, 2003, CBP requires ocean carriers to electronically transmit certain manifest information on the contents of cargo destined for the United States.[19] Carriers are required to transmit this information to CBP via the

[18] CBP's interim final rule allows an ISF Importer to designate an authorized agent to file the Importer Security Filing on the importer's behalf. Under the interim final rule, a party can act as an authorized agent for purposes of filing the Importer Security Filing data elements if the party has, or obtains, access to the Automated Broker Interface (ABI) or Vessel Automated Manifest System (Vessel AMS).

[19] A manifest is a document that lists in detail all the bills of lading issued by a carrier or its agent or master for a specific voyage. It is a detailed summary of the total cargo of a vessel (U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/m.html on March 20, 2007).

Vessel Automated Manifest System (Vessel AMS), an electronic cargo inventory control and release notification system, no later than 24 hours before containerized cargo is laden onboard a vessel at a foreign port.[20, 21] The CBP Automated Targeting System (ATS) processes the transmitted cargo manifest information to identify and evaluate the risk of smuggling weapons of mass effect, while, at the same time, enabling CBP to further expedite low-risk shipments following their arrival in the United States. In addition to other information, carriers are required to transmit container numbers and seal numbers for all seals affixed to containers.

The 24-Hour Rule allows CBP officers to analyze container content information and identify potential security threats before the U.S.-bound container is loaded at the foreign seaport, rather than after it arrives in a U.S. port. Low-risk and 24-Hour Rule compliant containers are released to be laden onto the vessel. High-risk and 24-Hour Rule non-compliant containers are placed on hold and may be subject to additional security procedures including additional inquiry, non-intrusive inspection (e.g., x-rays), and unloading and physical inspection. Lading may resume after CBP has cleared the container. Carriers that disregard these messages may be denied permission to unlade at U.S. ports. Moreover, if the carrier fails to submit data via Vessel AMS to CBP 24 hours or more prior to lading or if there is any other security risk with the cargo, CBP can deny the carrier permission to unlade at U.S. ports.

To improve the targeting currently done in ATS, CBP is requiring the reporting and transmittal of additional security filing data (Importer Security Filings, Vessel Stow Plans, and CSMs) evaluated in this report. These data will help identify the entities involved in the supply chain, identify the entities' locations, as well as corroborate and provide potentially more precise descriptions of the goods being shipped to the United States.[22] These data will also significantly enhance the risk assessment process by enabling CBP to more efficiently separate higher-risk shipments from lower-risk shipments that should be afforded more rapid release decisions. In addition, these

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Required manifest data includes bill of lading number, foreign port prior to depart to United States, Standard Carrier Abbreviation Code (SCAC), carrier assigned voyage number, date of arrival at first U.S. port, U.S. port of unlading, quantity, unit measure of quantity, first foreign place of receipt, commodity description (e.g., Harmonized Tariff Schedule of the United States (HTSUS) number), commodity weight, shipper name, shipper address, consignee name, consignee address, vessel name, vessel country, vessel number, foreign port of lading, hazmat code, container numbers, seal numbers, date of departure from foreign port, and time of departure from foreign port (U.S. Customs and Border Protection, "Data Elements Comparison," Annex B of *CBP Proposal for Advance Trade Data Elements ("10+2 Strawman")*, 2007).

[20] Carriers are required to transmit advance manifest information for approved break-bulk and bulk cargo no later than 24 hours prior to arrival in the United States.

[21] Vessel AMS is a "multi-modular cargo inventory control and release notification system for sea, air, and rail carriers. AMS speeds the flow of cargo and entry processing and provides participants with electronic authorization to move cargo prior to arrival." U.S. Customs and Border Protection, *AMS Benefits for the Trade and Participants,* as viewed at http://www.cbp.gov/xp/cgov/import/opreations_support/automated_systems/ams/benefits_participants.xml on June 3, 2007.

[22] U.S. Customs and Border Protection, *CBP Proposal for Advance Trade Data Elements*, 2007, pp. 2-3. Also known as the "10+2 Strawman."

additional data elements will enable CBP to make critical decisions during and immediately after elevated alert levels when business resumption is essential to the well being and security of the U.S. economy.

CARGO TYPES

This section describes the various types of cargo shipped from foreign ports to the United States, namely containerized and non-containerized cargo.[23] Upon arrival at a U.S. port, these shipments are also categorized according to their disposition (e.g., transshipped to other destinations within and outside the United States, in-bond cargo). For each of these various types of cargo and shipments arriving within the limits of a port in the United States, we summarize the specific requirements of the interim final rule.

CONTAINERIZED AND NON-CONTAINERIZED CARGO

There are two main cargo types: 1) containerized cargo, and 2) non-containerized cargo. The majority of ocean cargo is containerized, or carried in sealed metal containers.[24] These containers come in standard sizes (typically 20 feet, 40 feet, and 45 feet in length) and may include specialized technologies such as refrigeration units for chilled and frozen foods, or internal hanger systems for carrying garments. The standard measure of the volume of containerized cargo is a "TEU" (20-foot equivalent unit). One 40-foot long container of cargo, which is the most common size in U.S. trade, is counted as 2 TEUs of cargo. The World Shipping Council estimated that 13 million containers with an overall capacity of approximately 20 million TEUs were in circulation worldwide at the beginning of 2005. In 2004, more than 23.5 million TEUs of containerized cargo were imported into or exported from the United States.

Non-containerized cargo includes: 1) bulk cargo; 2) break-bulk cargo; and 3) roll-on/roll-off cargo (Ro-Ro). These cargo classifications are defined below.

- **Bulk Cargo –** Homogenous cargo that is stowed loose in the hold and is not enclosed in any container such as a box, bale, bag, cask, or the like. Such cargo is also described as bulk freight. Specifically, bulk cargo is composed of either:
    1) Free flowing articles such as oil, grain, coal, ore, and the like, which can be pumped or run through a chute or handled by dumping; or
    2) Articles that require mechanical handling such as bricks, pig iron, lumber, steel beams, and the like.
- **Break-Bulk Cargo –** Cargo that is not containerized, but which is otherwise packaged or bundled.

[23] Cargo refers to "freight loaded into a ship" (U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/c.html on March 20, 2007).

[24] Unless noted otherwise, all information from this paragraph is from the World Shipping Council, *Liner Shipping: Facts and Figures*, as viewed at http://www.worldshipping.org/liner_shipping-facts&figures.pdf on March 14, 2007.

- **Roll-on/Roll-off (Ro-Ro) Cargo** – Cargo that can be driven on and off the vessel, such as automobiles, buses, trucks, construction vehicles, and cargo mounted on trailers.

TRANSSHIPPED AND IN-BOND CARGO

Upon arrival at a U.S. port-of-entry (POE), containerized and non-containerized cargo are further classified depending on whether they are subsequently being transshipped (i.e., being transferred from one mode of transportation to another, or from one vessel to another, to travel to other foreign or U.S. destinations) and whether they are subsequently being transported "in-bond" (i.e., being transported under customs control where duty has not been paid).[25, 26] Classifications of interest in this analysis include:

- **Conventional -** Cargo is entered at the U.S. POE (i.e., customs documents required to clear import shipment for entry into general commerce and associated duties are filed and paid);[27]
- **Immediate Transport (IT) -** Cargo that is destined for another location in the United States. Shipment proceeds in-bond from the U.S. POE to customs clearing at the destination (port-of-discharge). Also called an "In-Transit" entry;[28]
- **Immediate Exportation (IE) -** Cargo that is immediately transferred to another vessel at the U.S. POE and re-exported to another country without payment of duty;[29]
- **Transportation and Exportation (T&E) –** Cargo that will subsequently be transported in-bond through the United States (e.g., via truck or rail) to be exported from another U.S. port to another country (e.g., Canada or Mexico), without payment of duty;[30]
- **Foreign Cargo Remaining on Board (FROB) -** Cargo remaining on board a ship that will subsequently be transported to another foreign port;[31]

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[25] POE is the location where cargo is unloaded from the ocean vessel and physically enters a country (U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/p.html on March 20, 2007).

[26] U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/i.html on March 20, 2007.

[27] Personal communication with U.S. Customs and Border Protection, Department of Homeland Security, on January 12, 2007.

[28] U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/i.html on March 20, 2007.

[29] U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/i.html on March 20, 2007.

[30] U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/t.html on March 20, 2007.

[31] Personal communication with Office of International Trade, U.S. Customs and Border Protection, Department of Homeland Security, on March 20, 2007.

- **Foreign Trade Zone (FTZ) –** Foreign merchandise, except that which is prohibited, that will be stored in a restricted area at the U.S. port-of-entry without being subject to import duty regulations;[32]
- **Instruments of International Traffic –** empty containers, racks, pallets, International Organization for Standardization (ISO) containers, and the like.[33]

REQUIREMENTS OF THE INTERIM FINAL RULE

Exhibits 2-1 and 2-2 present the Importer Security Filing requirements for each of the cargo types discussed above. Exhibit 2-3 presents the carrier requirements. Our analysis evaluates the following four alternatives to consider changes in the final security filing requirements:

1. **Alternative 1 (the chosen alternative):** Importer Security Filings and Additional Carrier Requirements are required.[34] Bulk cargo is exempt from the Importer Security Filing requirements;
2. **Alternative 2:** Importer Security Filings and Additional Carrier Requirements are required. Bulk cargo is **not** exempt from the Importer Security Filing requirements;
3. **Alternative 3:** Only Importer Security Filings are required. Bulk cargo is exempt from the Importer Security Filing requirements; and
4. **Alternative 4:** Only the Additional Carrier Requirements are required.

As shown in Exhibits 2-1 and 2-2, the interim final rule requires ISF Importers to submit data elements for all foreign waterborne shipments except bulk cargo (Alternatives 1 and 3) and instruments of international traffic. Ro-Ro cargo is treated as break-bulk cargo. Alternative 2 assumes that eight importer data elements are required for bulk cargo.

The interim final rule requires five importer data elements for IE and T&E in-bond cargo, which is to be filed by the party filing the IE or T&E documentation with CBP. The interim final rule requires the same five importer data elements for FROB, which is to be filed by the international carrier of the vessel arriving in the United States.

The interim final rule also provides for a 12-month "Structured Review and Flexible Enforcement Period" to allow the trade sufficient time to adjust to the new requirements and in consideration of the business process changes that may be necessary to achieve full compliance. During this period, CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the

[32] U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/f.html on March 20, 2007.

[33] Personal communication with U.S. Customs and Border Protection, Department of Homeland Security, on January 12, 2007.

[34] For each alternative, the Additional Carrier Requirements apply only to containerized cargo.

rule provides flexibility with respect to the required timing of submittal for and interpretation of certain Importer Security Filing data elements. In addition, CBP will conduct a structured review of the elements, including an evaluation of any specific compliance difficulties that the trade may be encountering with respect to these elements. This flexibility falls into two categories:

1. Two elements of the Importer Security Filings will be subject to flexibility as to timing. These elements are the 1) Container stuffing location and 2) Consolidator (stuffer); and

2. Four elements will be subject to flexibility as to interpretation. These elements are the 1) Manufacturer (or supplier), 2) Ship to party, 3) Country of origin, and 4) Commodity Harmonized Tariff Schedule of the United States (HTSUS) number. There is no special timing flexibility for these elements; they must be filed 24 hours prior to lading. However, CBP has added flexibility by allowing ISF Importers, in their initial filing, to provide a range of acceptable responses based on facts available to the importer at the time, in lieu of a single specific response (which may become known to the importer only at a later time). ISF importers will be required to update their filings with respect to these elements as soon as more precise or more accurate information is available, in no event later than 24 hours prior to arrival at a U.S. port (or upon lading at the foreign port if that is later than 24 hours prior to arrival in a U.S. port).

Finally, under the interim final rule, the party who filed the Importer Security Filing is required to update the Importer Security Filing if, after the filing and before the goods arrive within the limits of a port in the United States, there are changes to the information filed or more accurate information becomes available.

As shown in Exhibit 2-3, the carrier requirements for Vessel Stow Plans and CSMs apply only to containerized cargo.

EXHIBIT 2-1 IMPORTER SECURITY FILING REQUIREMENTS FOR CONTAINER, BULK, AND BREAK-BULK CARGO

CARGO TYPE	RESPONSIBLE PARTY	REQUIRED DATA ELEMENTS	TIME OF FILING	NOTES
Importer Security Filing Requirements				
Container	Owner, purchaser, consignee, or agent such as a licensed customs broker	8 importer data elements	No later than 24 hours prior to lading at the foreign port	The 8 importer data elements are: 1) Manufacturer, 2) Seller, 3) Buyer, 4) Ship to party, 5) Importer of record number, 6) Consignee number, 7) Country of origin, and 8) Commodity Harmonized Tariff Schedule of the United States (HTSUS) number. [1]
	Owner, purchaser, consignee, or agent such as a licensed customs broker	2 importer data elements	As early as possible, and in any event no later than 24 hours prior to arrival in a U.S. port (or upon lading at the foreign port if that is later than 24 hours prior to arrival in a U.S. port)	The 2 importer data elements are: 1) Container stuffing location and 2) Consolidator (stuffer). [1]
Bulk	Owner, purchaser, consignee, or agent such as a licensed customs broker	**Alternative 1 (the chosen alternative) and Alternative 3:** None required (exempt) **Alternative 2:** Eight importer data elements (Container stuffing location and Consolidator (stuffer) not required)	**Alternative 1 (the chosen alternative) and Alternative 3:** Not applicable (exempt) **Alternative 2:** No later than 24 hours prior to arrival in the United States	
Break-Bulk and Ro-Ro	Owner, purchaser, consignee, or agent such as a licensed customs broker	10 importer data elements For Container stuffing location, the name and addresses of the physical locations where the goods were made "ship ready" must be provided. For Consolidator (stuffer), the name and address of the party who made the goods "ship ready" or the party who arranged for the goods to be made "ship ready" must be provided.	No later than 24 hours prior to lading at the foreign port	Importer Security Filings for break-bulk cargo may be filed with CBP no later than 24 hours prior to *arrival in the United States* provided the goods are exempt from the requirement that the carrier file the cargo declaration (manifest information via Vessel AMS) 24 hours prior to loading. According to the 24-Hour Rule, in order to obtain this exemption, the carrier must apply for an exemption submitted to and approved by CBP (U.S. Code of Federal Regulations, Title 19, Part 4, § 4.7 (b)(4)).

Note:
[1] As discussed previously, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings.

EXHIBIT 2-2 IMPORTER SECURITY FILING REQUIREMENTS FOR TRANSSHIPPED AND IN-BOND CARGO

CARGO TYPE	RESPONSIBLE PARTY	REQUIRED DATA ELEMENTS	TIME OF FILING	NOTES
Importer Security Filing Requirements				
Conventional	Owner, purchaser, consignee, or agent such as a licensed customs broker	8 importer data elements	No later than 24 hours prior to lading at the foreign port	The 8 importer data elements are: 1) Manufacturer, 2) Seller, 3) Buyer, 4) Ship to party, 5) Importer of record number, 6) Consignee number, 7) Country of origin, and 8) Commodity Harmonized Tariff Schedule of the United States (HTSUS) number. [1]
	Owner, purchaser, consignee, or agent such as a licensed customs broker	2 importer data elements	As early as possible, and in any event no later than 24 hours prior to arrival in a U.S. port (or upon lading at the foreign port if that is later than 24 hours prior to arrival in a U.S. port)	The 2 importer data elements are: 1) Container stuffing location and 2) Consolidator (stuffer). [1]
Immediate Transportation (IT)	Owner, purchaser, consignee, or agent such as a licensed customs broker	Same as conventional	Same as conventional	
Immediate Exportation (IE)	Party filing the IE documentation with CBP	Five importer data elements	Same as conventional	The five importer data elements are: 1) Booking party, 2) Foreign port of unlading, 3) Place of delivery, 4) Ship to party, and 5) Commodity HTSUS number. [1]
Transportation and Exportation (T&E)	Party filing the T&E documentation with CBP	Same as IE	Same as conventional	
Foreign Cargo Remaining on Board (FROB)	International carrier of the vessel arriving in the United States	Same as IE	Any time prior to lading at the foreign port	
Foreign Trade Zone (FTZ)	Party filing the FTZ documentation with CBP (e.g., FTZ operator)	Same as conventional	Same as conventional	
Instruments of International Traffic	Not applicable	None required	Not applicable	

Note:

[1] As discussed previously, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings.

EXHIBIT 2-3 CARRIER REQUIREMENTS

CARGO TYPE	RESPONSIBLE PARTY	REQUIREMENT	TIME OF FILING	NOTES
Carrier Requirements				
Container	Carrier	Vessel Stow Plan	No later than 48 hours after departure from the last foreign port or for voyages less than 48 hours in duration, prior to arrival at the first U.S. port	Vessel Stow Plan requirements do not apply to vessels carrying exclusively bulk or break-bulk and Ro-Ro cargo.
Container	Carrier	Container Status Messages (CSMs)	No later than 24 hours after the message is entered into the carrier's equipment tracking system	Under the interim final rule, carriers must submit a CSM when any of the required events occurs if the carrier creates or collects a CSM in its equipment tracking system reporting that event.[1] The interim final rule would not require a carrier to create or collect any CSM data other than that which the carrier already creates or collects on its own and maintains in its electronic equipment tracking system. The interim final rule lists a total of nine events. Carriers may submit CSMs other than for the required events and carriers may submit CSMs for non-U.S. bound containers.

Note:
[1] Based on the interim final rule CSM requirements apply only to those carriers that already collect and maintain CSM data in their electronic equipment tracking systems.

SHIPPING TRENDS

This section discusses the current rate and future trends in shipments imported into the United States by vessel that would be affected by the interim final rule.

CURRENT SHIPPING VOLUME

Today, nearly 20 percent of world trade involves imports to or exports from the United States.[35] In 2002, approximately 202,800 U.S. importers received goods from more than 178,200 foreign exporters by ship.

By weight, almost 909 million metric tons of waterborne foreign trade were imported into the United States in 2005, down 1.4 percent from 2004 but up 9.1 percent from 2003.[36] Exhibit 2-4 summarizes the historic rates of imports to the United States by vessel obtained from the U.S. Department of Transportation Maritime Administration (MARAD). Of this amount, 122.8 million metric tons of containerized cargo (or 17.3 million TEUs) were imported into the United Stated in 2005, up approximately 9 percent from 2004 and up approximately 25 percent from 2003. By weight (metric tons), the top exporters of *all* waterborne foreign import trade into the United States are Mexico (10.7 percent), Canada (9.2 percent), Venezuela (8.7 percent), and China (6.1 percent). By weight (metric tons), the top exporters of *containerized* waterborne foreign import trade into the United States are China (34.3 percent), Brazil (4.7 percent), Japan (4.5 percent), and Italy (3.8 percent). By volume (TEUs), the top exporters of *containerized* waterborne foreign import trade into the United States are China (42.7 percent), Japan (4.8 percent), and Hong Kong (4.8 percent).

[35] Unless noted otherwise, all information from this paragraph is from the World Shipping Council, *Liner Shipping: Facts and Figures*, as viewed at http://www.worldshipping.org/liner_shipping-facts&figures.pdf on March 14, 2007.

[36] Unless noted otherwise, all information from this paragraph is from tables entitled *Trade Statistics*, U.S. Department of Transportation Maritime Administration (MARAD), as viewed at http://www.marad.dot.gov/Marad%5FStatistics/index.html on March 15, 2007.

EXHIBIT 2-4 RATES OF WATERBORNE IMPORTS TO THE UNITED STATES, 1997 TO 2005

YEAR	TOTAL IMPORTS (METRIC TONS)	PERCENT CHANGE	TOTAL CONTAINER IMPORTS (METRIC TONS)	PERCENT CHANGE	TOTAL CONTAINER IMPORTS (TEUS)	PERCENT CHANGE
HISTORIC RATES OF WATERBORNE IMPORTS TO THE UNITED STATES, 1997 - 2005						
1997	685,214,156		59,639,000		7,787,430	
1998	764,549,976	11.6%	67,137,000	12.6%	8,919,223	14.5%
1999	790,896,121	3.4%	74,635,000	11.2%	9,960,465	11.7%
2000	834,604,936	5.5%	81,288,000	8.9%	11,086,604	11.3%
2001	849,983,948	1.8%	80,725,000	-0.7%	11,268,347	1.6%
2002	791,306,352	-6.9%	91,925,000	13.9%	12,915,512	14.6%
2003	832,765,456	5.2%	98,114,000	6.7%	13,899,132	7.6%
2004	922,016,808	10.7%	112,863,000	15.0%	15,805,478	13.7%
2005	908,840,066	-1.4%	122,846,000	8.8%	17,290,350	9.4%
Average Year-to-Year Percent Change		3.8%		9.6%		10.6%
Annualized Growth Rate (1997 – 2005)		3.6%		9.5%		10.5%

Source: Tables entitled *Trade Statistics*, U.S. Department of Transportation Maritime Administration (MARAD), as viewed at http://www.marad.dot.gov/Marad%5FStatistics/index.html on March 15, 2007.

FUTURE TRENDS

As shown in Exhibit 2-4, cargo imports to the United States by vessel (by weight) increased at an annualized rate of approximately 4 percent per year from 1997 through 2005. During the same period, imported containerized cargo increased at an annualized rate of approximately 10 percent per year by weight (metric tons) and 11 percent per year by volume (TEUs). As countries relax trade barriers, the cost of exporting and importing goods declines, and the result is a net increase in trade. A 2002 study concluded that trans-Atlantic shipping would increase by an average of 4.2 percent each year between 2003 and 2008.[37] Similarly, trans-Pacific trade is undergoing rapid growth—exports from China, the source of more than one-third of the containerized imports to the United States, have experienced double-digit growth over the past few years.[38]

The increase in demand for container shipping has resulted in a critical shortage of container ships as the demand for shipping exceeds the carrying capacity of the worldwide fleet. Moreover, many shipping companies are unable to expand their

[37] Clancy, B., MergeGlobal Freight Transport Economics and Strategy, "Trans-Atlantic Market Outlook," *Journal of Commerce Trans-Atlantic Maritime Conference*, Short Hills, NJ, May 17-18, 2004.

[38] Chen, Y., "What Will Result from Rising Chinese Export Prices?," *Global Insight*, as viewed at http://www.globalinsight.com/PerspectiveDetail1390.htm on January 9, 2005.

capacity to take advantage of the demand for container shipping in the short run due to the limited capacity of adequately-sized ships available on the charter market.[39]

Another result of growth in container trade has been severe congestion at many world ports. For example, the ports at Los Angeles and Long Beach, the two largest ports in the United States, are so congested that vessels have been delayed a full week before unloading goods at the docks.[40] These delays, which can cost a carrier up to $300,000 per delay, are primarily the result of large volumes of imported Chinese goods. Similar delays affect foreign ports, leading to increased emphasis on decreasing the amount of time that containers sit at the port (i.e., "dwell time").

Despite the increase in charter rates and unloading delays, the shipping industry has had record performances in recent years. With demand for shipping exceeding supply, carriers have been able to raise their freight rates to more than recoup the increased operating costs associated with increased charter rates.[41] Freight rates rose by nearly one-third in 4 years to a peak in the third quarter of 2005 (approximately $1,525 per TEU), which led to a splurge in orders for new, larger ships; however, as new ships became operational, freight rates subsequently decreased by 8 percent to approximately $1,400 per TEU in the fourth quarter of 2006 compared to a year earlier.[42]

GENERAL SHIPPING PROCESS

This section provides a general overview of the process by which shipments are administered, arranged for transport, and transported by vessel to the United States.

The trans-ocean shipment of goods into the United States is just one step in a series of interrelated actions necessary to deliver a good from its foreign origin to the ultimate customer or "consignee." This process is characterized as the "supply-chain" and "consists of all parties involved, directly or indirectly, in fulfilling a customer request."[43] These entities include manufacturers, suppliers, carriers, warehousers, retailers, and the ultimate customer. A supply chain is dynamic, as the various entities must interact regarding timing, amounts, and other aspects of product delivery, to assure economical delivery of goods to the consumer. The ultimate goal is to maximize the value that the supply chain produces; that is, the difference between what the customer is willing to pay and the cost of getting goods to the customer.

[39] Barnard, B. "Carriers Face Critical Shortage of Box Ships," *Journal of Commerce Online*, December 23, 2004.

[40] Strom, S., "Port Chases New Business as Cargo Logjam Worsens," *The Business Journal of Portland*, November 19, 2004.

[41] ShipEcon.com, "Reach for the Sky," December 1, 2004.

[42] "The Coming Generation of Giant Ships Cuts Costs, but Creates New Problems," *The Economist*, March 1, 2007.

[43] Chopra, S., and P. Meindl, *Supply Chain Management: Strategy, Planning and Operation*, Second Edition, Pearson Prentice Hall, 2004, pp. 4-6.

Management of supply-chain processes for a firm is complex and is the subject of numerous texts and articles.[44] The overall approach is dependent upon a firm's business and competitive strategy, the nature of the competition it faces, and various internal constraints. Within this context, a firm must determine where and how it will obtain the raw, intermediate, or finished goods that it will sell to its customers and how it will get these goods to the customers. In addition, the firm must decide how much to order at any one time, taking into account customer demand, costs (including inventory carrying costs), and uncertainties.

INVOLVED PARTIES

There are typically, as a result of specialization, a number of parties involved in the procurement and subsequent transportation of a bill of goods between two points. These parties may be roughly divided into three groups: 1) those parties involved in the order and manufacture of goods, 2) those parties involved in the preparation and arrangement of goods for shipment, and 3) those parties involved in the shipment and customs clearance of goods from the foreign port to the United States. This section will detail the parties involved in a typical transaction.[45]

Order and Manufacture of Goods

The typical import transaction is initiated by a purchase order from the buyer to the seller, which includes information on the buyer, seller, goods to be purchased and imported, and shipping name and address. The seller could be the manufacturer or a third-party supplier of the goods being ordered (e.g., wholesaler, distributor, reseller). This transaction may be conducted between two U.S. parties, between two foreign parties, or between a U.S. and a foreign party. Once the goods are packed and shipped, the seller issues a commercial invoice requesting or confirming payment.

Preparation and Arrangement for Shipment

As the order is being filled, arrangements are made by the buyer or seller to transport the shipment from the manufacturer or supplier to a ship. The buyer or seller can arrange transport and shipment directly with the carrier or shipping line, also known as a Vessel Operating Common Carrier (VOCC), which owns the vessel on which the goods will be shipped. In this situation, the VOCC sends the shipper an empty container that is to be stuffed with the goods, transports the stuffed container to the port, and issues a "regular" bill of lading (BOL), which lists the manufacturer or supplier as the "shipper."[46]

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[44] One often cited text is Chopra, S. and P. Meindl, *Supply Chain Management: Strategy, Planning and Operation*, Second Edition, Pearson Prentice Hall, 2004. A more basic description is presented in Hugos, M., *Essentials of Supply Chain Management*, John Wiley & Sons, 2003. See also Frazelle, E.H., *Supply Chain Strategy*, McGraw Hill, 2002.

[45] It is important to note that while we discuss the general shipping process, there is, in fact, no uniform process and, therefore, each of the steps and parties discussed may not be an element of every transaction.

[46] Personal communication with Office of International Trade, U.S. Customs and Border Protection, Department of Homeland Security, on March 8, 2007.

A shipper is the person or company who is usually the supplier or owner of commodities shipped, also called Consignor (U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/s.html on March 20, 2007).

Buyers and sellers can also hire freight forwarders and Non-Vessel Operating Common Carriers (NVOCCs), known collectively as "cargo consolidators," as well as third party logistics providers to collect, transport, and arrange shipment of the goods.[47] Cargo consolidators buy space from an ocean carrier or VOCC and subsell it to smaller shippers. For logistical and economical reasons, they may collect and consolidate multiple shipments from multiple shippers into a single consolidated shipment.[48] In this situation, the consolidator books a container with a carrier, stuffs the container with shipments received from various shippers while documenting its contents, seals the container, and delivers the container to the VOCC for lading. At the time of booking, the VOCC issues a unique "master" BOL number to the consolidator, which designates the consolidator as the "shipper" for all of the consolidated shipments that are to be stuffed in the container.[49] Consolidators use this process to effectively conceal the identities of their shipping customers from the VOCCs.[50] The booking also provides applicable documentation and cargo receipt cut-off dates for the specified port of lading and vessel. The consolidator issues a "house" BOL for each individual shipment in the container, which lists the corresponding manufacturer or supplier as the shipper. After the container is stuffed, sealed, and declared "ship-ready," the consolidator then issues shipping instructions and provides manifest information covering all applicable house bills of lading to the VOCC.

To comply with the 24-Hour Rule, NVOCCs and VOCCs then submit their manifest information via Vessel AMS to CBP no later than 24 hours prior to lading. CBP's ATS then processes this information, using the master BOL number as the common link to match and evaluate manifest data provided at the master BOL and house BOL levels.[51]

A bill of lading is a document that establishes the terms of a contract between a shipper and a transportation company. It serves as a document of title, a contract of carriage, and a receipt for goods (U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/b.html on March 20, 2007).

[47] A NVOCC is a common carrier that does not operate the vessels by which the ocean transportation is provided and is a shipper in its relationship with a VOCC. NVOCCs licensed or registered with the Federal Maritime Commission and in possession of an International Carrier Bond are permitted to electronically transmit manifest information directly to CBP via the Vessel Automated Manifest System (Vessel AMS) to comply with the 24-Hour Rule. Freight forwarders are not considered NVOCCs (U.S. Code of Federal Regulations, Title 19, Part 4, § 4.7 (b)).

[48] In addition, a consolidator can consolidate one or more shipments received from one or more consolidators (known as "co-loading") (Personal communication with Cynthia D. (Jerome) Allen, Argents Air Express, Ltd., on March 21, 2007).

[49] Alternatively, the consolidator can select one of the pre-assigned master BOL numbers issued by a VOCC.

[50] Personal communication with Office of Field Operations, U.S. Customs and Border Protection, Department of Homeland Security, on March 8, 2007.

[51] For the Importer Security Filings required by the interim final rule, CBP is allowing one Importer Security Filing to satisfy multiple bills of lading covering one shipment to one importer of record. For purposes of our analysis, we assume one Importer Security Filing for each regular or house BOL. As discussed in Chapter 4, this assumption will overstate the number of Importer Security Filings.

Additionally, a regular or house BOL can cover one or more commodities (Personal communication with Office of International Trade, U.S. Customs and Border Protection, Department of Homeland Security, on March 8, 2007).

The VOCCs typically issue complete master BOL documents to the shippers near or shortly after the time of vessel departure.

In addition, the shippers (individual shippers or consolidators) typically issue advance shipping notices, which is an electronic packing list that may also include information on vessel and date of sailing. These notices serve as notification to the shippers' customers that the goods have been shipped.

Finally, a marine terminal operator (MTO), charged with operation of the maritime port, transfers the goods onto the carrier vessel. The MTO or VOCC then prepares a stow plan which depicts the location, size, and type of cargo and each container laden on the vessel. This plan is developed to ensure that the vessel is properly loaded for concerns such as weight and balance before sailing. It is shared with MTOs at intermediate and arrival ports to facilitate the handling of cargo upon arrival.

Shipment and Customs Clearance of Goods

Once the transfer has been completed, the carrier transports the goods from the foreign port to the U.S. port. Ships may make several stops before arriving at a U.S. port. For example, on Maersk Line's "Fareast Middle East Service" tradelane, the ship *Karen Maersk* (Voyage No. 0704) left Singapore on March 20, 2007, and made stops in Laem Chabang, Thailand; Shekou, Yantian, and Xiamen, China; and Kaohsiung, Taiwan; before arriving in Los Angeles three weeks later on April 10.[52] The vessel subsequently left Los Angeles on April 13, presumably with foreign destined FROB, and arrived in Vancouver, Canada, on April 15.

Upon arrival at the U.S. port, the goods are unloaded by the MTO and are either transshipped to other destinations or cleared for entry into the general commerce by CBP. Customs House Brokers (CHBs) are typically retained by importers to prepare, file, and pay the appropriate customs entry forms (entries) and duties. Maersk schedules show inland transit times after arrival at the U.S. port. After a 21-day trip from Singapore, goods arriving at Los Angeles, for example, may take 6 additional days to arrive in Chicago, and 14 days to arrive in Memphis.[53]

Container Status Messages

Carriers or VOCCs largely manage and provision the containers used in intermodal containerized shipping.[54] Typically, carriers lease containers from large equipment leasing pools. The leases require that the carriers know the equipment's location at all times. For this and logistical reasons, carriers as well as MTOs, container owners/lessors, and end recipients/consignees use Container Status Messages (CSMs) to track and manage the movement of cargo containers. CSMs are generated every time there is an

[52] Maersk Line, *Fareast Middle East Service*, as viewed at http://www.maerskline.com/frameset.jsp?app=schedules.directservices on April 18, 2007.

[53] Maersk Line, *Transpacific 9 Service (TP9), Eastbound*, as viewed at http://www.maerskline-usa.com/advertising/sailing%20schedules/Transpacific_Overview_IB.pdf on April 18, 2007.

[54] Unless noted otherwise, all information from this paragraph is from personal communication with Office of Field Operations, U.S. Customs and Border Protection, Department of Homeland Security, on March 13, 2007.

"event" to report regarding a container. Each CSM reports the event, status (e.g., empty or full), and event location. Examples of events include a particular container being provisioned empty for stuffing, entering full to the port of lading, being loaded on a vessel, being off-loaded and reloaded for transshipment, being off-loaded at the port of discharge, exiting the port full for deconsolidation or "devanning", and returning empty to the port for further use. CSMs are transmitted electronically using one of two basic standards, the American National Standards Institute (ANSI) X.12 standard or the United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport (UN EDIFACT) standard.

SOURCES OF SECURITY FILING DATA ELEMENTS FOR IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS

This section discusses the potential sources from which the required security filing data elements for Importer Security Filings and the Additional Carrier Requirements (Vessel Stow Plans and CSMs) could be obtained. These sources primarily include the documentation that supply chain parties typically prepare to purchase, ship, and enter imported goods into the United States. This discussion helps us identify the incremental measures that importers and carriers will take to meet the requirements of the interim final rule.

In general, the information relating to the required security filing data elements is available, even routinely reported; however, the gathering, processing, and electronic transmittal of these additional security filing elements to meet the specific content and timing requirements of the interim final rule will likely require ISF Importers (or their designated authorized agents) and carriers to adjust their business systems and processes. For example, certain computer systems and documentation processes may have to be reprogrammed or redesigned in order to retrieve and produce the required data elements from points earlier in the supply chain. Additional reprogramming may also be necessary in order to transmit the data via CBP-approved EDI (Electronic Data Interface) systems such as Vessel AMS or ABI.

Importer Data Elements

Information relating to the security filing data elements is available from parties and documentation typically involved in the purchase, shipping, and entry of imported goods into the United States. This documentation includes purchase orders from buyers to sellers, commercial invoices from sellers to buyers, shipping notices from shippers to their customers, and customs entry forms (entries) filed by importers or their brokers (e.g., CBP Forms 3461 and 7501). Exhibit 2-5 summarizes the potential sources of this information.

As discussed previously, purchase orders typically initiate the import process. Shippers issue shipping notices to their customers when the goods are packed and shipped. Sellers issue commercial invoices upon receipt of the purchase order and after the goods are packed and shipped. As shown in Exhibit 2-5, it appears that information relating to all of the importer data elements is available from these three types of documents.

Other sources of information relating to the importer data elements include the ship booking and the manifest data required by the 24-Hour Rule. As shown in Exhibit 2-5,

the ship booking contains information on the name and address of the recipient of the goods, container stuffing location, and consolidator name and address. The 24-Hour Rule requires the following information, which is related to some of the importer data elements, to be transmitted to CBP 24 hours prior to lading at a foreign port: Shipper name and address, Consignee name and address, and Commodity description (e.g., HTSUS number).[55]

Another source of information relating to the importer data elements is the customs entry forms (entries) prepared by importers (or their brokers) to allow entry of goods into the general commerce. As shown in Exhibit 2-5, these entry forms require the reporting of the following information that is related to some of the importer data elements: Manufacturer identification (MID) number, Consignee name and address, Consignee number, Importer of record name and address, Importer of record number, Country of origin, and Commodity HTSUS number.[56] If the MID numbers could be translated into manufacturer names and addresses (or if the underlying name and address information used to create the MID is available), five of the required importer data elements would be available from the entry data or filing.[57]

In general, entries can be submitted to CBP as early as before the shipment is loaded on the vessel at the foreign port to as late as 15 days after the shipment arrives at the port of discharge. However, entries are typically transmitted to CBP while the goods are on the vessel en route to the United States.[58] The time between when the shipment is laded at the foreign port and when the vessel carrying that shipment nears the U.S. arrival port gives the importers or their brokers the opportunity to conduct a comprehensive review of all of the transaction documentation and prepare an accurate entry filing. Furthermore, for immediate transport (IT) shipments, entry filings are typically not made until just before the shipment arrives at the port of discharge because the entry data is subject to change while the shipment is being transported in-bond from the U.S. arrival port to the port of discharge (e.g., from Los Angeles to Chicago).[59] In addition, for certain goods that are subject to import quotas, importers or their agents have to file "live entries," meaning the entry and visa must be presented in-person upon the goods arriving at the U.S. port.[60]

[55] U.S. Customs and Border Protection, "Data Elements Comparison," Annex B of *CBP Proposal for Advance Trade Data Elements ("10+2 Strawman")*, 2007.

[56] U.S. Customs and Border Protection, "Data Elements Comparison," Annex B of *CBP Proposal for Advance Trade Data Elements ("10+2 Strawman")*, 2007.

[57] MID numbers are up to 15 characters in length, consisting of a 2-character ISO code for country of origin, followed by the first 3 characters from each of the first two words of manufacturer name, first 4 numbers of the largest number on the street address line, and the first 3 alphabetic characters from the city name.

[58] Personal communication Amy Magnus, A.N. Deringer, Inc., on March 29, 2007.

[59] Personal communication with Cynthia D. (Jerome) Allen, Argents Air Express, Ltd., on March 21, 2007.

[60] Personal communication with Tammy Hetrick, The Burton Corporation, on April 13, 2007.

EXHIBIT 2-5 EXISTING SOURCES OF INFORMATION RELATING TO THE SECURITY FILING DATA ELEMENTS REQUIRED FOR IMPORTER SECURITY FILINGS

DATA ELEMENT	NOTES	SHIPPING DOCUMENTS[A]				CUSTOMS ENTRY DOCUMENTS	
		PURCHASE ORDER	SHIPPING NOTICE	COMMERCIAL INVOICE	OTHER	CBP FORM 3461[B] "ENTRY/IMMEDIATE DELIVERY"	CBP FORM 7501[C] "ENTRY SUMMARY"
Data Elements Required of Importers or their Designated Authorized Agents							
1. Manufacturer (or Supplier)	Name and address of the entity that last manufactures, assembles, produces, or grows the commodity; or Name and address of the party supplying the finished goods in the country from which the goods are leaving.	X	X			Block 26 "Manufacturer No."	Block 13 "Manufacturer ID"
2. Seller	If the goods are to be imported otherwise than in pursuance of a purchase, the name and address of the owner of the goods must be provided.	X		X	Shipper name and address from 24-hour manifest		
3. Buyer	If the goods are to be imported otherwise than in pursuance of a purchase, the name and address of the owner of the goods must be provided. Buyer could also be the consignee or importer of record.	X		X		Block 10 "Ultimate Consignee Name" Block 11 "Importer of Record Name"	Block 25 "Ultimate Consignee Name and Address" Block 26 "Importer of Record Name and Address"

EXHIBIT 2-5 EXISTING SOURCES OF INFORMATION RELATING TO THE SECURITY FILING DATA ELEMENTS REQUIRED FOR IMPORTER SECURITY FILINGS (CONTINUED)

DATA ELEMENT	NOTES	SHIPPING DOCUMENTS[A]				CUSTOMS ENTRY DOCUMENTS	
		PURCHASE ORDER	SHIPPING NOTICE	COMMERCIAL INVOICE	OTHER	CBP FORM 3461[B] "ENTRY/IMMEDIATE DELIVERY"	CBP FORM 7501[C] "ENTRY SUMMARY"
4. Ship To Party	Name and address of the first deliver-to party scheduled to physically receive the goods after the goods have been released from customs custody.	X	X	X	Ship booking	Block 10 "Ultimate Consignee Name"	Block 25 "Ultimate Consignee Name and Address"
5. Container Stuffing Location	For break-bulk shipments, the name and addresses of the physical locations where the goods were made "ship ready" must be provided.		X		Ship booking		
6. Consolidator (Stuffer)	For break-bulk shipments, the name and address of the party who made the goods "ship ready" or the party who arranged for the goods to be made "ship ready" must be provided.		X		Ship booking		
7. Importer of Record Number/FTZ Applicant Identification Number	Entity liable for payment of all duties and responsible for meeting all statutory and regulatory requirements incurred as a result of importation. For goods intended to be delivered to an FTZ, the party filing the FTZ documentation with CBP.	X				Block 9 "Importer Number"	Block 23 "Importer No."

EXHIBIT 2-5 EXISTING SOURCES OF INFORMATION RELATING TO THE SECURITY FILING DATA ELEMENTS REQUIRED FOR IMPORTER SECURITY FILINGS (CONTINUED)

DATA ELEMENT	NOTES	SHIPPING DOCUMENTS[A]				CUSTOMS ENTRY DOCUMENTS	
		PURCHASE ORDER	SHIPPING NOTICE	COMMERCIAL INVOICE	OTHER	CBP FORM 3461[B] "ENTRY/IMMEDIATE DELIVERY"	CBP FORM 7501[C] "ENTRY SUMMARY"
8. Consignee Number(s)	Individual(s) or firm(s) in the United States on whose account the merchandise is shipped.	X			Consignee name and address from 24-hour manifest	Block 8 "Consignee Number"	Block 22 "Consignee No."
9. Country of Origin	Country of manufacture, production, or growth of the article, based upon the import laws, rules and regulations of the United States.	X		X		Block 25 "Country of Origin"	Block 10 "Country of Origin"
10. Commodity HTSUS Number	The HTSUS number must be provided to the 6-digit level. The HTSUS number may be provided to the 10-digit level.	X			Commodity description or HTSUS number from 24-hour manifest	Block 24 "H.S. Number"	Block 29A "HTSUS No." (10-digit)

Notes:
[A] U.S. Customs and Border Protection presentation entitled "Security Filing Scenarios (10 data elements)," January 10, 2007.
[B] CBP Form 3461 (01/89)
[C] CBP Form 7501 (04/05) and CBP Form 7501 Instructions.

In comparing the documents that are routinely submitted to CBP, namely the 24-hour manifest and entry forms, there are pronounced differences in their content and timing of submittal with respect to the specific requirements of the interim final rule. While carriers (VOCCs and NVOCCs) are accustomed to submitting their manifest information to CBP 24 hours prior to lading, the manifest includes information relating to only three importer data elements. Key data such as the importer of record number, manufacturer, country of origin, and HTSUS number (if not provided as part of describing the commodity being shipped) are not included. On the other hand, most of the information relating to the required data elements is already filed in entries submitted by importers or their brokers; however, as described above, this information is typically not processed until the shipment is en route to the United States.[61]

In summary, although information relating to the importer data elements is generally available, additional gathering and processing of this information will be required to satisfactorily meet the specific content and timing requirements of the interim final rule. While this information is routinely used in existing shipping or import documentation, some of this information is not typically recorded or entered until or after the ship is laded and has left the foreign port. We interviewed several participants in CBP's Advanced Trade Data Initiative (ATDI) program, which is a partnership with trade representatives to research and evaluate ways to strengthen CBP risk management efforts through the use of advanced information prevalent in today's supply chains. In discussing their pilot studies designed to evaluate the transfer of data from the supply chain to CBP, the participants indicated that they have generally experienced no problems transmitting data contained in existing import documentation to CBP as they are being generated; however, they noted that existing business systems and practices will have to be modified in order to promptly retrieve and process the additional security filing data elements required by the interim final rule in time to meet the deadline of 24 hours prior to lading at a foreign port. Specific examples of where additional processing of the information and data is likely necessary to comply with the interim final rule include:

- **Manufacturer (or Supplier) –** Customs entry forms require Manufacturer Identification (MID) numbers, which is a combination of 15 characters abbreviating the country of origin, manufacturer name, and manufacturer address. Therefore, the information used to create these MID numbers will need to be translated or converted, or even amended. In some instances, MID numbers do not relate to the actual manufacturer or supplier (e.g., instead relating to a third-party shipper, trading company, or seller agent) or do not represent fixed, physical locations from which the goods originated. Other possible sources include purchase orders and shipping notices.

[61] CBP's interim final rule allows Importer Security Filings and customs entries to be filed together. However, filing both submissions together does not relieve the requirement to submit the importer data elements 24 hours prior to lading at the foreign port.

- **Container Stuffing Location and Consolidator (Stuffer) –** These are the only data elements for which related information is not being recorded in documents routinely submitted to CBP (e.g., 24-Hour manifest and customs entries). The likely sources of this information are ship bookings and shipping notices issued by shippers or their cargo consolidators (NVOCCs and freight forwarders) and carriers.
- **Manufacturer (or Supplier), Country of Origin, and Commodity HTSUS Number –** According to importers that commented on the "10+2 Strawman" which was posted on the CBP website along with a request for comments from the public, itemizing these three elements for each good or commodity listed on a regular or house BOL ("line-by-line") for the corresponding security filing would require significant effort to comply with the 24-hour deadline.[62] The commenters believed that information related to these three elements are typically not compiled and processed until the goods are en route to the United States, when importers and their more sophisticated brokers are processing and confirming the shipment and entry data associated with the goods that were actually laden on the vessel. Despite these comments, however, CBP notes that for most importers, this information is known well before the placement of the purchase order for their goods because importers need to determine duty cost and admissibility status prior to finalizing the purchase or shipment contract.
- **Consolidated Shipments –** The complete and timely submittal of the importer data elements may be more problematic for shipments that are consolidated in containers due to advance cut-off times established by consolidators.[63] For such shipments, the supply chain is generally more complex and the importer has less control of the flow of goods and associated security filing information. The consolidator may be consolidating multiple shipments from one or more shippers in a container destined for one or more buyers or consignees. In order to ensure that the security filing data is provided by the shippers to the importers (or their designated agents) and is then transmitted to and accepted by CBP in advance of the 24-hour deadline, the consolidator may advance their cut-off times for receipt of shipments and associated security filing data. These advanced cut-off times would help prevent a consolidator or carrier from having to unpack or unload a container in the event the security filing for one of the shipments contained in the container is inadequate or not accepted by CBP. For example, consolidators may require shippers to submit, transmit, or obtain CBP acceptance of their security filing data before their shipment(s) are stuffed in the container, before the container is sealed, or before the container is delivered to the port for lading.

[62] U.S. Customs and Border Protection, *CBP Proposal for Advance Trade Data Elements*, 2007. Also known as the "10+2 Strawman."

[63] Personal communication with Jim Phillips of General Motors Inc. on March 13, 2007, and Cynthia D. (Jerome) Allen of Argents Air Express, Ltd., on March 21, 2007.

- **FROB –** For foreign cargo remaining on board (FROB), the international carrier (not the importer, who is likely to be a foreign party) is required to submit the Importer Security Filing. However, carriers are not routinely collecting or transmitting to CBP (e.g., as part of the 24-Hour Rule) any of the required five security filing data elements for FROB.

Additional Carrier Requirements

As discussed previously in the section on the general shipping process, the two additional data requirements of carriers, namely Vessel Stow Plans and CSMs, are already routinely being produced. However, additional effort on the part of carriers may be required to prepare and transmit these existing documents to CBP. Specific examples of where additional processing of the information and data is likely necessary to comply with the interim final rule include:

- **Vessel Stow Plans** – Most containerized carriers currently prepare and transmit stow plans as attachments to email transmissions in an Electronic Data Interface (EDI) format called the Bayplan/Stowage Plan Occupied and Empty Locations Message (BAPLIE).[64] However, there are some carriers that do not currently prepare and transmit stow plans electronically (i.e., they prepare paper or hand-drawn stow plans that are transmitted via facsimile machine or "fax"). CBP will accept Vessel Stow Plans in UN EDIFACT BAPLIE SMDG formats and will accept ANSI X.12 "324" formats on a case-by-case basis. CBP will not accept the Adobe.pdf format for stow plans. Stow plans must be submitted through Vessel AMS, secure file transfer protocol (sFTP), or email. Less sophisticated carriers may need to adopt new information systems and practices to electronically prepare and transmit their stow plans to CBP. In addition, stow plans for voyages of very short duration (e.g., importing cargo from Canada and the Caribbean) may be difficult to transmit prior to arrival at the U.S. port.[65]
- **Scope of CSM Submittals** – CBP's interim final rule requires that carriers, provided they already collect and maintain CSM data in their electronic equipment tracking systems, must submit CSMs for as many as nine events for containers containing cargo destined for the United States by vessel. When any of these events occurs, the carrier must transmit to CBP a report of that event within 24 hours after the message is entered into the carrier's equipment tracking system.

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[64] EDI is a generic term for transmission of transactional data between computer systems. EDI is typically via a batched transmission, usually conforming to consistent standards (U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/e.html on March 20, 2007).

BAPLIE is an international standard EDI message that generally lists (in tabular form) the location, size, and type of each cargo laden on the vessel. The software used to access BAPLIE files typically also has a graphical interface to create and view Vessel Stow Plans in graphical form (i.e., cargo and container location and information is graphically represented on a vessel layout plan, arranged by deck, bay, or hold) (Kockum Sonics Co., *EdiRite 'the BAPLIE message general tool,'* as viewed at http://www.kockumsonics.com/pdf/marine/edirite.pdf on June 1, 2007).

[65] Personal communication with Chris Koch, World Shipping Council, on March 9, 2007.

CBP will also accept any CSMs from carriers other than for the required events as well as any CSMs for non-U.S. bound containers. We do not know how many carriers will elect to transmit all CSMs for all containers ("global" CSMs), CSMs for just U.S.-bound containers, or CSMs related to just the events required by the interim final rule. It appears that transmitting global CSMs is the most cost-effective option; however, some carriers may elect not to transmit their global CSMs to restrict giving CBP wide access to all of their CSM data and keep the nature of their shipping practices and operations confidential.

- **Transmitting via CBP-Approved Systems** – CBP will allow carriers to transmit Vessel Stow Plans through Vessel AMS, sFTP, or email, and CSMs through sFTP. As a result, carriers may have to modify their existing information systems to adjust, reprocess, or transmit their electronic stow plan or CSM data through these approved interchange systems.

CHAPTER 3 | BASELINE SHIPPING ANALYSIS

This chapter describes the regulatory baseline for the interim final rule. Our focus is to estimate and characterize the number of shipments and importers potentially affected by the Importer Security Filing requirements and the number of vessel trips and carriers potentially affected by the Additional Carrier Requirements. The baseline analysis establishes the parameters from which we assess the potential incremental impact of the interim final rule. We characterize annual shipping activity using 2005 data.

In this chapter, we first analyze 2005 shipments in order to categorize and estimate the number of shipments as containerized, bulk, break-bulk, and roll-on/roll-off (Ro-Ro), due to the variation in the interim final rule's requirements for these different types of cargo.[66] Next, we estimate the number of importers associated with each of these cargo types that are potentially affected by the interim final rule and characterize them by the volume and value of their imports.

After estimating the type and quantity of cargo imported into the United States for 2005, we estimate the quantity of Foreign Cargo Remaining on Board (FROB).[67] Then, we analyze the carriers and vessels that transported cargo to the United States from foreign ports of lading and estimate the number of containership, break-bulk, and bulk operators, as well as other carriers, in addition to the number of unique vessel trips to the United States. Finally, we project future baseline shipping activity for the 10-year period of 2009 to 2018.

[66] Ro-Ro cargo is considered break-bulk cargo under the interim final rule. For the purposes of enhanced detail, we separate break-bulk and Ro-Ro cargo in this analysis.

[67] We do not attempt to separately estimate the volume of Immediate Exportation (IE) or Transportation and Exportation (T&E) cargo due to limitations in available data. We assume the cost to comply with the rule for the party taking delivery of IE and T&E in the United States is similar to the cost of compliance for importers of conventional cargo; therefore, we include IE and T&E cargo in our estimate of shipments.

ANALYSIS OF IMPORTS

CLASSIFYING IMPORTS BY TYPE

The source of data for this segment of the analysis is the Port Import Export Reporting Service (PIERS) database.[68] Specifically, we analyze imported cargo arriving in the United States between the 8th and the 15th days of each month of the year 2005 for a total of 96 days.[69] A large subset of the PIERS data is identified or flagged as containerized cargo. We further classify the containerized cargo as full container loads or parts of consolidated container shipments in order to account for the potentially differing costs associated with each type. We classify the remaining cargo as bulk, break-bulk, or Ro-Ro.

Below, we discuss the following steps for characterizing imported cargo:

- **Step One:** Remove Canadian-destined cargo;
- **Step Two:** Remove empty containers;
- **Step Three:** Segregate containerized from non-containerized cargo;
- **Step Four:** Identify bulk, break-bulk, and Ro-Ro cargo;
- **Step Five:** Aggregate records with identical bill of lading (BOL) numbers to estimate the number of unique shipments;
- **Step Six:** Remove master BOLs from containerized BOLs;
- **Step Seven:** Separate remaining house and regular bills into full container BOLs and less than full container load (consolidated) shipments;
- **Step Eight:** Extrapolate the sample data to annual totals; and
- **Step Nine:** Check extrapolated values against alternative published sources.

[68] PIERS collects, edits, and cleans import data obtained from the Vessel Automated Manifest System (Vessel AMS) and vessel manifests before providing the information for sale to the public. The CBP Office of International Trade provided 96 sample days of containerized imports from the PIERS database to IEc on January 10, 2007 and non-containerized imports on February 2, 2007.

[69] We only analyze a subset of the pertinent PIERS data because otherwise the volume of data would have been difficult to process. We believe that the subset is reflective of the dataset. Later in this chapter we compare the results of our analysis to alternate published sources of the data for the entire year to verify our hypothesis.

Remove Canadian-Destined Cargo

First, we remove records for shipments not destined to the United States. Specifically, PIERS includes FROB destined for Canada.[70] Because the FROB in the PIERS data sample set is all destined for Canada, we remove those records with port of unlading codes representing Canadian ports.[71] Of the 2,582,454 records in our PIERS dataset, 86,425 list a port of unlading in Canada, leaving us with 2,496,029 records with a U.S. destination.

Remove Empty Containers

Next, we remove from the dataset records relating to empty containers. We use the Harmonized Tariff Schedule (HTS) code for empty freight containers (860900) to identify these records in the database. Of the 2,496,029 records with a U.S. destination, we remove 7,013 that have this HTS code, leaving us with 2,489,016 records of U.S. imports.

Segregate Containerized from Non-containerized Cargo

We then separate the containerized cargo from the non-containerized cargo. The PIERS dataset flags containerized records, so we use this identification to separate our 2,489,016 records of U.S. imports into 2,395,194 records of containerized cargo and 93,822 records of non-containerized cargo.

Identify Bulk, Break-bulk, and Ro-Ro Records

The most involved step of our record classification is identifying which non-containerized cargo records are bulk, break-bulk, or Ro-Ro, because the PIERS database does not provide such a breakdown. We took the following steps to sort the non-containerized cargo records into the three categories:

- **Identify bulk cargo records.** We use three methods – vessel classification, unit of measure, and HTS code – to identify bulk cargo records in the universe of non-containerized records. The union of these three approaches classifies 23,752 records as bulk-shipped goods. Below we describe in more detail the process we use to identify bulk cargo records via each of the three methods.
    - **Vessel classification.** Using data on ship entries from the U.S. Army Corps of Engineers (USACOE) for calendar year 2004, we identify the International Classification of Ships by Type (ICST) code for the

[70] Later in this chapter, we use the Vessel AMS database to estimate the total volume of FROB entering U.S. ports.

[71] Note that for the purposes of the analysis in this chapter, the port of discharge (the location the shipment enters the country through Customs), if different than the port of unlading (the location that the cargo is taken off the ship), is not material to our analysis. Therefore, we use the location of the port of unlading as a consistent identifying characteristic of shipments and vessel trips when necessary.

vast majority of vessels appearing in the database.[72] We accomplish this by matching the unique vessel International Maritime Organization (IMO) numbers from PIERS to the IMO numbers in the USACOE database. IMO numbers in the USACOE database have an associated ICST code.

We classify all records of goods arriving on vessels classified as "tankers," "oil/ore carriers," "LPG/LNG carriers," "other tank barges," and "other bulk carriers" as bulk. The list above corresponds to those vessels that, according to the definition of bulk cargo, are likely to be carrying bulk cargo. Furthermore, we find relatively few records per vessel of this type and typically a single commodity, both attributes we would expect for bulk cargo. Using this approach, we classify 20,544 records as bulk.

- **Units of measure.** Using the units of measure field in the PIERS data set, we identify additional records in the database as bulk. Specifically, we identify all records with the units of measure listed as "bulks", "barrels", or "lifts" as bulk cargo. As a result, we classify an additional 2,956 records as bulk.
- **Commodity type.** Using the HTS codes and the assumption that mineral products (including ores and petroleum products) are generally bulk cargo, we categorize all records having HTS codes beginning with 25 (salt; sulfur; earths and stone; plastering materials, lime and cement), 26 (ores, slag and ash), and 27 (mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes) as bulk.[73] Of the remaining unclassified records in the database, we identify an additional 252 records as bulk using this approach.

- **Identify Ro-Ro records.** We take two steps to identify Ro-Ro records. First, we identify records of goods arriving on Ro-Ro vessels. Second, we use the HTS code to identify additional Ro-Ro records. The union of these two sets is a total of 32,015 Ro-Ro records. We describe the specific details of our process to identify Ro-Ro records below:

[72] U.S. Army Corps of Engineers, "U.S. Waterway Data, Vessel Entrances and Clearances," 2004, as viewed at http://www.iwr.usace.army.mil/ndc/data/dataclen.htm#The%20International%20Classification%20of%20Ships%20by%20Type%20(ICST) on March 13, 2007.

[73] HTS code definitions from United States International Trade Commission, "TARIFF INFORMATION CENTER: By Chapter, Harmonized Tariff Schedule of the United States", as viewed at http://www.usitc.gov/tata/hts/bychapter/index.htm on May 31, 2007.

- **Vessel classification.** Similar to the process used above in the bulk section, we use vessel type to categorize records as Ro-Ro goods.[74] We characterize all records conveyed in vessels classified as "vehicle carriers", "Ro-Ro passenger", "other Ro-Ro cargo", and "Ro-Ro container" as Ro-Ro. Using this approach, we identify 29,590 records as Ro-Ro.
- **Commodity type.** We also use the HTS code field to identify records of Ro-Ro goods. Specifically, we classify records with HTS codes at the 2-digit level of 86 and 89 (trains and boats, respectively), and HTS codes at the 4-digit level of 8701-8705 (motor vehicles) and 8802-8804 (aircraft) as Ro-Ro. Using this method, we identify an additional 2,425 records as Ro-Ro.

- **Identify break-bulk records.** For our analysis, we define break-bulk records as any records of goods that are not classified as containerized, bulk, or Ro-Ro. Given that the security filing for break-bulk cargo is likely to be more expensive than the other non-containerized cargo, this is a conservative approach. There are 38,055 records remaining that we classify as break-bulk.

Aggregate All Records by BOL Number

The unit of measure for our economic analysis is a shipment, which is defined by a distinct bill of lading (BOL), either as a house bill issued by a non-vessel operating common carrier (NVOCC) or a regular bill issued by a vessel operating common carrier (VOCC) directly to a shipper. In certain cases, the PIERS database lists multiple records sharing a common BOL number.[75] An examination of these records shows similar commodities being shipped under a single BOL with slight variations in the description or HTS code from a single exporter to a single importer, adding up to a single shipment of goods as defined by the interim final rule. Therefore, we sum the volume and estimated dollar value of records with identical BOL numbers. This step reduces the number of records in our sample from 2,489,016 to 2,254,480 unique BOL numbers or shipments, with 2,168,262 BOLs of containerized cargo, 23,409 BOLs of bulk cargo, 36,582 BOLs of break-bulk cargo, and 26,227 BOLs of Ro-Ro cargo.

Remove Master Bills from Containerized BOLs

To avoid double counting, we remove the 124,241 bills labeled as master bills, which cover one or more house bills found elsewhere in the data sample set. This step further reduces the number of containerized bills from 2,168,262 to 2,044,021. As a result, the total number of unique BOLs for all cargo types in our data sample set is 2,130,239.

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[74] U.S. Army Corps of Engineers, "U.S. Waterway Data, Vessel Entrances and Clearances," 2004, as viewed at http://www.iwr.usace.army.mil/ndc/data/dataclen.htm#The%20International%20Classification%20of%20Ships%20by%20Type%20(ICST) on March 13, 2007.

[75] These records are house or regular BOLs sharing a BOL number, distinct from master BOLs, which we address in the next step.

Separate Containerized Bills into Full and Consolidated Shipments

Of the containerized shipments, some are full containers (or multiple full containers) of goods, while others represent only a portion of a container-load of goods, which we assume are consolidated with another importer's shipment. Because we expect that compliance with the interim final rule may affect consolidated shipments differently than full container shipments, we estimate the number of consolidated shipments.

PIERS identifies the size of the container for each containerized shipment, using the code "LC" to represent a shipment of less than a container-load of goods. Any other designation in the field (e.g., "20" or "40") designates a full container.[76] Using this information, we identify 1,063,651 BOLs as full container shipments and 980,370 BOLs representing less than container load or consolidated shipments in our sample.[77]

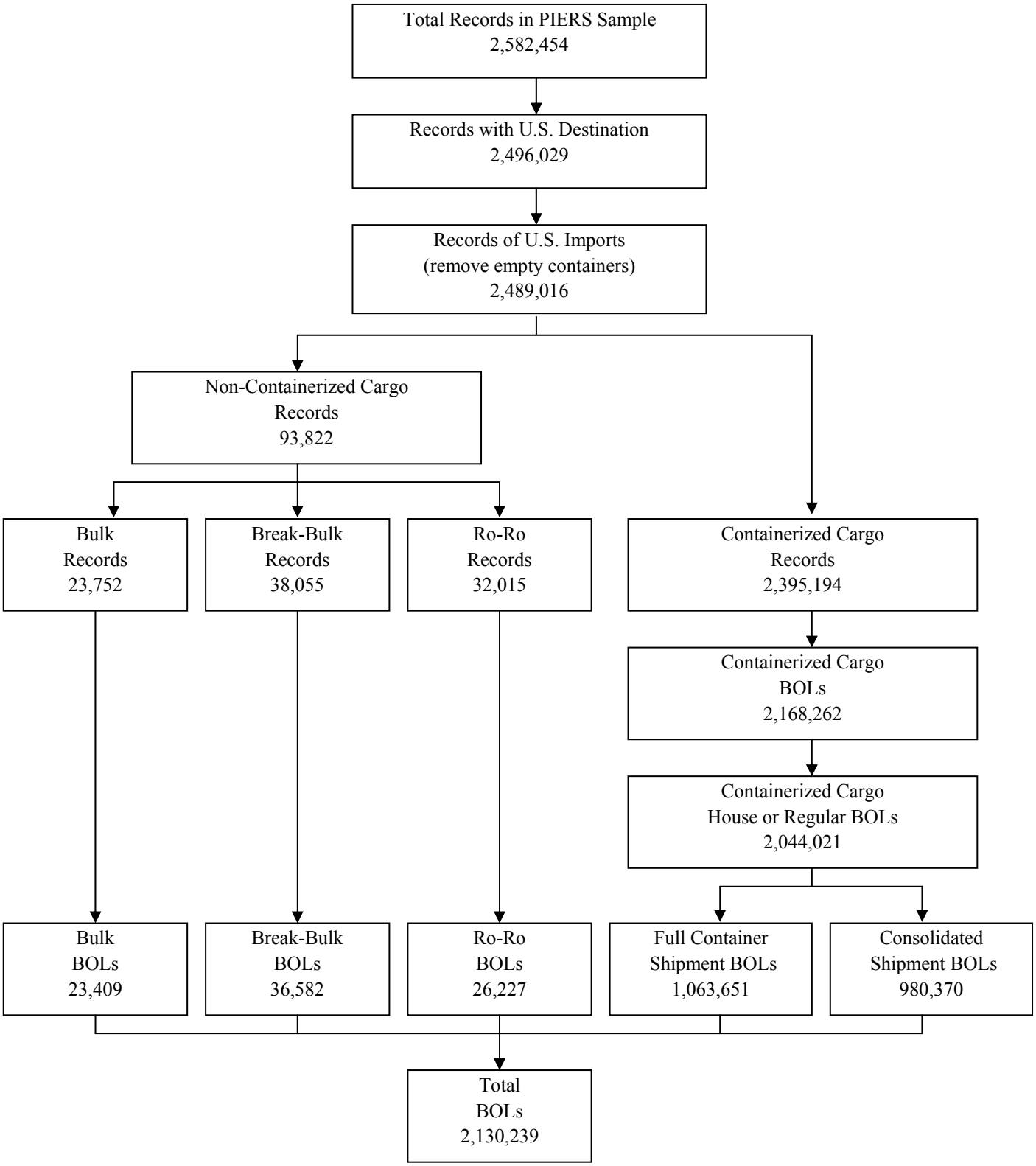
Summary of Shipment Classification

Our analysis separates the 2,582,454 records in the 96-day PIERS data sample set into five categories – bulk, break-bulk, Ro-Ro, full containers, and consolidated containerized shipments – ranging in size from 23,409 bulk shipments to more than one million full container shipments. The steps in our analysis and derivation of the baseline characterization of shipments are summarized in Exhibit 3-1.

[76] Often, several less-than-full container shipments on the same BOL are listed as "LC", but there is an additional record for the same bill identifying the size of the container. We consider these records to be a single full container shipment.

[77] In the unlikely case that a carrier issued multiple BOLs for a full container of goods from the same shipper to the same importer, we may have misidentified the records as a consolidated shipment.

EXHIBIT 3-1 CLASSIFYING SHIPMENTS IN THE 2005 PIERS DATA SAMPLE SET



Source: PIERS data sample set; IEc calculation.

Extrapolate BOLs from Data Sample Set to Full Year Totals

To extrapolate our 96 days of shipments to a full year, we multiply the number of U.S.-destined imports calculated from PIERS by 3.8 (365/96). Our sample of 2,130,239 shipments in 96 days translates to approximately 8.1 million shipments for the year. This is the value on which we base our cost calculations and our prediction of future trends in shipments. Exhibit 3-2 extrapolates the number of BOLs in each category of cargo from the 96-day data sample set to rounded full year totals.

EXHIBIT 3-2 EXTRAPOLATING SAMPLE TO FULL YEAR

CARGO TYPE	BOLs IN 96-DAY SAMPLE	TOTAL BOLs (2005)
Bulk	23,409	89,000
Break-bulk	36,582	139,100
Ro-Ro	26,227	99,700
Full Container	1,063,651	4,044,100
Consolidated Shipments	980,370	3,727,400
Total Shipments	**2,130,239**	**8,099,300**

Note: Columns may not sum due to rounding.
Source: 2005 PIERS data sample set; IEc calculation.

Checking for Sample Bias

In order to verify that our 96-day data sample set does not suffer from sampling bias (i.e., to assure that our sample is representative of the entire year of imports), we compare our data to published sources characterizing the entire year's database. The U.S. Department of Transportation's Maritime Administration (MARAD) publishes annual summary statistics of container imports and vessel calls at U.S. ports derived from the full PIERS data set.[78] We compare the total twenty-foot equivalent units (TEUs) of cargo unloaded at the top U.S. ports with the same data published by MARAD. We do this by summing the TEU values in our data sample set across ports of unlading and then by extrapolating these values to an entire year (i.e., multiplying by 3.8). Exhibit 3-3 presents the data from both sources.

[78] U.S. Department of Transportation Maritime Administration, "Data & Statistics," as viewed at http://www.marad.dot.gov/MARAD_statistics/index.html on March 19, 2007.

EXHIBIT 3-3 CONTAINERIZED IMPORTS AT THE 10 LARGEST U.S. PORTS IN 2005

PORT OF UNLADING	TEUs FROM DATA SAMPLE SET (96 DAYS)	EXTRAPOLATED NUMBER OF TEUs (365 DAYS)	TEUs REPORTED BY MARAD	DIFFERENCE
Los Angeles, CA	1,026,870	3,904,247	3,821,325	2.2%
Long Beach, CA	824,356	3,134,269	3,354,711	-6.6%
New York/New Jersey	630,429	2,396,943	2,415,165	-0.8%
Charleston, SC	238,908	908,348	893,515	1.7%
Seattle, WA	245,281	932,579	875,359	6.5%
Savannah, GA	200,842	763,618	799,687	-4.5%
Tacoma, WA	209,045	794,807	792,521	0.3%
Norfolk, VA	208,402	792,362	778,979	1.7%
Oakland, CA	194,547	739,685	762,747	-3.0%
Houston, TX	181,187	688,890	622,883	10.6%
All Other Ports	608,749	2,314,509	2,173,458	6.5%
Total Containerized Imports	**4,568,616**	**17,370,257**	**17,290,350**	**0.5%**

Source: 2005 PIERS data sample set; IEc calculation; MARAD, "U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2005," as viewed at http://www.marad.dot.gov/MARAD_statistics/2005%20STATISTICS/Container%20Custom%20Ports,%201997-2005.xls on March 19, 2007.

Based on our comparison of data from our sample and the full year of data analyzed by MARAD, we find that there is no obvious sampling error in our data sample set. Overall, for all containerized imports the difference in the TEUs of our data sample set and MARAD's is 0.5 percent. The largest difference, an overestimation of 10.6 percent between our Houston imports and the MARAD Houston imports is likely the result of Hurricanes Rita and Katrina in 2005. As the port was closed for several weeks of the year due to these hurricanes, and those weeks straddled our sample, we would overestimate the annual container traffic at that port. Lacking a similar set of data published for non-containerized imports, we assume those data are also free of systematic sampling error.

CHARACTERIZING THE UNIVERSE OF SHIPMENTS

Next, we characterize the value of each of the shipments in our sample using the PIERS data sample set. We will use this value to assess the incremental cost of the rule in Chapter 4. We show the results of our analysis in Exhibit 3-4. Of the 89,000 bulk shipments, the average (mean) value is about $3.9 million.[79] The median, however, is only $145,000. This large discrepancy is due to the small number of high-value bulk

[79] PIERS estimates the values "based on an extrapolation of product category information from the U.S. Department of Census". PIERS, "Product FAQs," as viewed at http://www.piers.com/customersupport/faq/product_faqs.asp on March 19, 2007.

shipments (typically oil). The most valuable shipment identified by PIERS is a tanker shipment of oil worth over $2.7 billion.[80]

For the 139,100 break-bulk shipments, the mean value is slightly more than $300,000, while the median is $38,277. The most valuable break-bulk shipment is $240 million. For the 99,700 Ro-Ro shipments, the mean value is approximately $71,000, while the median is $51,682. The most valuable Ro-Ro shipment is $53 million. The 4,044,100 full container shipments have an average value of $141,000 per shipment, with a median value of $53,409. The 3,727,400 consolidated shipments have an average value of $56,740 and a median value of $18,411. These statistics are summarized in Exhibit 3-4.

EXHIBIT 3-4 DESCRIPTIVE STATISTICS OF SHIPMENTS IN 2005

STATISTIC	BULK	BREAK-BULK	RO-RO	FULL CONTAINER	CONSOLIDATED SHIPMENT	ALL SHIPMENTS
BOLs	89,000	139,100	99,700	4,044,100	3,727,400	**8,099,300**
Total Value	$354b	$42.1b	$71.1b	$573b	$211b	**$1,250b**
Maximum Value	$2.7b	$240m	$53m	$480m	$58m	**$2.7b**
95th Percentile	$11m	$850,000	$2.8m	$470,000	$210,000	**$390,000**
Median Value	$145,000	$38,000	$52,000	$53,000	$18,000	**$35,000**
5th Percentile	$3,100	$1,400	$1,800	$8,500	$750	**$1,600**
Minimum Value	$0	$0	$0	$0	$0	**$0**
Value/BOL (Mean)	$3.9m	$300,000	$710,000	$140,000	$60,000	**$150,000**

Note: Rows may not sum due to rounding.
Source: 2005 PIERS data sample set; IEc calculation.

While the value of a single shipment ranges from $0 to almost $3 billion, more than half of the shipments are worth between $10,000 and $100,000.[81] The distribution of BOLs by value and type of shipment is shown in Exhibit 3-5.

[80] Based on the size of the oil tanker carrying this shipment and the cost of oil, this value is uncharacteristically high and the value may represent an entry error.

[81] A small number (4,788 or 0.2 percent) of BOLs have $0 listed as the value. This may be due to a combination of reporting error and PIERS being unable to ascertain the nature of the shipment from the description.

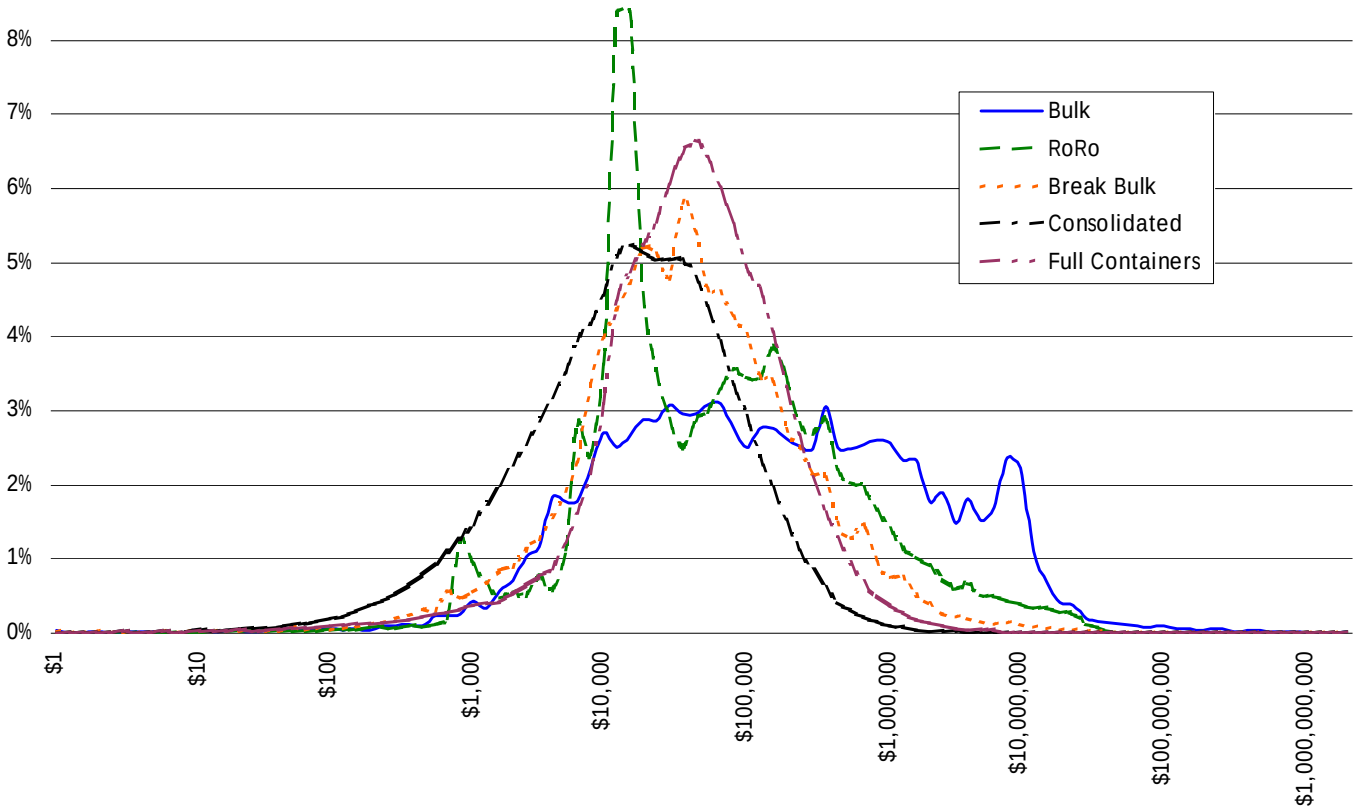
EXHIBIT 3-5 DISTRIBUTION OF SHIPMENTS BY VALUE

VALUE	BULK	BREAK-BULK	RO-RO	FULL CONTAINER	CONSOLIDATED SHIPMENT	ALL SHIPMENTS
$0	122	1,890	920	11,900	3,400	18,200
$1 - $10,000	13,100	26,000	14,000	259,900	1,325,500	1,638,600
$10,001 - $100,000	27,300	70,600	44,900	2,507,100	1,900,800	4,550,600
$100,001 - $1 million	24,900	34,700	29,600	1,199,300	483,800	1,772,300
$1,000,001 - $10 million	18,700	5,320	8,550	65,300	13,800	111,700
$10,000,001 - $100 million	4,450	548	1,740	589	110	7,440
$100,000,001+	449	19	0	53	0	521
Total	**89,000**	**139,100**	**99,700**	**4,044,100**	**3,727,400**	**8,099,300**

Note: Columns may not sum due to rounding.
Source: 2005 PIERS data sample set; IEc calculation.

The distributions of shipments by value and type are presented in graphical format in Exhibit 3-6 for comparison purposes. We normalized the distributions by measuring the relative frequency at which values fell into particular ranges. The spike in frequency for Ro-Ro shipments occurs at the value of a single car. Bulk cargo is more broadly distributed than other cargo, with a higher frequency of more valuable shipments, particularly oil. Note that the horizontal axis has a logarithmic scale.

EXHIBIT 3-6 RELATIVE FREQUENCY OF SHIPMENTS BY VALUE



Source: 2005 PIERS data sample set; IEc calculation.

CHARACTERIZING THE UNIVERSE OF IMPORTERS

Next, we count the number of BOLs (shipments) attributable to each unique importer. Unfortunately, there are significant variations in the names of the importers in the PIERS database, complicating our ability to make an accurate count. For example, within our sample, the importer "Target Stores" imported 17,864 BOLs, while an additional 3,400 BOLs simply list "Target" as the importer. "Target Com" imported 213 BOLs, "Target Com Division of Target" imported 11 BOLs, and "Target Stores Division of Targe" [*sic*] imported four more. In all, 52 different importer names begin with the word "Target". Similarly, 13 different importer names begin with "Costco," and 15 more begin with "IKEA." In many cases, such as with "IKEA Wholesale" and "IKEA Wholseale" [*sic*], the importer is obviously the same entity; however, we suspect "Target Promotions & Divinity" is not, in fact, a subsidiary of Target Corporation. Therefore, we must take care in aggregating similar names in our database.

In order to aggregate the names, we compare the list of names in our database of records and the zip codes listed for each importer. We compare the names using the "Levenshtein Edit Distance" method. The principle behind the concept of "edit distance"

is to count the number of letter changes (either addition, deletion, or substitution of letters) and divide by the length of the original name in order to derive a percentage of error.[82] For example, to change "Bob" to "Rob" requires changing one letter in a three-letter word, a 33 percent error rate. The rules we use in our comparison are as follows:

- Importers with identical names are considered the same importer, regardless of geographic locale;
- Importers with differing names where the first 2 digits of the zip code do not match are considered different importers;
- Importers with different names but at least one is missing the zip code are considered the same with up to 10 percent error in the spelling of the name; and
- Importers where the first 2 digits of the zip code are the same are considered the same with up to 20 percent error in spelling.

Using these criteria, we narrow the list of 226,534 unique importer names in our sample to 205,890 unique importers. Removing the Canadian importers who only list FROB as their cargo in the PIERS data sample set further reduces the list to 197,941 importers.[83]

We then characterize the importers by the total number and type of BOLs or shipments they import. Since we expect more active importers to be able to comply with the interim final rule more efficiently than importers with few shipments on an annual basis, we classify the importers and their shipments into categories based on frequency of shipments during the year. The result of our analysis is shown in Exhibit 3-7.

EXHIBIT 3-7 DISTRIBUTION OF IMPORTER BY NUMBER OF SHIPMENTS

BOLs or SHIPMENTS PER IMPORTER IN DATA SAMPLE SET	IMPORTERS	
	NUMBER IN DATA SAMPLE SET	PERCENT
1	103,916	52.5%
2 - 11	68,863	34.8%
12 - 51	22,771	11.5%
52 - 364	2,295	1.2%
365 - 10,000+	92	0.0%
Total	**197,941**	**100.0%**

Note: Columns may not sum due to rounding.
Source: 2005 PIERS data sample set; IEc calculation.

[82] Levenshtein, V.I., "Binary codes capable of correcting deletions, insertions, and reversals," in *Soviet Physics Doklady* 10, 1966, pp.707–710.

[83] Note that 350,095 BOLs in the PIERS data sample set, or 16.6 percent of the total, have the importer name redacted by CBP. These BOLs are included in the row labeled "Anonymous" in Exhibits 3-9 through 3-11 below. Any importer may request that CBP have their name redacted from public data. We do not know how many importers or what size firms these redacted records represent.

Because our analysis is based on a sample and not a full year's data, we provide lower and upper bound estimates of the number of total importers in 2005. These estimates are approximations and we have no data to inform the probabilistic distribution of the true number of importers between the two bounds. For the lower bound estimate, we assume that the total number of importers reported in the sample captures the total number of importers in the entire year. In other words, we assume that the number of importers is fixed, and these importers account for the total number of annual shipments. We adjust the number of shipments per importer by 3.8 (the ratio of an entire year, or 365 days, to the time period of the PIERS data sample set, 96 days) to arrive at the total number of shipments previously estimated for the entire year (8.1 million).

For the upper bound estimate, we assume that the number of shipments reported for each importer in our data sample set characterizes per importer shipping frequency for all importers throughout the year, including those importers not in the data sample set. We adjust the total number of importers to account for the number necessary to accomplish 8.1 million shipments per year. Exhibit 3-8 shows the results of our estimates for the entire year, which range from approximately 200,000 to 750,000 total importers.

EXHIBIT 3-8 ESTIMATED NUMBER OF TOTAL IMPORTERS IN 2005

FREQUENCY OF IMPORT SHIPMENTS	BOLs OR SHIPMENTS PER IMPORTER PER YEAR	LOWER BOUND ESTIMATE		UPPER BOUND ESTIMATE	
		NO. OF IMPORTERS	PERCENT	NO. OF IMPORTERS	PERCENT
Once per year	1	0	0.0%	395,097	52.5%
Twice yearly to less than monthly	2 - 11	142,052	71.8%	268,674	35.7%
Monthly to less than weekly	12 - 51	35,563	18.0%	68,438	9.1%
Weekly to less than daily	52 - 364	17,775	9.0%	18,782	2.5%
Daily or greater	365 - 10,000+	2,551	1.3%	1,597	0.2%
Total		**197,941**	**100.0%**	**752,588**	**100.0%**

Note: In the lower bound, we assume that importers in the data sample set responsible for a single shipment imported 3.8 shipments (365/96), or 1 times 3.8 shipments, in 2005. As a result of our methodology for the lower bound estimate, no importers are estimated in the one shipment per year importer frequency category.

Exhibit 3-9 presents our estimate of the total number and value of shipments of all cargo types that were imported by each category of importer frequency during 2005. The table shows, for example, that for our lower bound estimate, importers importing shipments at least on a daily basis represented the largest share of importers that year (37 percent). For our upper bound estimate, importers importing shipments on a weekly to less than daily basis represented the largest share of imports (26 percent). Exhibits 3-10 and 3-11

provide similar estimates specifically for shipments of containerized and non-containerized cargo, respectively.

EXHIBIT 3-9 DISTRIBUTION OF SHIPMENTS BY IMPORTER FREQUENCY (ALL CARGO)

IMPORTER FREQUENCY	SHIPMENTS		VALUE (BILLION $)	
	IN 2005	PERCENT	IN 2005	PERCENT
LOWER BOUND ESTIMATE				
Once per year	0	0.0%	$0	0.0%
Twice yearly to less than monthly	586,300	7.2%	56.5	4.5%
Monthly to less than weekly	1,009,100	12.5%	129.6	10.4%
Weekly to less than daily	2,188,300	27.0%	353.5	28.2%
Daily or greater	2,984,700	36.9%	506.6	40.5%
Anonymous	1,331,100	16.4%	205.3	16.4%
Total	**8,099,300**	**100.0%**	**$1,251.6**	**100.0%**
UPPER BOUND ESTIMATE				
Once per year	395,100	4.9%	$35.3	2.8%
Twice yearly to less than monthly	1,124,100	13.9%	141.9	11.3%
Monthly to less than weekly	1,577,300	19.5%	265.3	21.2%
Weekly to less than daily	2,097,500	25.9%	367.2	29.3%
Daily or greater	1,574,200	19.4%	236.5	18.9%
Anonymous	1,331,100	16.4%	205.3	16.4%
Total	**8,099,300**	**100.0%**	**$1,251.6**	**100.0%**

Note: Columns may not sum due to rounding.
Source: 2005 PIERS data sample set; IEc calculation.

EXHIBIT 3-10 DISTRIBUTION OF SHIPMENTS BY IMPORTER FREQUENCY (CONTAINERIZED CARGO)

IMPORTER FREQUENCY	FULL CONTAINER SHIPMENTS		CONSOLIDATED CONTAINER SHIPMENTS		TOTAL CONTAINER SHIPMENTS	
	SHIPMENTS	VALUE (BILLION $)	SHIPMENTS	VALUE (BILLION $)	SHIPMENTS	VALUE (BILLION $)
LOWER BOUND ESTIMATE						
Once per year	0	$0	0	$0	0	$0
Twice yearly to less than monthly	243,400	28.5	454,100	18.2	697,500	46.7
Monthly to less than weekly	491,100	65.5	734,000	43.7	1,225,000	109.2
Weekly to less than daily	1,020,200	159.3	1,165,600	72.9	2,185,700	232.2
Daily or greater	1,606,700	214.2	755,700	43.3	2,362,400	257.5
Anonymous	682,800	105.8	618,100	33.4	1,300,800	139.2
Total	**4,044,100**	**$573.3**	**3,727,400**	**$211.5**	**7,771,500**	**$784.8**
UPPER BOUND ESTIMATE						
Once per year	152,700	$16.2	303,000	$10.6	455,700	$26.8
Twice yearly to less than monthly	546,700	73.4	836,900	48.1	1,383,600	121.5
Monthly to less than weekly	736,300	117.6	907,300	57.7	1,643,600	175.3
Weekly to less than daily	1,068,900	152.4	739,400	44.8	1,808,300	197.2
Daily or greater	856,800	107.8	322,800	16.9	1,179,600	124.7
Anonymous	682,800	105.8	618,100	33.4	1,300,800	139.2
Total	**4,044,100**	**$573.3**	**3,727,400**	**$211.5**	**7,771,500**	**$784.8**

Note: Columns may not sum due to rounding.
Source: 2005 PIERS data sample set; IEc calculation.

EXHIBIT 3-11 DISTRIBUTION OF SHIPMENTS BY IMPORTER FREQUENCY (NON-CONTAINERIZED CARGO)

IMPORTER FREQUENCY	BULK		BREAK-BULK		RO-RO	
	SHIPMENTS	VALUE (BILLION $)	SHIPMENTS	VALUE (BILLION $)	SHIPMENTS	VALUE (BILLION $)
LOWER BOUND ESTIMATE						
Once per year	0	$0	0	$0	0	$0
Twice yearly to less than monthly	4,900	31.8	11,400	8.6	28,700	3.2
Monthly to less than weekly	11,900	50.8	15,700	8.5	10,400	3.8
Weekly to less than daily	25,500	114.1	42,400	12.1	17,300	12.0
Daily or greater	35,500	107.2	60,000	9.5	33,800	39.1
Anonymous	11,200	49.8	9,600	3.4	9,500	13.0
Total	**89,000**	**$353.7**	**139,100**	**$42.1**	**99,700**	**$71.1**
UPPER BOUND ESTIMATE						
Once per year	2,800	17.2	7,900	4.4	25,200	2.3
Twice yearly to less than monthly	12,600	61.2	18,200	12.4	12,900	4.3
Monthly to less than weekly	20,000	102.6	25,400	8.5	12,800	8.6
Weekly to less than daily	29,400	110.7	56,100	10.5	18,200	29.2
Daily or greater	13,100	12.2	21,900	2.8	21,100	13.7
Anonymous	11,200	49.8	9,600	3.4	9,500	13.0
Total	**89,000**	**$353.7**	**139,100**	**$42.1**	**99,700**	**$71.1**

Note: Columns may not sum due to rounding.
Source: 2005 PIERS data sample set; IEc calculation.

FOREIGN CARGO REMAINING ON BOARD

Foreign cargo remaining on board (FROB) is cargo loaded at a foreign port and destined for a foreign port, but carried on a vessel that stops at a U.S. port before traveling to the foreign port for unlading. Under this interim final rule, carriers with FROB are required to submit Importer Security Filings consisting of five data elements. The PIERS data sample set analyzed previously in this chapter does not contain records for all FROB arriving at U.S. ports. Therefore, we use 2005 data from CBP's Vessel Automated Manifest System (Vessel AMS) to estimate the total volume of FROB subject to the interim final rule. We calculate the proportion of records in Vessel AMS designated as FROB, addressing containerized and non-containerized shipments separately, and then

we apply this proportion to our estimate of the U.S-destined shipments based on the PIERS data sample set.

We define containerized shipments in Vessel AMS as all shipments for which there is a container number. Non-containerized shipments are thus defined as the remainder. Of the 23,091,140 records in Vessel AMS for the year 2005, 20,465,507 have container numbers while 2,625,633 do not. Of the Vessel AMS records pertaining to container shipments, 2,637,405 are identified as FROB.[84] Of the non-containerized records, 118,089 are identified as FROB. We calculate total FROB by multiplying the number of U.S.-destined shipments derived from the PIERS data sample set above by the ratio of the number of Vessel AMS records identified as FROB in Vessel AMS to the number of all Vessel AMS records for U.S-destined shipments.

For containerized shipments:

[2,637,405 ÷ (20,465,507 - 2,637,405)] * 7,771,538 = 1,149,685 containerized FROB

For non-containerized shipments:

[118,089 ÷ (2,625,633 - 118,089)] * 327,808 = 15,438 non-containerized FROB

Therefore, we conclude that, during 2005, vessels stopping at U.S. ports carried 1,149,685 containerized FROB shipments and 15,438 non-containerized FROB shipments. Adding these estimates of FROB to the numbers of containerized and non-containerized shipments estimated from the PIERS data sample set results in a total of 8,920,000 containerized and 343,000 non-containerized shipments in 2005.

VESSEL DATA ANALYSIS

VESSEL TRIPS AND UNIQUE CARRIERS

The incremental costs for the remaining two data elements – the Vessel Stow Plan and the Container Status Messages (CSMs) – that are the responsibility of carriers are dependent on the number of vessel trips and carriers. Therefore, we calculate the number of vessel trips arriving at their first U.S. port and the number of unique carriers transporting cargo into the United States. For this analysis, we use the Vessel AMS data for the full year of 2005, which contains approximately 23 million records, one for each bill of any type for cargo arriving in or passing through the United States.

Our steps for estimating and characterizing the number of unique vessel trips and carriers from the Vessel AMS data are:

- **Step One:** Match misspelled vessel names with correctly spelled counterparts;
- **Step Two:** Determine the VOCC for each vessel;
- **Step Three:** Remove cruise ships;
- **Step Four:** Characterize carriers by type of vessel operation;

[84] Vessel AMS designates shipments as FROB by labeling BOLs as "Remaining on Board" or "Canadian Discharge".

- **Step Five:** Determine the number of voyages entering a U.S. port for the first time since departing a foreign port; and
- **Step Six:** Characterize the VOCCs by the number of vessel trips arriving at U.S. ports for the first time since visiting a foreign port.

Correct for Misspelled Vessel Names

Similar to our analysis of the importer names described above, vessel names frequently appear misspelled or with alternate spellings in the Vessel AMS database. For example, the data list 2 vessels that appear to be the same: *YM Kaohsiung* and *YM Kaohsuing*. The data also list a vessel as both an *Aaron McAll* and an *Aaron McCall*. Our goal is to automatically match these similar names, since it is not practical to manually read and correct a list of more than 8,000 vessel names.

We follow a similar analytic process to that described above with importer names, but in this case we lack a zip code or other identifying data other than the vessel name. Therefore, we simply check each name against each other name and define a match to exist with up to 20 percent error in spelling. Our algorithm successfully matches similar names like those shown above, but we still have a number of false positive and false negative matches, creating a level of uncertainty in our analysis. An example of a false positive is the successful matching of *American Star* to *African Star*, as changing from one to the other only requires replacing "me" with "f," a very small change relative to the length of the name. A false negative in our analysis is the unsuccessful matching of *Zim Houston* to *Zim Houston III*, as the addition of three letters to a 10-letter name is too high of an error rate.[85] This step reduces the number of vessels identified in Vessel AMS from 8,676 to 7,858. We did not fix the false positive and negative matches by hand because we prefer that our analysis be reproducible. In addition, we do not estimate how widespread these additional errors are, which is therefore a significant source of uncertainty in our analysis.

Removing Vessels Unloading Only in Canada

A number of the records of Canadian-destined data are on vessels that do not unload any shipments in the United States. We suspect that these vessels are loading some cargo at a U.S. port prior to discharging other cargo at a Canadian port. In Vessel AMS, such vessels are identified by a numerical carrier code instead of the alphabetic Standard Carrier Abbreviation Code (SCAC) used for all U.S.-destined shipments. Therefore, we remove these records prior to continuing our analysis, as we cannot aggregate the numerical codes with the alphabetic codes, and we want to avoid double-counting carriers listed with each type of code. This step reduces the number of vessels by 140 to 7,718.

[85] The vessel *Zim Houston III* appears in thousands of records in Vessel AMS in 2005, while *Zim Houston* only appears once, on the same day at the same port as the *Zim Houston III*. Therefore, we conclude that these are the same vessel.

Determining the VOCC

In both the PIERS database analyzed above and the raw Vessel AMS database, the carrier listed for a given shipment is the carrier that issued the BOL. Therefore, house BOLs list the NVOCC as the carrier. To determine the VOCC that will ultimately be responsible for submitting the Additional Carrier Requirements, we count the number of BOLs issued by each carrier on each vessel and assume the carrier issuing the most BOLs on a given vessel is likely the vessel operator.[86] In cases where 2 carriers issued the same number of BOLs on a given vessel for the year, we choose a carrier at random from the two.

Based on our analysis, we conclude that 1,179 carriers operated 7,718 vessels (as determined by matching similarly spelled names above) that unloaded cargo at U.S. ports in 2005. Of these vessels, 3,007, or 39 percent, carried containerized cargo.[87] Note that this number includes any vessels carrying a container, not just containerships. For example, a bulk vessel with a container on its deck is included in this total. In addition, we use the USACOE data of ship entries, wherein vessels are listed by name with an ICST code, to identify bulk vessels. We identify 2,460 vessels from the Vessel AMS database as bulk vessels.

Removing Cruise Lines and Cruise Ships

The Vessel AMS contains records pertaining to cruise ships that are exempt from the interim final rule. The data do not identify the type of vessel, so we manually identify the major cruise line companies and remove all ships identifying those companies as the carrier. Exhibit 3-12 summarizes the cruise lines owning vessels that we remove from further analysis.

Removing records pertaining to vessels operated by these cruise lines reduces the total number of VOCCs to 1,163 and the total number of vessels to 7,452. To the extent that cruise lines other than those listed here filed manifest information via Vessel AMS in 2005, we overstate the number of carriers, vessels, and vessel trips potentially affected by the interim final rule.

[86] CBP estimates 20 to 25 percent of BOLs are issued by NVOCCs with the remainder issued by the VOCCs. Personal communication with Peggy Rutledge, Green Line Systems, Inc., March 12, 2007.

[87] We determine the number of container ships by checking the Container Number entry in Vessel AMS. If a vessel had an entry in this field other than something starting with "NC" (signifying non-containerized cargo) at any point in 2005, it is included in the total listed above. The remainder of the vessels either had blank entries or "NC" in all of their Container Number fields.

EXHIBIT 3-12 CRUISE LINES REMOVED FROM ANALYSIS

SCAC	CRUISE LINE
CRNV	Carnival Cruise Lines
CELY	Celebrity Cruises
COCL	Costa Cruises
CUNA	Cunard Line
CRYC	Crystal Cruises
DCRL	Disney Cruise Line
HAWI	Holland America Line
MSCU	MSC Cruises
NOCL	Norwegian Cruise Line
PNSS	Princess Cruises
RSSC	Regent Seven Seas Cruises
RCCU	Royal Caribbean Cruise Lines
SBCL	Seabourn Cruise Line
SDMY	SeaDream Yacht Club
SVSC	Silver Sea Cruises
WSSC	Windstar Cruises

Note: MSC Cruises is operated by a carrier that also operates cargo vessels. Therefore, only the vessels MSC Lirica and MSC Opera are removed from further analysis.
Source: IEc research.

Characterizing Carriers by Vessel Operation

We then characterize the carriers and the number of vessels operated. The distribution of the number of vessels operated by unique carriers is shown in Exhibit 3-13. Of the 1,163 carriers operating vessels in 2005 that are subject to this rule, 524 have one vessel that arrived in the United States, while five carriers operated more than 100 vessels that entered U.S. ports in 2005.

EXHIBIT 3-13 VESSELS PER CARRIER

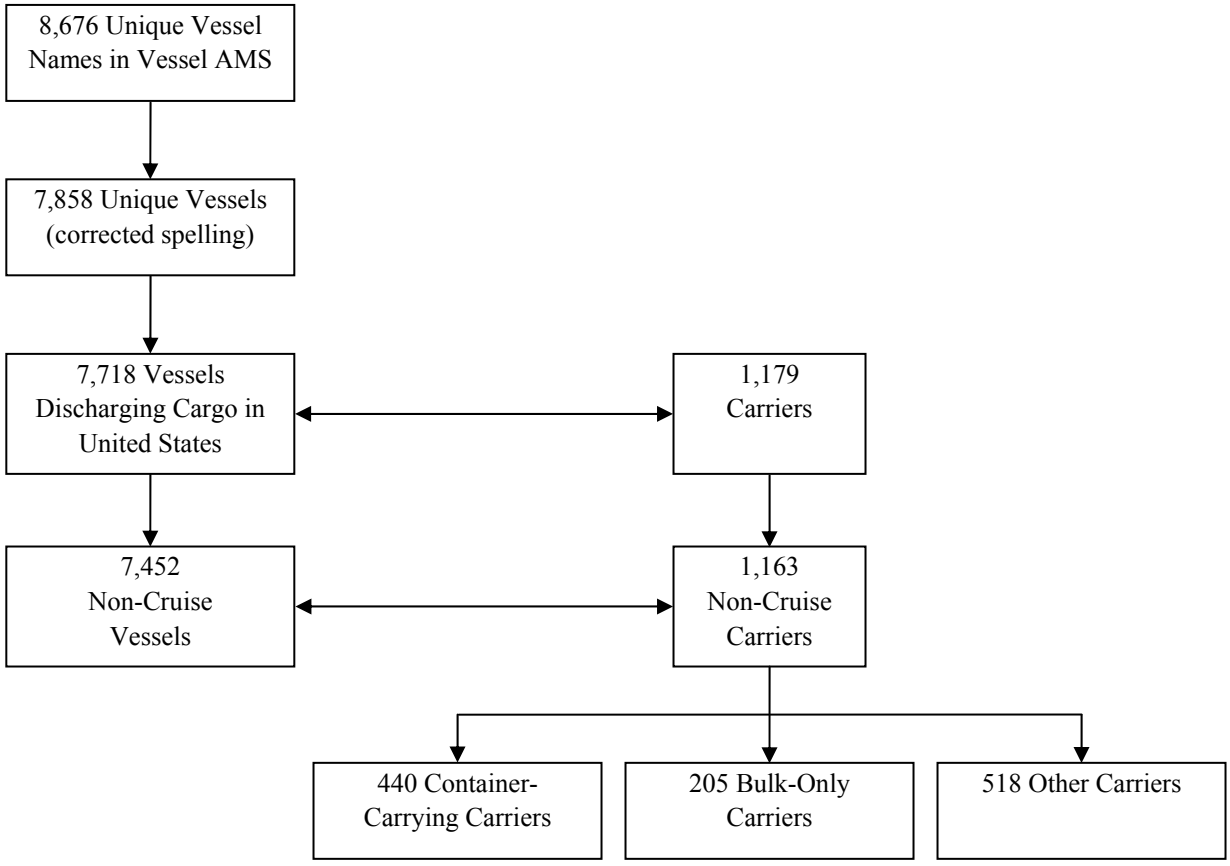
VESSELS	CONTAINER CARRIERS	BULK-ONLY CARRIERS	OTHER CARRIERS	TOTAL CARRIERS
1	197	158	169	**524**
2 - 10	179	46	245	**470**
11 - 100	61	1	102	**164**
101+	3	0	2	**5**
Total Carriers	**440**	**205**	**518**	**1,163**

Note: Container Carriers include any carriers who carried containers in 2005, not only containership operators. Bulk-only Carriers include carriers that operated only bulk vessels. The Other Carriers category includes all carriers who did not carry containers into the United States in 2005 and operated vessels other than (or in addition to) bulk vessels during that time.
Source: Vessel AMS; IEc calculation.

Summary of Carrier Classification

Our analysis identifies the 8,676 unique vessel names owned by 1,179 carriers from the Vessel AMS database for 2005. We correct for spelling and other errors, eliminate vessels discharging cargo only in Canada and cruise ships, and determine the VOCC by counting the number of BOLs issued by each carrier on each vessel. The steps in our analysis and derivation of the baseline characterization of carriers are shown in Exhibit 3-14.

EXHIBIT 3-14 DETERMINING VOCCs IN THE 2005 VESSEL AMS



DETERMINING UNIQUE VESSEL TRIPS ENTERING U.S. PORTS

Under the interim final rule, each vessel carrying cargo other than bulk or break-bulk and Ro-Ro cargo exclusively would need to submit a Vessel Stow Plan for each unique vessel trip from the last foreign port to the first U.S. port. In addition, carriers importing containerized cargo destined for the United States would need to transmit CSMs for certain events, provided they already collect and maintain CSM data in their electronic equipment tracking systems. Therefore, the next step in our analysis is to aggregate the shipments by port of lading, port of unlading, date, and vessel. Any two shipments for which these four data elements match will redundantly identify a single vessel trip. Counting unique combinations of those four data elements in the Vessel AMS data reduces the 23 million total records to 197,411 records.

Note that there is still redundancy in the reduced dataset calculated in the prior step. A vessel discharging cargo from 2 foreign ports at a single U.S. port will appear twice, as will a vessel discharging cargo at multiple U.S. ports visited consecutively. Therefore, we now need to estimate the number of initial stops at U.S. ports for each vessel in 2005.

Consistent with the interim final rule's requirements, we need only consider the first visit to a U.S. port by a vessel after visiting a foreign port. Unfortunately, the Vessel AMS data do not indicate whether a vessel unloading cargo at a particular U.S. port stopped at another U.S. port previously. For example, if a vessel sailed from Shanghai to Seattle and on to Oakland, the database would list records for cargo delivered from Shanghai to Seattle and, separately, for cargo delivered from Shanghai to Oakland. Under the interim final rule, the vessel operator, however, would only need to send one Vessel Stow Plan prior to arriving in Seattle. Nothing is required of the vessel operator sailing between Seattle and Oakland. For the purposes of this analysis, therefore, we need to count the direct trip from Shanghai to Seattle, but we do not want to count the indirect trip from Shanghai to Oakland (via Seattle).

Our approach is to compare chronological records for each vessel to determine whether that vessel could have visited a foreign port and returned to the United States in the time that passed between records. Continuing the previous example, if the shipments from Shanghai were discharged in Oakland 5 days after shipments from Shanghai were discharged in Seattle from the same vessel, there is no possibility that the vessel could have returned to Shanghai in between stopping at Seattle and Oakland. With nearly 200,000 records in our dataset, we develop an automated solution to determine whether chronologically consecutive records for a single vessel represented one visit to the United States from a foreign port or 2 visits.

Specifically, we first classify each U.S. port as belonging to one of four regions: Pacific ports, Atlantic ports, Gulf Coast ports, or Great Lakes ports. Ports with codes in Vessel AMS not appearing in the Schedule D reference table were classified as Unknown.[88]

Similarly, we classify foreign ports as Asia, Europe, Latin America, Caribbean, Canada – Great Lakes, Canada – West Coast, and Canada – East Coast. Ports with codes in Vessel AMS not appearing in the Schedule K reference table are classified as Unknown.[89]

From an analysis of shipping schedules on various carrier websites we select a value, in days, for ship transit time for each U.S. port and foreign port region pair.[90] This value represents the minimum time that we estimate must pass between visits to U.S. ports for a vessel to have visited a foreign port of lading in between. Using the Shanghai-Seattle-Oakland example, a discharge in Oakland of cargo loaded in Shanghai could not represent a new vessel trip if the same vessel discharged cargo in Seattle 5 days earlier. However, if the previous stop at Seattle was 25 days prior to the stop in Oakland, the vessel could feasibly have returned to Shanghai in between. The minimum trip lengths,

[88] U.S. Census Bureau, "Schedule D - District and Port Codes and Descriptions," as viewed at http://www.census.gov/foreign-trade/schedules/d/distcode.html on March 20, 2007.

[89] U.S. Army Corps of Engineers, "Schedule K - Classification of Foreign Ports by Geographic Trade Area and Country," as viewed at http://www.iwr.usace.army.mil/NDC/wcsc/scheduleK/schedulek.htm on March 20, 2007.

[90] See, for example: Maersk Line, "Sailing Schedules," as viewed at http://www.maerskline.com/frameset.jsp?app=schedules.directservices on March 20, 2007.

in days, assigned to each pair are shown in Exhibit 3-15. Note that these values are not meant to be accurate estimates of how long such a trip might take, but rather they are conservative estimates of the minimum number of days a round trip might take between the two geographically closest ports in each region.

EXHIBIT 3-15 ESTIMATES OF MINIMUM VESSEL ROUND TRIP TIME BETWEEN REGIONS (IN DAYS)

FOREIGN PORT REGIONS	U.S. PORT REGIONS				
	ATLANTIC	GREAT LAKES	GULF COAST	PACIFIC	UNKNOWN
Asia	14	14	14	14	14
Canada - East Coast	2	3	5	10	2
Canada - Great Lakes	5	2	7	10	2
Canada - West Coast	10	10	7	2	2
Caribbean	5	7	2	10	3
Europe	10	10	10	14	10
Latin America	7	10	5	7	5
Unknown	2	2	2	2	2

Note: Ports in unknown regions are assigned the minimum value in the column or row.
Source: IEc analysis.

After assigning each record a minimum round-trip time based on the regions of the port of lading and the port of unlading, we sort the records by vessel and date. Then, for each vessel, we compare each record to the previous record chronologically. If the minimum round-trip time exceeds the time passed between consecutive records, the record is not counted as a new vessel trip. If, however, the time passed between records does exceed the minimum round-trip time (i.e., the vessel could have conceivably visited the port of lading between visiting the previous port of unlading and the port of unlading in the record), the record is counted as a new vessel trip.

Applying this methodology to the 197,411 unique Vessel AMS records, we estimate that there were 45,726 unique vessel trips to the United States in 2005. The distribution of carriers by number of vessel trips is shown in Exhibits 3-16 and 3-17. Carriers completed 22,091 vessel trips with ships carrying containers and 13,515 vessel trips with bulk vessels. Carriers completed the remaining vessel trips with other types of vessels, typically carrying break-bulk or Ro-Ro cargo.[91] Of these trips, 221 carriers operated a single vessel entering the United States a single time in 2005. On the other hand, 4

[91] Note that any type of vessel discharging a container during a vessel trip is counted with the container vessel trips, while bulk vessel trips only include bulk vessels identified using the ICST code, not other types of vessels carrying bulk cargo.

carriers were responsible for over 1,000 vessel trips into the United States, the vast majority of which were with containerships.

EXHIBIT 3-16 CARRIERS BY VESSEL TRIPS AND TYPE

TOTAL VESSEL TRIPS/CARRIER	CONTAINER CARRIERS	BULK-ONLY CARRIERS	OTHER CARRIERS	TOTAL CARRIERS
1	51	39	131	221
2-10	116	121	224	461
11-100	183	43	159	383
101-1,000	70	5	19	94
1,000+	4	0	0	4
Total	**424**	**208**	**533**	**1,163**

Note: Container Carriers include any carriers who carried containers in 2005, not only containership operators. Bulk-only Carriers include carriers that operated only bulk vessels. The other Carriers category includes all carriers who did not carry containers into the United States in 2005 and operated vessels other than (or in addition to) bulk vessels during that time.
Source: Vessel AMS; IEc calculation.

EXHIBIT 3-17 VESSEL TRIPS BY TYPE PER CARRIER

TOTAL VESSEL TRIPS/CARRIER	CARRIERS	TOTAL CONTAINER VESSEL TRIPS	TOTAL BULK VESSEL TRIPS	TOTAL OTHER VESSEL TRIPS	TOTAL VESSEL TRIPS
1	221	51	39	131	221
2-10	461	396	849	903	2,148
11-100	383	4,156	5,241	4,847	14,244
101-1,000	94	13,174	7,348	3,835	24,357
1,000+	4	4,314	38	404	4,756
Total	**1,163**	**22,091**	**13,515**	**10,120**	**45,726**

Note: Container vessel trips include any trip where a vessel carried a container, regardless of vessel type. Bulk vessel trips include all trips by bulk vessels (identified using the ICST code) not carrying containers on that trip.
Source: Vessel AMS; IEc calculation.

FUTURE BASELINE SHIPPING ACTIVITY

The final step in our analysis of the shipment data is to estimate the projected growth in shipments and vessel trips for the 10-year analysis period. We rely on prior research by the USACOE of future infrastructure needs to determine a growth rate. This section applies growth rates from that research to the values we estimated earlier in this chapter for the number of annual shipments and vessel trips in 2005.

SHIPMENTS

We use statistics in the *National Dredging Needs Study of US Ports and Harbors: Update 2000*, prepared for the USACOE ("USACOE study"), to calculate the yearly percentage

increase in tonnage for containerized and non-containerized shipments.[92] These increases are 5.4 percent and 1.4 percent, respectively. We segment containerized and non-containerized shipments because containerized shipments are expected to grow faster in the near future than non-containerized shipments. Next, we assume that the average weight of a shipment through time will remain constant.[93] This allows us to apply the annual growth rate from the USACOE study to our estimate from PIERS of the total number of shipments in 2005 to estimate total number of shipments in each year from 2005 through 2018, shown in Exhibit 3-18.

EXHIBIT 3-18 PROJECTED U.S.-DESTINED SHIPMENTS PER YEAR, 2005 - 2018

YEAR	SHIPMENTS/YEAR		
	CONTAINERIZED	NON-CONTAINERIZED	TOTAL
2005	7,770,000	328,000	8,100,000
2006	8,190,000	332,000	8,520,000
2007	8,630,000	337,000	8,970,000
2008	9,100,000	342,000	9,440,000
2009	9,590,000	347,000	9,940,000
2010	10,100,000	351,000	10,500,000
2011	10,700,000	356,000	11,000,000
2012	11,200,000	361,000	11,600,000
2013	11,800,000	366,000	12,200,000
2014	12,500,000	372,000	12,800,000
2015	13,100,000	377,000	13,500,000
2016	13,900,000	382,000	14,200,000
2017	14,600,000	387,000	15,000,000
2018	15,400,000	393,000	15,800,000

Note: Projections assume average weight per shipment remains constant. Rows may not sum due to rounding.
Source: IEc calculation.

[92] Hackett, B., Global Transportation, 2003, *National Dredging Needs Study of US Ports and Harbors: Update 2000*, Prepared for Thorpe, P., U.S. Army Corps of Engineers, pp.15-24. We also consulted alternate data sources including historical PIERS data, several industry associations (the World Shipping Council, the American Association of Port Authorities, and others), and Federal government statistics. Most sources derive their projections from the same sources as the USACOE study.

[93] This assumption is conservative because we would actually expect the tonnage/shipment to increase through time, reflecting a general increase in efficiency in the supply chain. In particular, there is a large upfront cost to arrange and process a shipment, regardless of size or weight. Thus, the approach we employ likely overestimates the number of shipments that will occur in the future, thus overestimating the incremental cost of the interim final rule.

We apply the same growth rates to containerized and non-containerized FROB, making the same assumptions as above. The estimated volume of FROB traveling through U.S. ports from 2005 to 2018 is shown in Exhibit 3-19.

EXHIBIT 3-19 PROJECTED FROB PER YEAR, 2005 - 2018

YEAR	FROB/YEAR		
	CONTAINERIZED	NON-CONTAINERIZED	TOTAL
2005	1,150,000	15,400	1,170,000
2006	1,210,000	15,700	1,230,000
2007	1,280,000	15,900	1,290,000
2008	1,350,000	16,100	1,360,000
2009	1,420,000	16,300	1,440,000
2010	1,500,000	16,500	1,510,000
2011	1,580,000	16,800	1,590,000
2012	1,660,000	17,000	1,680,000
2013	1,750,000	17,300	1,770,000
2014	1,850,000	17,500	1,860,000
2015	1,950,000	17,700	1,960,000
2016	2,050,000	18,000	2,070,000
2017	2,160,000	18,200	2,180,000
2018	2,270,000	18,500	2,290,000

Note: Projections assume average shipment size remains constant. Rows may not sum due to rounding.
Source: IEc calculation.

In Chapter 4, we will apply the Importer Security Filing costs to both U.S.-destined shipments and FROB. Therefore, in Exhibit 3-20 we sum the values in the previous two tables.

EXHIBIT 3-20 PROJECTED TOTAL SHIPMENTS (INCLUDING FROB) PER YEAR, 2005-2018

YEAR	TOTAL SHIPMENTS/YEAR		
	CONTAINERIZED	NON-CONTAINERIZED	TOTAL
2005	8,920,000	343,000	9,260,000
2006	9,400,000	348,000	9,750,000
2007	9,910,000	353,000	10,300,000
2008	10,400,000	358,000	10,800,000
2009	11,000,000	363,000	11,400,000
2010	11,600,000	368,000	12,000,000
2011	12,200,000	373,000	12,600,000
2012	12,900,000	378,000	13,300,000
2013	13,600,000	384,000	14,000,000
2014	14,300,000	389,000	14,700,000
2015	15,100,000	394,000	15,500,000
2016	15,900,000	400,000	16,300,000
2017	16,800,000	406,000	17,200,000
2018	17,700,000	411,000	18,100,000

Note: Projections assume average shipment size remains constant. Rows may not sum due to rounding.
Source: IEc calculation.

VESSEL TRIPS

We obtained an annual growth rate in vessel calls of 3.35 percent from the USACOE national dredging study.[94] This estimated growth rate takes into account forecasted increases in tonnage and changes in types and sizes of vessels. We apply this yearly growth percentage to our 2005 estimate of 45,726 unique vessel trips to estimate total unique vessel trips for each year from 2005 through 2018, shown in Exhibit 3-21.

[94] Hackett, B., Global Transportation, 2003, *National Dredging Needs Study of US Ports and Harbors: Update 2000*, Prepared for Thorpe, P., U.S. Army Corps of Engineers, p.104.

EXHIBIT 3-21 PROJECTED VESSEL TRIPS, 2005 - 2018

YEAR	CONTAINER VESSEL TRIPS	BULK VESSEL TRIPS	OTHER VESSEL TRIPS	TOTAL VESSEL TRIPS
2005	22,091	13,515	10,120	**45,726**
2006	22,831	13,968	10,459	**47,258**
2007	23,596	14,436	10,809	**48,841**
2008	24,386	14,919	11,172	**50,477**
2009	25,203	15,419	11,546	**52,168**
2010	26,048	15,936	11,933	**53,916**
2011	26,920	16,469	12,332	**55,722**
2012	27,822	17,021	12,745	**57,589**
2013	28,754	17,591	13,172	**59,518**
2014	29,717	18,181	13,614	**61,512**
2015	30,713	18,790	14,070	**63,572**
2016	31,742	19,419	14,541	**65,702**
2017	32,805	20,070	15,028	**67,903**
2018	33,904	20,742	15,531	**70,178**

Note: Container vessel trips include any trip where a vessel carried a container, regardless of vessel type. Bulk vessel trips include all trips by bulk vessels (identified using the ICST code) not carrying containers on that trip.
Source: IEc calculation.

LIMITATIONS AND KEY SOURCES OF UNCERTAINTY

The key uncertainty in our analysis is reporting error in the PIERS database and the Vessel AMS database on which it is based. This includes misspelled importer names that we are unable to match (resulting in an overstatement of the number of importers), misspelled vessel names that we are unable to match (resulting in an overstatement of the number of vessel trips), missing BOL numbers, missing wholesale values, and unrealistically high and low wholesale values. Missing data may lead to underestimates of the number of shipments and the value of shipments.

In addition, we do not know the number or size of the importers with names redacted by CBP in the PIERS data (labeled "ORDER" in the data sample set). Therefore, we understate the number of importers. Intuitively, we expect larger importers are more likely to request anonymity than smaller importers, as evidenced by the absence of such prominent importers as Wal-Mart and Home Depot in the PIERS data sample set. In this case, we specifically understate the number of large importers.

Additional sources of error in our analysis include possible miscategorization of shipments into the different non-containerized shipment categories, sampling error in our PIERS data, and our series of simplifying assumptions (e.g., all importers with the same name are the same entity, the carrier issuing the most BOLs for shipments on a vessel is the vessel operator). Because we do not know how we may have miscategorized non-containerized imports, we do not know how this will bias our estimates of the cost of the

interim final rule. Similarly, we do not know the direction of bias resulting from sampling error in our 96-day data sample set. We use various assumptions and factors to approximate the total number of affected importers and shipments for the entire baseline year (2005). Our simplifying assumptions with regard to importer names may result in an underestimate of the number of importers, while the assumption that the carrier issuing the most BOLs on a vessel is the VOCC may result in an overstatement of the number of carriers, as NVOCCs will be included in our total. Accordingly, we may miss small VOCCs that rely primarily on NVOCCs to fill their vessel.

We also may have miscategorized the number of bulk vessel trips, as we base our estimate on the type of vessel, not the type of cargo on the vessel. We also do not know if carriers will adjust operations such that fewer non-containerships carry containers due to the additional filing requirements. Therefore, we may overstate the future projected container vessel trips and understate the non-container-carrying vessel trips. Finally, we may miss cruise ships and ferries that filed declarations in Vessel AMS that are exempt from filing the data elements, which would cause us to overstate the number of vessels and carriers subject to the rule.

CHAPTER 4 | INCREMENTAL COSTS AND ECONOMIC IMPACT

In this chapter, we estimate costs associated with complying with the requirements of the interim final rule for importers and carriers. In addition, we estimate the welfare losses to U.S. importers arising from potential delays in the supply chain for imported goods. These estimated costs represent the incremental costs above and beyond the costs currently incurred under the baseline conditions described in Chapter 2, including compliance with the 24-Hour Advance Vessel Manifest Rule ("the 24-Hour Rule"). We estimate the incremental costs associated with anticipated shipping volume (estimated in Chapter 3) over an analysis period of 10 years. In addition, this cost analysis considers and evaluates the following four alternatives:

1. **Alternative 1 (the chosen alternative):** Importer Security Filings and Additional Carrier Requirements are required.[95] Bulk cargo is exempt from the Importer Security Filing requirements;
2. **Alternative 2:** Importer Security Filings and Additional Carrier Requirements are required. Bulk cargo is **not** exempt from the Importer Security Filing requirements;
3. **Alternative 3:** Only Importer Security Filings are required. Bulk cargo is exempt from the Importer Security Filing requirements; and
4. **Alternative 4:** Only the Additional Carrier Requirements are required.

Estimated costs generally consist of the following three components: (1) costs incurred to collect, coordinate, and electronically transmit the required data to U.S. Customs and Border Protection (CBP); (2) welfare losses to U.S. importers arising from potential delays in the supply chain; and (3) government implementation costs.

We develop compliance costs on a per importer basis to account for initial, one-time security filing implementation costs. Because an Importer Security Filing is required of importers for each shipment (as defined herein as a unique house or regular bill of lading (BOL)), we add compliance costs per shipment.[96] For foreign cargo remaining on board (FROB), where the importer is construed as the *international carrier* of the vessel arriving in the United States, we develop separate compliance costs per shipment. For the

[95] For each alternative, the Additional Carrier Requirements apply only to containerized cargo.

[96] As discussed in Chapter 2, CBP is allowing one Importer Security Filing to satisfy multiple BOLs covering one shipment to one importer of record. To be conservative, we assume one Importer Security Filing for each regular or house BOL. As discussed later in this chapter, this assumption will overstate the number of Importer Security Filings.

Additional Carrier Requirements (Vessel Stow Plans and Container Status Messages (CSMs)), we develop compliance costs per carrier and vessel trip. We then apply these unit costs to the baseline number of importers, shipments, carriers, and vessel trips for each year of the 10-year analysis period.

This chapter is organized as follows. We first describe our overall approach to the analysis and the various data and information sources relied upon. Second, we estimate the importer costs associated with collecting and transmitting the importer data elements and shipment delays. Third, we estimate the costs associated with collecting and transmitting the additional carrier data requirements (Vessel Stow Plans and CSMs). We then describe the government implementation costs provided to us by CBP. Finally, we present the overall cost results and discuss the key sources of uncertainty in the analysis.

APPROACH TO COST ANALYSIS

In the remainder of this chapter, we describe in detail the analysis and calculations that we perform to estimate the incremental costs of the interim final rule. Our general approach involves five primary steps:

1. Evaluating and estimating the incremental costs to collect, coordinate, and transmit the required security filing data elements to CBP;
2. Expressing or converting these incremental costs to an equivalent unit cost (e.g., per importer, per shipment, per carrier, per vessel trip);
3. Multiplying the unit costs by the baseline number of importers, shipments, carriers, and vessel trips estimated in Chapter 3 for each year of the 10-year analysis period;
4. Evaluating and estimating the welfare losses to U.S. importers arising from potential delays in the supply chain; and
5. Incorporating the costs the U.S. government expects to incur to implement the interim final rule.

Because the set of required importer data elements is distinct from the required set of additional carrier data elements, the costs associated with these two sets of data requirements are analyzed separately. These two sets of elements differ not only by the party assigned the responsibility of preparing and transmitting the data (importer versus carrier), but also by the types of units that the data must be supplied for (e.g., per importer or shipment versus per carrier or vessel trip). For example, costs incurred by the carriers to prepare and transmit the additional carrier data elements are not necessarily dependent on the number of shipments, but rather on the number of vessels they operate and the trips these vessels make to the United States. Exhibit 4-1 presents the cost components and their respective units.

EXHIBIT 4-1 COST COMPONENTS AND UNITS

COST TYPE	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS
Security filing data collection and transmittal	per importer (initial, one-time upfront costs) per shipment (as a recurrent transaction cost or fee)	per operating carrier (Vessel Stow Plans and CSMs) per vessel trip (Vessel Stow Plans)
Supply chain	per day of delay	assume none for carrier costs
Government implementation	initial, one-time costs plus annual operating and maintenance costs	initial, one-time costs plus annual operating and maintenance costs

To estimate the full range of the total estimated costs for complying with the interim final rule for the four alternatives, we develop a high cost scenario and a low cost scenario by assuming certain values for the key cost factors. Exhibit 4-2 presents these two cost scenarios and their bases. The primary variation between the low and high cost scenarios relates to the security filing data collection and transmittal and supply chain cost components.

EXHIBIT 4-2 COST SCENARIOS

	LOW COST SCENARIO		HIGH COST SCENARIO	
COST TYPE	IMPORTER SECURITY FILING	ADDITIONAL CARRIER REQUIREMENTS	IMPORTER SECURITY FILING	ADDITIONAL CARRIER REQUIREMENTS
Security filing data collection and transmittal	low estimates of the number of importers and shipments low unit costs	low unit costs	high estimates of the number of importers and shipments high unit costs	high unit costs
Supply chain	assume no costs	assume no costs	assume shipments are delayed	assume no costs
Government implementation	costs provided by CBP			

We assume that the interim final rule will be effective on January 1, 2009.[97] We calculate the costs of complying with the interim final rule annually for a period of 10 years using real dollars. In accordance with U.S. Office of Management and Budget (OMB) direction, we then calculate the present value of the annual costs using real discount rates

[97] The reader is cautioned that this assumption is made for the purposes of this analysis only. The actual effective date will be determined upon publication of the interim final rule.

of 3 percent and 7 percent.[98] We then calculate an annualized cost based on the present value figures.

For our analysis, the relevant cost data and information come largely from interviews we conducted with representatives from the shipping, importing, and customs brokerage industries. Exhibit 4-3 summarizes the types and numbers of industry contacts we interviewed. Appendix A lists the names of the companies or firms we interviewed, provided they permitted such disclosure in this report. For confidentiality reasons, we do not cite sensitive company information provided by specific respondents. In addition, where an industry contact is referenced, we reviewed the referenced information with the contact to ensure that we correctly characterized their statements to us. Finally, additional cost data and information were provided in public comments to the proposed rule published January 2, 2008 (73 FR 90).[99]

EXHIBIT 4-3 INDUSTRY CONTACTS INTERVIEWED

INTERVIEWEE DISTRIBUTION	
TYPE	**NUMBER**
Small importers	3
Large importers	4
Non-vessel operating common carriers (NVOCCs)	1
NVOCCs/Freight Forwarders/Brokers	6
Vessel operating common carriers (VOCCs)	4
Trade groups and consultants	3
Software vendors	2

IMPORTER SECURITY FILING COSTS

As discussed in Chapter 2, the interim final rule requires the ISF Importer to transmit as many as 10 security filing data elements for each shipment 24 hours prior to lading at a foreign port (Alternatives 1, 2, and 3).[100] The ISF Importer, in turn, may designate an

[98] For this cost analysis, we assume a base year (Year 0) of 2009 for present value calculations using costs estimated in 2008 dollars.

OMB requires Federal agencies to estimate present value costs and benefits of proposed regulations applying real discount rates of 3 and 7 percent (U.S. OMB, *Circular A-4*, September 17, 2003, p. 34). OMB provides no specific guidance on the time frame for an analysis. In our opinion, projecting trends in international shipping beyond 10 years is highly speculative.

[99] These comments can be viewed in their entirety at www.regulations.gov at USCBP-2007-0077.

[100] As discussed in Chapter 2, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings. However, because of data limitations, we cannot estimate the changes in cost attributable specifically to CBP's restraint in enforcing the rule during the initial 12 months or the flexibilities that the rule provides. We therefore estimate the incremental costs of the interim final rule assuming that importers will be fully compliant upon the effective date of the rule (i.e., ISF Importers or

authorized agent to file the security filing on its behalf. Based on our interviews with importers and other parties involved in the supply chain, collection and transmittal of the required importer data elements to CBP involves incremental costs. These costs include:

- Costs to collect, coordinate, and transmit the required security filing data elements to CBP; and
- Welfare losses to U.S. importers from potential delays in the supply chain that may arise as carriers ensure that either the Importer Security Filing is sufficiently prepared or has been transmitted to and accepted by CBP prior to lading at a foreign port.

Each of these cost components is described and estimated below.

SECURITY FILING DATA COLLECTION AND TRANSMITTAL COSTS

From our interviews with representatives from the importing, shipping, and customs brokerage industries as well as public comments to the proposed rule, importers and their designated security filing agents will incur additional costs to collect, coordinate, and transmit the required security filing data elements to CBP. We identify and group these costs into the following two cost categories according to when they would be incurred, namely: 1) initial, one-time implementation costs, and 2) recurring costs.

Initial, One-Time Costs

The following costs represent the types of initial, one-time or upfront costs incurred by importers and their designated security filing agents to implement the security filing requirements of the interim final rule:

- **Information systems costs:** Importers and their designated security filing agents will have to upgrade or acquire computer systems technology (e.g., software) to effectively and seamlessly collect and coordinate the information and data needed to prepare and transmit complete and accurate security filings. Some of this information is uniquely known to various parties within the supply chain (e.g., container stuffing location from a shipper or NVOCC, importer of record number from an importer or broker); therefore, importers or their agents will likely need to design these upgraded or new systems to allow multiple parties to provide this information to importers or their agents electronically (e.g., via a web-based system). In addition, in order to comply with the requirements, some parties may have to obtain access to a CBP-approved system such as the Vessel Automated Manifest System (Vessel AMS) or Automated Broker Interface (ABI).

  Although compliance with the 24-Hour Rule advanced the deadline when manifest data must be submitted to CBP, under the interim final rule additional security filing data must be collected and assimilated. As discussed in Chapter 2, some of these additional data are currently not recorded in documents routinely

their designated agents will transmit all of their required Importer Security Filing data elements to CBP no later than 24 hours prior to lading at a foreign port), which likely overstates costs.

submitted to CBP. For example, the container stuffing location and consolidator are not currently contained in 24-hour manifests or customs entries. Additionally, although most of the required data elements are routinely tracked or recorded, they typically are not compiled and entered until much later in the shipping process than required by the interim final rule (e.g., while the shipment is onboard a vessel traveling to a U.S. port of entry). As a result, ISF Importers or their designated agents must upgrade their information systems to retrieve and produce the required data elements at earlier points in time in the supply chain in order to meet the interim final rule's filing deadline of 24 hours prior to lading.

- **Research and restructuring costs:** ISF Importers and their designated security filing agents may have to engage in research activities to identify, evaluate, and implement the optimal business processes, methods, or information systems with which to comply with the security filing requirements. For example, some importers may elect to file their security filings themselves ("self-file") instead of designating their brokers or NVOCCs to complete their filings on their behalf. In addition, certain business relationships (e.g., terms of sale) between importers and their shippers or suppliers may have to be restructured in order to allow for and facilitate the transfer of information between supply chain parties.
- **Bonds:** Parties designated by their importing customers to file security filings may have to update their existing international carrier, basic importation and entry, or foreign trade zone operator bonds to meet the interim final rule requirements. CBP is amending several bond conditions to include liquidated damages of $5,000 for violations of the requirements.

In consideration of the cost types described above, we assume that ISF importers will incur initial, one-time implementation costs regardless of whether they file their Importer Security Filings themselves ("self-file") or designate a filing agent. According to a comment submitted by the chair of the Departmental Advisory Committee on the Commercial Operations of CBP and Related Homeland Security Functions (COAC), a COAC subcommittee conducted a survey of companies using either in-house resources or a service provider to provide them with the necessary security filing data. The subcommittee estimated a cost of $25,000 per importer to complete some level of internal programming and modify their information systems.[101] This estimate is based on estimates provided to COAC by two software providers to modify existing information systems ($50,000) or acquire new information systems ($100,000) to manage the data needed to supply the security filing data elements prior to 24 hours before lading. The COAC subcommittee used 50 percent of the lower estimate of $50,000 ($25,000) as a conservative and realistic estimate, in consideration of companies that are already prepared to provide the required data in advance.

[101] This comment can be reviewed in its entirety at www.regulations.gov. Comment number USCBP-2007-0077-0046. Note that while this comment was submitted by the Chair of the Departmental Advisory Committee on the Commercial Operations of U.S. Customs and Border Protection and Related Homeland Security Functions (COAC), the author submitted it as an individual and not on behalf of COAC.

Recurring Costs

Recurring costs incurred by ISF Importers and their designated security filing agents to implement the security filing requirements of the interim final rule include additional staff or labor to collect, coordinate, and transmit the required security filing data elements to CBP. Associated staff activities may include operations and maintenance of the updated information systems described above; security filing data input, review, and reconciliation; communications with supply chain parties; and Importer Security Filing monitoring and revisions. Most parties we interviewed indicated that for those importers designating a filing party, the designated filing parties would likely pass their recurring costs as well as their initial, one-time costs on to the importers in the form of a security filing transaction fee.

We assume that all importers will incur security filing transaction costs on a continual, recurrent basis. As discussed above, importers will likely incur a transaction fee charged by the authorized parties designated to transmit security filings on their behalf. These fees are incremental to the fees brokers currently charge importers for filing entries and carriers charge for filing manifest information in compliance with the 24-Hour Rule.

The various parties involved in the supply chain that we interviewed estimated that this transaction fee could range from as low as $0 to more than $100 per Importer Security Filing. These estimates are based on the amount currently charged by brokers and NVOCCs to file entries and manifest data, respectively. If we disregard the lowest and highest estimates provided in our interviews, then the estimates fall into a narrower range of $10 to $50 per Importer Security Filing. These transaction fees overstate our cost estimate because there are likely some importers who would file security filings themselves (self-filers) if their own filing costs are lower than the transaction costs charged by their designated filers.[102]

The exact initial costs and transaction costs are likely to depend on factors such as the specific party designated by the importer to collect and transmit the required security filing data to CBP, whether foreign cargo remaining on board (FROB) is involved, whether Importer Security Filings and entry filings are made together, the level of importer technological sophistication, complexity of an importer's supply chain and business style, whether multiple BOLs can be satisfied by one Importer Security Filing, cargo type (e.g., containerized, bulk, break-bulk, or Ro-Ro; transshipped or in-bond; consolidated or unconsolidated shipments), the number of goods contained in a particular shipment, whether required Importer Security Filings updates are made, and the importer or carrier's transaction volume. Each of these cost factors is discussed in further detail below.

[102] A number of interviewees indicated that some importers, especially those with routine and less complex shipments (e.g., limited number of commodity types, regular delivery times, unconsolidated shipments), are considering filing customs entries on their own to reduce costs as they and third-party brokerage software becomes more advanced and to reduce the number of inaccurate entries. The incremental costs for these importers to also file their own importer security filings are expected to be lower than the potential transaction costs or fees charged by brokers or carriers.

Security Filing Cost Factors

- **Filing party:** The costs may vary depending on the party filing the security filing. The parties we interviewed indicated that the initial, one-time costs are not necessarily different between those importers who self-file and those who designate a filing agent.[103] For the security filing transaction costs, although brokers typically charge higher fees for filing entries (via ABI) than carriers (VOCCs or NVOCCs) charge for filing manifest data (via Vessel AMS), our findings from the interviews we conducted do not suggest that the security filing fees are likely to be higher for brokers as compared to carriers.

  In addition, Importer Security Filing fees may be different for unconventional, in-bond types of cargo, where the party filing the immediate exportation (IE), transportation and exportation (T&E), and foreign trade zone (FTZ) documentation with CBP (and not necessarily the importer of record) is required to provide the security filing. However, we do not have the data or information to quantify the extent to which the security filing fee would vary for parties or carriers filing security filings for in-bond or FTZ shipments.

- **Foreign cargo remaining on board (FROB):** For FROB, the international carrier is required to submit the security filing. In this instance, the transaction fees would likely be in addition to the fees currently charged by the carriers for filing manifest data (via Vessel AMS). However, we estimate that these fees would be comparatively high because the carriers have expressed concerns with meeting the security filing requirements for FROB. Two non-containerized carriers that we interviewed, Fednav International Ltd. (Montreal, Canada) and Wallenius Wilhelmsen Logistics AS (New Jersey), indicated that there would be significant difficulties with providing security filings for FROB to CBP before lading the cargo at a foreign port.[104] Carriers are not routinely collecting or transmitting to CBP any of the required five security filing data elements for FROB.[105] Moreover, their shipping customers may be reluctant to provide the necessary data as they are not particularly concerned that the carrier's vessel is scheduled to call on a U.S. port first, so long as the cargo is ultimately delivered to the foreign customer. The specific difficulties for one particular carrier also stem from the type and scope of their operations, where they deploy bulk vessels that, on the same voyage, typically call at multiple ports in both Canada and the United States that are in close proximity and frequently change on very short

[103] For example, an interviewee indicated that being a self-filer does not automatically imply that an importer is more advanced or sophisticated technically and, therefore, has lower initial costs (personal communication with Leslie Levy August, Trade Bridge International, Inc., on April 18, 2008).

[104] Personal communication with Dan Crowe, Fednav International Ltd., on May 14, 2007, and Daniel M. Conaton, Wallenius Wilhelmsen Logistics AS, on May 17, 2007.

[105] Wallenius Wilhelmsen Logistics AS indicated that carriers have no method to collect any of the required five security filing data elements without significant and costly programming. Personal communication with Daniel M. Conaton, Wallenius Wilhelmsen Logistics AS, on May 17, 2007.

notice.[106] For example, a vessel originally destined for a Canadian port first (e.g., Windsor, Ontario) is subsequently redirected within a few hours of arrival to a U.S. port (e.g., Detroit, Michigan). This vessel would now be carrying FROB and the appropriate security filing for the cargo would have to be made. Because of the unique circumstances concerning FROB, we separately estimate transaction costs per security filing for FROB, on a per-shipment basis, at the higher end of the range.

- **Importer security filings and entry filings:** Pursuant to the interim final rule, Importer Security Filings and customs entries can be filed together.[107] As discussed in Chapter 2, there are four data elements that both submissions share: 1) consignee number; 2) importer of record number; 3) country of origin; and 4) commodity Harmonized Tariff Schedule of the United States (HTSUS) number if provided at the 10-digit level.[108] If the Importer Security Filing and entry are filed together, the importer or licensed customs broker must file these submissions.

  While there may be a preference to file both security filings and entry submissions together to save time and cost, it is not clear whether there are, in fact, cost savings or whether any potential cost savings would be passed on to importers. For instance, although there are four data elements in common, the option of filing both submissions together does not relieve an importer of the requirement to submit the remaining six security filing data elements. In addition, there may be additional costs involved as a result of a higher potential of having to correct or amend entries that would be filed earlier than they are now typically filed (i.e., 24 hours prior to lading at a foreign port versus while the vessel is en route to the United States).[109] We do not have the data or information to quantify which importers (or their brokers) will elect to file their security and entry filings together or the extent to which the security filing costs would change using this option.

[106] For example, in the Great Lakes, ports of call and their sequence are changed while the vessel is sailing for various reasons such as berth congestion, inclement weather, logistical issues, inadvertent over- and under-carriage of cargo, and dockworker strikes.

[107] Pursuant to the interim final rule, Importer Security Filings and applications to admit goods to an FTZ can also be filed together. However, we do not have the data or information to quantify which FTZ applicants will elect to file their security filings and FTZ admissions applications together or the extent to which the Importer Security Filing fee would change using this option.

[108] An importer could choose to do one of the following: (1) submit the Importer Security Filing and/or entry or entry summary data with no connection between them; or (2) submit the entry and/or entry summary data via the same electronic transmission as the Importer Security Filing. If the importer chooses the latter option, the importer would only be required to submit the four common data elements once to be applied to the Importer Security Filing as well as the entry and/or entry summary.

[109] Some interviewees indicated that it would be difficult to amend entry filings. Personal communication with Brett Swasey, Tradex International Inc., on April 2, 2007.

- **Importer sophistication:** Security filing costs are likely to be lower for the more sophisticated importers that have automated systems collecting information during the shipping process and with which to share and transmit the necessary data to the filing party. However, we do not have the data or information to quantify the extent to which the costs would change with the level of importer sophistication.
- **Complexity of importer's supply chain and business style:** Security filing costs are likely to be lower for importers with less complex supply chains and business styles, as reflected by the number and type of goods imported and their suppliers; whether goods are purchased directly from suppliers or manufacturers or indirectly through a wholesaler, distributor, or reseller; whether their goods are consolidated with other cargo; whether the importer employs a freight forwarder or consolidator; and whether the importer uses just-in-time inventory schemes. However, we do not have the data or information to quantify the extent to which the security filing costs would change with the level of supply chain and business style complexity.
- **Multiple bills of lading:** As discussed in Chapter 2, multiple bills of lading (e.g., master and house BOLs) are issued by carriers and consolidators while consolidating shipments. Pursuant to the interim final rule, one Importer Security Filing can satisfy multiple BOLs covering one or more individual shipments, as long as those shipments represent a single consolidated shipment or "conveyance" to one importer of record. For example, one Importer Security Filing could be filed for both a master BOL and its underlying house BOLs that have been issued for individual shipments that are then consolidated into a single shipment to one importer of record.[110] The security filing data elements would be required for each good or commodity listed on the master BOL.

  For purposes of this analysis, we conservatively assume that an Importer Security Filing would be required for each unique house or regular BOL because we do not have the data or information to estimate and characterize the number of individual shipments that are consolidated into a single consolidated shipment and covered by master BOLs for conveyance to individual importers. In addition, we do not have the data or information to quantify the extent to which the security filing fee would vary for parties filing security filings at the master BOL level. Our assumption will overstate the number of Importer Security Filings.
- **Cargo type and number of goods:** Importer Security Filing fees are likely to be higher for containerized cargo comprised of multiple consolidated shipments. For example, the costs and fees associated with completing a security filing for a shipment comprised of multiple commodities that has been consolidated with

[110] In this example, such a situation would arise when an importer issues a single purchase order for goods to be provisioned by multiple manufacturers or suppliers.

other shipments in a container are likely to be higher than a single commodity bulk shipment of oil or grain. However, we do not have the data or information to quantify the extent to which the Importer Security Filing fee would change with cargo type or the number of different commodities.

In addition, Importer Security Filing fees may be lower for in-bond shipments where only five importer data elements are required. We assume, however, that the cost differential associated with filing a reduced number of data elements is not significant, as we do not estimate costs on an element-by-element basis, but rather a per-shipment basis.

- **Importer security filing updates:** Under the interim final rule, the party who filed the Importer Security Filing is required to update the filing if, after the filing and before the goods arrive within the limits of a port in the United States, there are changes to the information filed or more accurate information becomes available. However, we do not have the data or information to estimate the frequency of these required updates and their associated costs. As a result, costs associated with these shipments may be understated.
- **Transaction volume:** The interviewees most commonly cited transaction volume as a factor in determining the Importer Security Filing fee. Brokers and carriers are likely to charge lower security filing fees to their customers importing large numbers of shipments on an annual basis. Furthermore, we understand that the customs brokerage business is highly competitive and brokers would not want to risk losing their best customers as a result of inappropriately priced security filing fees.

Security Filing Cost Estimates

For initial or one-time costs, we use a cost of $25,000 per importer for both the low and high cost scenarios, based on the COAC subcommittee estimate. We amortize this cost over the first three years of the analysis period (2009 through 2011).[111] As discussed in the previous subsection, we do not have the data or information to quantify the extent to which these initial costs would change with the various cost factors described above. However, because we believe that these costs would be especially cost prohibitive for "infrequent importers" (i.e., those that import only one shipment per year), we assume that these importers would choose not to incur these initial costs and instead seek alternative sources for their goods or cease importing altogether. We assume the costs associated with this switch are de minimis relative to the total costs of this rule.[112]

[111] According to tax accounting guidance, software costs are recoverable as a deductible capital expense over a 3-year period (Sair, Edward A., "New guidelines on tax accounting for software costs," *The Tax Adviser*, March 1, 2001, as viewed at http://www.allbusiness.com/technology/computer-software/811715-1.html on April 29, 2008).

[112] Because the methodology used to estimate the number of affected importers results in a lower bound estimate of zero importers who import only one shipment per year (see Chapter 3), this assumption applies only to the upper bound estimates of the number of importers who import only one shipment per year.

As a result of the considerations discussed in the previous subsection, for the low cost scenario, we estimate that the lower end of the cost range ($10 per Importer Security Filing or shipment) would apply to larger importers and that the higher end of the cost range ($50 per Importer Security Filing or shipment) would apply to small, lower volume importers. For the high cost scenario, we estimate a higher cost range by increasing these values by 50 percent. These higher values are still within the upper bound estimate of $100 per Importer Security Filing that we obtained from one interviewee.

Using the results from Chapter 3, Exhibits 4-4A through 4-4B present our distribution of the estimated initial, one-time costs based on importer frequency for importers importing cargo other than exclusively bulk cargo and importers importing exclusively bulk cargo, respectively.

Using the results from Chapter 3, Exhibits 4-5A through 4-5C present our distribution of the estimated Importer Security Filing costs based on importer frequency for containerized, bulk, and break-bulk and Ro-Ro cargo, respectively. For importers listed anonymously, we assume a unit cost near the lower end of the range ($15 or $22.50 per shipment). This assumption is based on our belief that these anonymous importers are likely to be larger companies. As discussed in Chapter 3, some of the most recognized large importers are not explicitly listed in the PIERS database, including Wal-Mart and Home Depot. We believe that larger importers would be more likely to request that the necessary documentation in PIERS be listed anonymously. Finally, for FROB shipments, we assume the higher end of the cost ranges for both the low and high cost scenarios, at $40 and $60 per FROB shipment, respectively, as shown in Exhibit 4-5D.

EXHIBIT 4-4 IMPORTER SECURITY FILING INITIAL, ONE-TIME UNIT COSTS (PER IMPORTER) (2008 DOLLARS)

A: IMPORTERS IMPORTING CARGO OTHER THAN EXCLUSIVELY BULK CARGO (ALTERNATIVES 1, 2, AND 3)				
IMPORTER FREQUENCY	TOTAL NO. OF IMPORTERS (2005) LOW ESTIMATE	TOTAL NO. OF IMPORTERS (2005) HIGH ESTIMATE	LOW COST SCENARIO (PER IMPORTER)	HIGH COST SCENARIO (PER IMPORTER)
Once per year	0	393,443	$0	$0
Twice yearly to less than monthly	141,393	267,245	25,000	25,000
Monthly to less than weekly	35,387	68,164	25,000	25,000
Weekly to less than daily	17,727	18,771	25,000	25,000
Daily or greater	2,548	1,597	25,000	25,000
Anonymous	NA	NA	25,000	25,000
Total	**197,055**	**749,220**		

Source: IEc calculations presented in Chapter 3 and comments to the proposed rule.

B: IMPORTERS IMPORTING EXCLUSIVELY BULK CARGO (ALTERNATIVE 2 ONLY)				
IMPORTER FREQUENCY	TOTAL NO. OF IMPORTERS (2005) LOW ESTIMATE	TOTAL NO. OF IMPORTERS (2005) HIGH ESTIMATE	LOW COST SCENARIO (PER IMPORTER)	HIGH COST SCENARIO (PER IMPORTER)
Once per year	0	1,654	$0	$0
Twice yearly to less than monthly	659	1,430	25,000	25,000
Monthly to less than weekly	176	274	25,000	25,000
Weekly to less than daily	48	11	25,000	25,000
Daily or greater	3	0	25,000	25,000
Anonymous	NA	NA	25,000	25,000
Total	**886**	**3,369**		

Source: IEc calculations presented in Chapter 3 and comments to the proposed rule.

EXHIBIT 4-5 IMPORTER SECURITY FILING TRANSACTION UNIT COSTS (PER SHIPMENT) BY IMPORTER SIZE (2008 DOLLARS)

A: CONTAINERIZED CARGO (ALTERNATIVES 1, 2, AND 3)

IMPORTER FREQUENCY	TOTAL NO. OF BOLS OR SHIPMENTS (2005) LOW ESTIMATE	TOTAL NO. OF BOLS OR SHIPMENTS (2005) HIGH ESTIMATE	LOW COST SCENARIO (PER SHIPMENT)	HIGH COST SCENARIO (PER SHIPMENT)
Once per year	0	455,700	$50.00	$75.00
Twice yearly to less than monthly	697,500	1,383,600	40.00	60.00
Monthly to less than weekly	1,225,000	1,643,600	30.00	45.00
Weekly to less than daily	2,185,700	1,808,300	20.00	30.00
Daily or greater	2,362,400	1,179,600	10.00	15.00
Anonymous	1,300,800	1,300,800	15.00	22.50
Total	**7,771,500**	**7,771,500**		

Note: Columns may not sum due to rounding.
Source: IEc calculations presented in Chapter 3 and interviews with representatives of various components of the supply chain.

B: BULK CARGO (ALTERNATIVE 2 ONLY)

IMPORTER FREQUENCY	TOTAL NO. OF BOLS OR SHIPMENTS (2005) LOW ESTIMATE	TOTAL NO. OF BOLS OR SHIPMENTS (2005) HIGH ESTIMATE	LOW COST SCENARIO (PER SHIPMENT)	HIGH COST SCENARIO (PER SHIPMENT)
Once per year	0	2,800	$50.00	$75.00
Twice yearly to less than monthly	4,900	12,600	40.00	60.00
Monthly to less than weekly	11,900	20,000	30.00	45.00
Weekly to less than daily	25,500	29,400	20.00	30.00
Daily or greater	35,500	13,100	10.00	15.00
Anonymous	11,200	11,200	15.00	22.50
Total	**89,000**	**89,000**		

Note: Columns may not sum due to rounding.
Source: IEc calculations presented in Chapter 3 and interviews with representatives of various components of the supply chain.

C: BREAK-BULK AND RO-RO CARGO (ALTERNATIVES 1, 2, AND 3)				
IMPORTER FREQUENCY	TOTAL NO. OF BOLS OR SHIPMENTS (2005) LOW ESTIMATE	TOTAL NO. OF BOLS OR SHIPMENTS (2005) HIGH ESTIMATE	LOW COST SCENARIO (PER SHIPMENT)	HIGH COST SCENARIO (PER SHIPMENT)
Once per year	0	33,100	$50.00	$75.00
Twice yearly to less than monthly	40,000	31,100	40.00	60.00
Monthly to less than weekly	26,100	38,200	30.00	45.00
Weekly to less than daily	59,700	74,400	20.00	30.00
Daily or greater	93,800	43,000	10.00	15.00
Anonymous	19,100	19,100	15.00	22.50
Total	**238,800**	**238,800**		

Note: Columns may not sum due to rounding.
Source: IEc calculations presented in Chapter 3 and interviews with representatives of various components of the supply chain.

D: FOREIGN CARGO REMAINING ON BOARD (FROB) (ALTERNATIVES 1, 2, AND 3)			
	TOTAL NO. OF BOLS OR SHIPMENTS (2005)	LOW COST SCENARIO (PER SHIPMENT)	HIGH COST SCENARIO (PER SHIPMENT)
Containerized	1,149,700	$40.00	$60.00
Non-Containerized	15,400	40.00	60.00
Total	**1,165,100**		

Note: Columns may not sum due to rounding.
Source: IEc calculations presented in Chapter 3 and interviews with representatives of various components of the supply chain.

After applying these unit costs to the baseline number of importers and shipments estimated in Chapter 3, Exhibits 4-6 through 4-9 present the estimated incremental costs for collecting and transmitting the importer data elements over the 10-year analysis period. Exhibits 4-6 and 4-7 present the estimated initial, one-time costs for Alternatives 1 and 3 (bulk cargo exempt) and Alternative 2 (bulk cargo not exempt), respectively. Exhibits 4-8 and 4-9 present the estimated Importer Security Filing transaction costs for Alternatives 1 and 3 (bulk cargo exempt) and Alternative 2 (bulk cargo not exempt), respectively.

EXHIBIT 4-6 ESTIMATED COSTS FOR COLLECTING AND TRANSMITTING IMPORTER DATA ELEMENTS, INITIAL, ONE-TIME COSTS, 2009 - 2018 (ALTERNATIVES 1 AND 3, MILLION $, 2008)

ALTERNATIVES 1 (CHOSEN ALTERNATIVE) AND 3: BULK CARGO EXEMPT				
YEAR	TOTAL NO. OF IMPORTERS (LOW ESTIMATE)	TOTAL NO. OF IMPORTERS (HIGH ESTIMATE)	LOW COST SCENARIO (MILLION $, UNDISCOUNTED)	HIGH COST SCENARIO (MILLION $, UNDISCOUNTED)
2009	197,000	356,000	$1,640	$2,960
2010	197,000	356,000	1,640	2,960
2011	197,000	356,000	1,640	2,960
2012	197,000	356,000	0	0
2013	197,000	356,000	0	0
2014	197,000	356,000	0	0
2015	197,000	356,000	0	0
2016	197,000	356,000	0	0
2017	197,000	356,000	0	0
2018	197,000	356,000	0	0
Present Value Total (3 Percent, Million $):			**$4,780**	**$8,640**
Present Value Total (7 Percent, Million $):			**$4,610**	**$8,330**

Notes: Columns may not sum due to rounding. Cost estimates assume number of importers does not grow and upfront costs are amortized over a period of 3 years. Cost estimates assume that those entities importing only one shipment per year do not incur initial, one-time costs and are therefore not included in the total number of importers.
Source: IEc calculations.

EXHIBIT 4-7 ESTIMATED COSTS FOR COLLECTING AND TRANSMITTING IMPORTER DATA ELEMENTS, INITIAL, ONE-TIME COSTS, 2009 - 2018 (ALTERNATIVE 2, MILLION $, 2008)

ALTERNATIVE 2: BULK CARGO NOT EXEMPT				
YEAR	TOTAL NO. OF IMPORTERS (LOW ESTIMATE)	TOTAL NO. OF IMPORTERS (HIGH ESTIMATE)	LOW COST SCENARIO (MILLION $, UNDISCOUNTED)	HIGH COST SCENARIO (MILLION $, UNDISCOUNTED)
2009	198,000	357,000	$1,650	$2,980
2010	198,000	357,000	1,650	2,980
2011	198,000	357,000	1,650	2,980
2012	198,000	357,000	0	0
2013	198,000	357,000	0	0
2014	198,000	357,000	0	0
2015	198,000	357,000	0	0
2016	198,000	357,000	0	0
2017	198,000	357,000	0	0
2018	198,000	357,000	0	0
Present Value Total (3 Percent, Million $):			**$4,810**	**$8,680**
Present Value Total (7 Percent, Million $):			**$4,630**	**$8,370**

Notes: Columns may not sum due to rounding. Cost estimates assume number of importers does not grow and upfront costs are amortized over a period of 3 years. Cost estimates assume that those entities importing only one shipment per year do not incur initial, one-time costs and are therefore not included in the total number of importers.
Source: IEc calculations.

As shown above in Exhibit 4-6, for Alternatives 1 and 3 (bulk cargo exempt) we estimate a total of between 197,000 and 356,000 affected importers in the 10-year analysis period with an incremental present value cost ranging from $4.6 billion to $8.6 billion, depending on the discount rate and cost scenario, for security filing initial, one-time costs.[113] Similarly, in Exhibit 4-7, for Alternative 2 (bulk cargo not exempt) we estimate a total of between 198,000 and 357,000 affected importers in the 10-year analysis period with an incremental present value cost ranging from $4.6 billion to $8.7 billion, depending on the discount rate and cost scenario.

[113] For this cost analysis, we assume a base year (Year 0) of 2009 for present value calculations using costs estimated in 2008 dollars.

EXHIBIT 4-8 ESTIMATED COSTS FOR COLLECTING AND TRANSMITTING IMPORTER DATA ELEMENTS, AS IMPORTER SECURITY FILING TRANSACTION FEES, 2009 - 2018 (ALTERNATIVES 1 AND 3, MILLION $, 2008)

ALTERNATIVES 1 (CHOSEN ALTERNATIVE) AND 3: BULK CARGO EXEMPT					
YEAR	NO. OF CONTAINER SHIPMENTS	NO. OF NON-CONTAINERIZED SHIPMENTS	TOTAL NO. OF SHIPMENTS	LOW COST SCENARIO (MILLION $, UNDISCOUNTED)	HIGH COST SCENARIO (MILLION $, UNDISCOUNTED)
2009	11,000,000	269,000	11,300,000	$249	$457
2010	11,600,000	273,000	11,900,000	263	481
2011	12,200,000	276,000	12,500,000	277	507
2012	12,900,000	280,000	13,200,000	291	534
2013	13,600,000	284,000	13,900,000	307	562
2014	14,300,000	288,000	14,600,000	323	592
2015	15,100,000	292,000	15,400,000	340	623
2016	15,900,000	296,000	16,200,000	359	656
2017	16,800,000	300,000	17,100,000	378	691
2018	17,700,000	305,000	18,000,000	398	728
Total	**141,000,000**	**2,860,000**	**144,000,000**		
Present Value Total (3 Percent, Million $):				**$2,760**	**$5,060**
Present Value Total (7 Percent, Million $):				**$2,330**	**$4,260**

Notes: Columns may not sum due to rounding. As discussed in Chapter 3 on estimating future baseline shipping activity, cost estimates assume container shipments and non-containerized shipments increase at a rate of 5.4 percent per year and 1.4 percent per year, respectively. Estimates also assume that the estimated growth in the number of shipments is distributed among importers according to 2005 baseline condition.
Source: IEc calculations.

EXHIBIT 4-9 ESTIMATED COSTS FOR COLLECTING AND TRANSMITTING IMPORTER DATA ELEMENTS, AS IMPORTER SECURITY FILING TRANSACTION FEES, 2009 - 2018 (ALTERNATIVE 2, MILLION $, 2008)

ALTERNATIVE 2: BULK CARGO NOT EXEMPT					
YEAR	NO. OF CONTAINER SHIPMENTS	NO. OF NON-CONTAINERIZED SHIPMENTS	TOTAL NO. OF SHIPMENTS	LOW COST SCENARIO (MILLION $, UNDISCOUNTED)	HIGH COST SCENARIO (MILLION $, UNDISCOUNTED)
2009	11,000,000	363,000	11,400,000	$251	$460
2010	11,600,000	368,000	12,000,000	264	484
2011	12,200,000	373,000	12,600,000	278	510
2012	12,900,000	378,000	13,300,000	293	537
2013	13,600,000	384,000	14,000,000	309	565
2014	14,300,000	389,000	14,700,000	325	595
2015	15,100,000	394,000	15,500,000	342	627
2016	15,900,000	400,000	16,300,000	360	660
2017	16,800,000	406,000	17,200,000	380	695
2018	17,700,000	411,000	18,100,000	400	732
Total	**141,000,000**	**3,870,000**	**145,000,000**		
Present Value Total (3 Percent, Million $):				**$2,780**	**$5,090**
Present Value Total (7 Percent, Million $):				**$2,340**	**$4,280**

Notes: Columns may not sum due to rounding. As discussed in Chapter 3 on estimating future baseline shipping activity, cost estimates assume container shipments and non-containerized shipments increase at a rate of 5.4 percent per year and 1.4 percent per year, respectively. Estimates also assume that the estimated growth in the number of shipments is distributed among importers according to 2005 baseline condition.
Source: IEc calculations.

As shown above in Exhibit 4-8, for Alternatives 1 and 3 (bulk cargo exempt) we estimate a total of 144 million affected shipments in the 10-year analysis period with an incremental present value cost ranging from $2.3 billion to $5.1 billion, depending on the discount rate and cost scenario, for security filing transaction fees for collecting and transmitting the importer data elements to CBP. Similarly, in Exhibit 4-9, for Alternative 2 (bulk cargo not exempt) we estimate a total of 145 million affected shipments in the 10-year analysis period with an incremental present value cost ranging from $2.3 billion to $5.1 billion, depending on the discount rate and cost scenario.

WELFARE LOSSES TO U.S. IMPORTERS ARISING FROM POTENTIAL SUPPLY CHAIN DELAYS

The interim final rule requires importers to collect and submit specified security filing data at least 24 hours in advance of lading at the foreign port (Alternatives 1, 2, and 3).[114] Some of the importers we interviewed, along with many commenters to the proposed rule asserted that their supply chain would be lengthened and delayed as a result of the new requirements.[115] These potential delays would most likely affect those importers that routinely import shipments that are consolidated in containers, with multiple shipments in a single container. In general, importers of consolidated cargo have less control of the flow and exchange of security filing information and the process of stuffing, shipping, and releasing container shipments. These importers expressed concern that their carriers, consolidators, freight forwarders, and logistics providers would advance their shipment cut-off times for receipt of shipments and associated Importer Security Filing data to ensure that the filings are adequately collected, assimilated, transmitted, and approved before their shipments are packed into a container or laden on a vessel. For example, consolidators may require shippers to submit, transmit, or obtain CBP approval of their security filing data before their shipments are stuffed in the container, before the container is sealed, or before the container is delivered to the port for lading. The importers estimate that the additional delays resulting from the interim final rule could range from 1 to as many as 7 days, which are incremental to the current timing of data filings required to comply with the 24-Hour Rule.

We also interviewed the NVOCCs and freight forwarders who might impose such advanced cut-off times on their shipping customers. Their responses regarding changes in practice varied: 1) no expected change (cut-off times already established by the 24-

[114] As discussed in Chapter 2, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings. However, because of data limitations, we cannot estimate the changes in cost attributable specifically to CBP's restraint in enforcing the rule during the initial 12 months or the flexibilities that the rule provides. We therefore estimate the incremental costs of the interim final rule assuming that importers will be fully compliant upon the effective date of the rule (i.e., ISF Importers or their designated agents will transmit all of their required Importer Security Filing data elements to CBP no later than 24 hours prior to lading at a foreign port), which likely overstates the welfare losses.

[115] Personal communication with Jim Phillips of General Motors Inc. on March 13, 2007, and Tammy Hetrick of The Burton Corporation on April 13, 2007. Other interviewees expressed the same assertion, but did not want to be explicitly cited in this report. Comments submitted by Bruce Leeds of COAC, Glenn Del Ross, Mark P. Neumann, Albert Saphir of ABS Consulting, Darrell J. Sekin, Jr. of DJS International Services, Inc., Hallock Northcott of the American Association of Exporters and Importers (AAEI), Ken Montgomery of AeA, the National Association of Manufacturers (NAM), James Febono of Molex, Inc., Eric Segal of Panasonic, John T. Whatley of the Alliance of Automobile Manufacturers, Ellen J. Gleberman of the Association of International Automobile Manufacturers, Renee Stein of U.S. Business Alliance for Customs Modernization, Richard J. Salamone of BASF Corporation, Matthew C. Erion of Parksite, and James W. Thatcher and Mark M. Sola of Hellman Worldwide Logistics, Inc. These comments can be viewed in their entirety at www.regulations.gov at USCBP-2007-0077.

Hour Rule are sufficient), or 2) an initial delay of 1 to 2 additional days that decreases over time as the trade adapts to the new requirements, or 3) substantial delays beyond the 24-Hour Rule, especially for consolidated shipments.

Finally, several public comments to the proposed rule indicated supply chain delays ranging from 2 to 7 days. For example, the American Association of Exporters and Importers (AAEI) anticipates delays of 2 to 5 days.[116] One member of the National Association of Manufacturers (NAM) estimates "up to five days in additional inventory may be needed to ensure collection and filing of the required data."[117] In addition, several public comments indicated that supply chain delays would affect not only consolidated containers but also non-consolidated (or "full") containers as well.[118]

Based on the wide range of responses, we establish two scenarios to estimate the potential impact of changes in the supply chain. For the low cost scenario, we assume no delays, and therefore no associated costs, in the supply chain. For the high cost scenario, we assume an initial incremental delay for the first year of implementation and a decreased incremental delay for years 2 through 10. Some of the supply chain parties that we interviewed indicated that, based on their experience with implementing the 24-Hour Rule, initial delays will likely decrease over time as parties get more comfortable with the security filing process and modify their business systems and practices. Even our assumption for this scenario likely overstates costs, as CBP is adopting a "Structured Review and Flexible Enforcement Period" during which CBP will work with the trade following the effective date of the interim final rule to assist them in achieving compliance with minimal disruption. As a result, for consolidated container shipments, we assume an initial delay of 3 days for the first year of implementation and an incremental delay of 1 day for years 2 through 10. For unconsolidated or full container shipments, we assume an initial delay of 2 days for the first year of implementation and an incremental delay of 1 day for years 2 through 10.

Approach to Measuring Supply Chain Impacts

Delaying shipments adversely impacts importers in several ways. Costs of delays may include: (1) higher inventory carrying costs; (2) the need to hold larger buffer-stock inventories to accommodate variation in arrival time; (3) depreciation in shipment value, particularly for highly time-sensitive products like fresh produce and seasonal goods; (4) costs of storage at the manufacturer, freight forwarder, consolidator, or port; and (5) costs for additional security to protect the freight from tampering.[119]

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[116] This comment can be reviewed in its entirety at www.regulations.gov. Comment number USCBP-2007-0077-0170.

[117] This comment can be reviewed in its entirety at www.regulations.gov. Comment number USCBP-2007-0077-0094.

[118] "Delays will not be limited to consolidated containers. Whether the container is consolidated or not, the carriers will not be able to process cargo containers the same way as they do now"(Comment number USCBP-2007-0077-0170).

[119] Comment number USCBP-2007-0077-0170.

Incurring a delay of shipment is the simplest response of exporters to the regulation, assuming a delay results from implementing the rule. In those cases, all the above costs could be a consequence of delay. To capture all of these costs in our estimate of the impact of time delays, we rely on studies conducted by Dr. David Hummels of Purdue University that estimate willingness to pay of consumers for reducing the transit time for imports by 1 day.[120] Hummels (2007) estimates the value of saving a day in travel time by analyzing manufacturers/importers decisions to ship cargo by air or by vessel, the difference in transit time between the two modes, shipping costs by mode, and the likelihood that producers will substitute air shipment for water shipment based on consumer demands for rapid delivery of goods (both intermediate and final good). Because the Hummels' work is focused on application to trade policies, he expresses his estimates of the cost of delay relative to the value of the cargo, or in trade terms, as an *ad valorem* tax. In the text that follows below, we explain how the effective application of an *ad valorem* tax, which approximates the effect of a delay in ocean-based shipping, can be used to estimate the U.S. consumer surplus losses if producers incur the delay.

A second alternative for rule compliance, however, would involve changing modes of transport. Some portion of those exporters who currently ship goods to the U.S. via vessel could choose to incur the premium of shipping goods via air rather than incur an incremental delay in vessel shipping. We would expect the marginal cost of the air premium to, in many cases, be less than the marginal value to consumers of goods arriving a day early - Hummels (2007) in fact finds this to be true. However, not all goods subject to regulation under this rule are amenable to transport via air. Further, we would expect that a substantial shift to air transport would increase the price of air transport by increasing the demand for air freight. Nonetheless, it seems clear that at least some exporters, particularly those who export the highest value goods, and those for which there is the highest demand for timely delivery, will switch to air transport as a result of the rule. In those cases, we would expect the cost impact of the rule to be less.

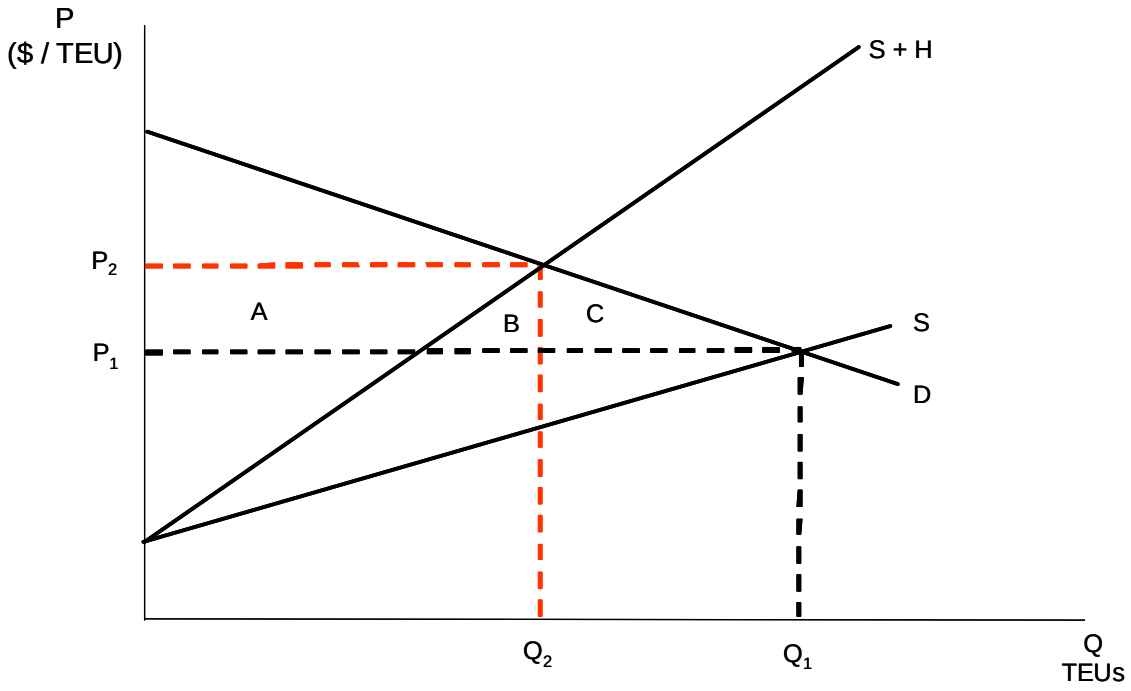
An ideal analysis would first estimate the response of exporters to the rule - either incur the delay, and the consequent costs, or pay the premium for air transport - and then estimate costs separately for each of these two classes of shipments. Data available to us for this analysis, however, was not sufficient to characterize the response of exporters. As a result, our analysis makes the most conservative assumption that all exporters will respond to the rule by incurring a delay. As a result, we believe it is likely that our estimates overstate the actual costs of the rule.

By looking at the shares of goods that travel by air or by sea, Dr. Hummels is able to generate estimates of the value of time for those who travel by sea and do not switch shipment mode types. Using Dr. Hummels' estimates of the *ad valorem* amount consumers are willing to pay to avoid an additional day of ocean transit and producers' propensity to substitute air shipment for ocean shipment (referred to in this discussion as the "Hummels' parameters"), we are able to construct a partial equilibrium model of the

[120] Hummels, David, "Time as a Trade Barrier," unpublished manuscript, 2001; and Nathan Associates Inc., "Calculating Tariff Equivalents for Time in Trade," prepared for USAID, March 2007.

supply and demand for international imports by product category.[121] Exhibit 4-10 illustrates our use of the Hummels' parameters to estimate an upwards shift in the supply curve for imported goods (the imposition of an *ad valorem* tax would effectively shift supply conditions). In other words, we assume that the cost of supplying goods to U.S. importers, including transportation costs, will be greater as a result of the regulation.[122] Quantity of imports is represented along the horizontal axis, and is measured in shipping container units (TEUs). Price of those imports, measured as dollars per TEU, is represented along the vertical axis.

EXHIBIT 4-10 SUPPLY AND DEMAND FOR FOREIGN IMPORTS SHIPPED TO THE UNITED STATES VIA VESSEL



[121] The value of time in trade parameters were produced by David Hummels of Purdue University and Nathan Associates with support from USAID's Bureau of Economic Growth, Agriculture and Trade (EGAT) under Contract No. GS-10F-0619N, Task Order No. EEM-M-00-06-00028-00. It was produced for the paper "Calculating Tariff Equivalents for Time in Trade," by David Hummels, Peter Minor, Matthew Reisman, and Erin Endean, USAID/Nathan Associates, 2007."

[122] A partial equilibrium model estimates changes in supply and/or demand in a single market assuming that all other related markets are unaffected. This type of model is commonly applied in regulatory analysis as it generally requires only a few key inputs and provides a transparent assessment of the effect of a policy decision.

For a particular category of imports (e.g., shoes), the initial equilibrium, Q_1 TEUs of shoe shipments provided at price P_1 is the amount of trade shipped from foreign ports to the United States by full and consolidated containers in the baseline year (2005). The total value (dollars) of that amount of trade is equal to Q_1 (TEUs) * P_1 (dollars per TEU). An additional day of delay caused by the regulation effectively increases the cost of supplying the imports, shifting the supply curve upward from S to S+H ("H" refers to "Hummels' parameter" or the *ad valorem* value of a day's delay). As a result, the equilibrium quantity of shoes brought into the United States decreases to Q_2, and the price per TEU increases to P_2.

Welfare analysis studies changes in the well-being of society as a whole, measured in terms of changes in producer and consumer surplus following an event, such as the implementation of the interim final rule, that affects markets. Surpluses are the amounts of value that parties to a trade get that they do not have to pay for. Producer surplus, also known as profit, is the difference between the total revenue that goods are sold for and the costs of producing them. Consumer surplus is a similar concept. In most cases, the buyer of a good values that good at an amount equal to or greater than the price he pays for it. The difference between what a consumer would pay for a good and the price a consumer actually pays for the good is the consumer surplus.[123]

In this analysis, producers are assumed to be foreign entities supplying the goods, and the consumers are domestic importers.[124] Because this is an analysis of impacts to the U.S. economy (i.e., changes in U.S. welfare), we are concerned only with changes in consumer surplus.[125] The change in consumer surplus is represented in Figure 4-10 as the sum of the areas [A + B + C].

To develop our partial equilibrium models, we combine the Hummels' parameters with estimates of supply and demand elasticity for separate product categories and baseline quantity estimates obtained from PIERS. The full details of the estimation procedure are provided in Appendix B. Consumer surplus losses are estimated separately for cargo transported in consolidated containers and for full containers.

This approach likely overstates lost welfare in the United States for two reasons. First, the transfer of Hummels' findings to this analysis of the welfare losses is imperfect. Hummels restricts his analysis to goods that are valuable enough to be transported by either air or vessel. However, many of the goods in our PIERS data sample set are never shipped by air because their value is too low, or the demand for these goods is not time

[123] For additional discussion of the concepts of consumer and producer surplus, see Gramlich, Edward, M., *A Guide to Benefit-Cost Analysis* (Second Edition), Waveland Press, Inc., 1990, pp. 48-51.

[124] For the purpose of simplification, we ignore U.S. income generated through U.S. foreign subsidiaries, potentially understating welfare losses. Estimating the amount and type of imported goods produced by U.S. foreign subsidiaries, the baseline U.S. income generated by those entities, and changes in U.S. income resulting from the interim final rule is beyond the scope of this analysis. Furthermore, we believe the application of the Hummels' findings significantly biases our overall results upwards (i.e., supply chain costs are likely to be overstated).

[125] In other words, we do not estimate lost profits to foreign entities.

sensitive enough to warrant a faster, more expensive mode of transportation. As a result, the estimation in Hummels (2007) may describe time preferences for a subset of higher value, more time sensitive imports than is necessarily characteristic of the full universe of shipments affected by the interim final rule. Our application of the Hummels' data, however, assumes that the welfare loss for categories of goods where the Hummels estimation does not provide a parameter value is equal to the weighted average *ad valorem* welfare loss for all other goods affected by the rule. It is clear that the Hummels study provides the best available information for application in this analysis, but in this aspect we are unsure whether the data currently available from the Hummels work provides an accurate estimate of the costs of the rule for those categories of freight that are almost exclusively shipped by sea and for which it may be reasonable to assume that the loss associated with a delay in shipment in modest. We are unable to estimate the magnitude of this effect based on current data. Appendix B provides further discussion of the potential upward bias resulting from the application of Hummels' results to this analysis.

Second, the potential losses in consumer surpluses may be affected to some degree by changes in consumer and producer surpluses in markets for domestically produced substitutes. When prices for imported goods rise, prices for domestically produced goods may become competitive. As a result, some consumers may switch to goods produced by U.S. manufacturers. However, an increase in the price of some imported goods may cause a decrease or cessation of production of other goods domestically; such an effect would be welfare reducing. Depending on the slopes of the supply and demand curves in the relevant markets, consumers or producers may experience surplus gains. The sum of these gains will offset consumer surplus losses in markets for foreign-produced products. We have not estimated these gains; the magnitude of this source of bias is unknown.

Results of Supply Chain Impact Analysis

As calculated in Appendix B, for the year 2008 we estimate welfare losses of approximately $860 million per day of delay and $2.40 billion per day of delay for consolidated container shipments and full container shipments, respectively.[126] For consolidated container shipments, we assume 3 days of delay in the first year and 1 day of delay for years 2 through 10. For full container shipments, we assume 2 days of delay in the first year and 1 day of delay for years 2 through 10. Exhibit 4-11 presents our estimate of the total welfare losses from potential delays in the supply chain.

[126] To account for growth in total shipment value between 2008 and the first year of the analysis period (2009), these values are increased using the annual shipment growth rate of 5.4 percent (from the USACOE study). This assumes that the value per shipment remains constant. As a result, for 2009, we estimate welfare losses of approximately $906 million per day of delay and $2.53 billion per day of delay for consolidated container shipments and full container shipments, respectively.

EXHIBIT 4-11 ESTIMATED COSTS FOR WELFARE LOSSES FROM POTENTIAL SUPPLY CHAIN DELAYS, 2009 - 2018 (MILLION $, 2008)

ALTERNATIVES 1, 2, AND 3						
YEAR	CONSOLIDATED CONTAINERS DELAY (DAYS)	CONSOLIDATED CONTAINERS WELFARE LOSS	FULL CONTAINERS DELAY (DAYS)	FULL CONTAINERS WELFARE LOSS	LOW COST SCENARIO (UNDISCOUNTED)	HIGH COST SCENARIO (UNDISCOUNTED)
2009	3.0	$2,720	2.0	$5,060	$0	$7,800
2010	1.0	955	1.0	2,660	0	3,600
2011	1.0	1,010	1.0	2,810	0	3,800
2012	1.0	1,060	1.0	2,960	0	4,000
2013	1.0	1,120	1.0	3,120	0	4,200
2014	1.0	1,180	1.0	3,290	0	4,500
2015	1.0	1,240	1.0	3,470	0	4,700
2016	1.0	1,310	1.0	3,650	0	5,000
2017	1.0	1,380	1.0	3,850	0	5,200
2018	1.0	1,450	1.0	4,060	0	5,500
Present Value Total (3 Percent, Million $):					**$0**	**$43,000**
Present Value Total (7 Percent, Million $):					**$0**	**$36,000**

Notes: Columns may not sum due to rounding. The estimated per day of delay welfare loss estimates increase from year-to-year because the underlying total value of import shipments is increased at the projected shipment growth rate of 5.4 percent per year. The low cost scenario assumes no delay.

Source: IEc calculations.

As shown in Exhibit 4-11, we estimate an incremental present value cost ranging from $0 to $43 billion for potential delays in the supply chain, depending on the discount rate and cost scenario. While large in dollar terms, the estimated supply chain costs are less than 0.8 percent of the value of shipments in any year of the analysis period.[127]

[127] As calculated in Chapter 3, the total value of consolidated and full container shipments was $784 billion in 2005. Adjusting this value for inflation and shipment growth since 2005, using GDP Implicit Price Deflators and the USACOE study growth rate of 5.4 percent, respectively, results in a total value of approximately $1 trillion in 2009 (2008 dollars). Therefore, for 2009, we calculate that the estimated supply chain costs as a percentage of total shipment value is approximately 0.8 percent ($7.8 billion / $1 trillion). For subsequent years, the estimated costs are approximately 0.3 percent of the total shipment value in each year since the estimated days of delay are constant (1 day) and the estimated per day of delay costs and total shipment values are assumed to increase at the same growth rate (5.4 percent). Note that this calculation compares the surplus loss to total value of the shipments, rather than baseline consumer surplus, given readily available data. The comparison is made solely for illustrative purposes.

ADDITIONAL CARRIER REQUIREMENTS COSTS

As discussed in Chapter 2, the interim final rule assigns the carrier the responsibility of transmitting Vessel Stow Plans and CSMs for containerized cargo (Alternatives 1, 2, and 4). We solicited input from the World Shipping Council, which represents more than 40 container shipping lines that carry more than 93 percent of the U.S. containerized imports and exports, on the potential impacts and associated costs of meeting these new requirements.[128] The World Shipping Council received feedback from seven different shipping lines. Based on their input, we project that the incremental costs primarily result from the modification or implementation of new information systems to collect, coordinate, and transmit Vessel Stow Plans and CSMs to CBP. These costs include initial, one-time implementation costs as well as recurring labor and operating costs. At this time, the respondent carriers generally do not anticipate passing on these costs to their customers; however, they indicated that their decision would ultimately depend on the rule's requirements as finalized. We describe and estimate these costs separately for Vessel Stow Plans and CSMs below.

VESSEL STOW PLAN COSTS

As described in Chapter 2, carriers and marine terminal operators (MTOs) currently submit and exchange Vessel Stow Plans with other carriers and MTOs to ensure that vessels are properly loaded for weight and balance and to facilitate handling of cargo upon arrival. According to the responses to our questions submitted to the World Shipping Council, most containerized carriers currently transmit stow plans as attachments to email transmissions in an Electronic Data Interface (EDI) format called "BAPLIE."[129] However, there are some carriers that do not currently prepare and transmit stow plans electronically and instead prepare paper or hand-drawn stow plans that are transmitted via facsimile machine or "fax." CBP will accept Vessel Stow Plans in UN EDIFACT BAPLIE SMDG formats and will accept ANSI X.12 "324" formats on a case-by-case basis. CBP will not accept the Adobe.pdf format for stow plans. Stow plans must be submitted through Vessel AMS, secure file transfer protocol (sFTP), or email. Given the lack of stow plan cost data from these carriers, it is difficult to estimate their costs to comply with the interim final rule.

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[128] World Shipping Council, "Liner Shipping: Facts and Figures," as viewed at http://www.worldshipping.org/liner_shipping-facts&figures.pdf on March 14, 2007. Responses to our questions submitted to the World Shipping Council on March 9, 2007 were received on March 23, 2007.

[129] EDI is a generic term for transmission of transactional data between computer systems. EDI is typically via a batched transmission, usually conforming to consistent standards (U.S. Department of Transportation Maritime Administration, *Shipping Terms*, as viewed at http://www.marad.dot.gov/publications/glossary/e.html on March 20, 2007).

BAPLIE is an international standard EDI message that generally lists (in tabular form) the location, size, and type of each cargo laden on the vessel. The software used to access BAPLIE files typically also has a graphical interface to create and view Vessel Stow Plans in graphical form (i.e., cargo and container location and information is graphically represented on a vessel layout plan, arranged by deck, bay, or hold) (Kockum Sonics Co., *EdiRite 'the BAPLIE message general tool,'* as viewed at http://www.kockumsonics.com/pdf/marine/edirite.pdf on June 1, 2007).

Because stow plans will overwhelmingly be accepted by CBP in their current form and method of transmission ("BAPLIE" files attached to email transmissions), most carriers do not anticipate additional costs to comply with the interim final rule. One carrier, however, estimated an initial, one-time cost of $50,000 to execute modifications if a new transmission method needed to be found or developed. In addition, some carriers anticipate recurring labor and operating costs to process and transmit stow plans to CBP. The carriers estimated little to no additional time to transmit stow plans in their current form and method of transmission to as much as $100 (2 hours at $50 per hour) to process and transmit each stow plan to CBP via Vessel AMS.

For those carriers that do not currently prepare stow plans electronically, costs could be substantially higher if they need to adopt new information systems and practices to electronically prepare and transmit their stow plans to CBP. One Ro-Ro carrier that ships once per month indicated that they would convert their paper stow plans into an Excel file and email them to CBP, at an estimated cost of $50 per stow plan (1 hour at $50 per hour).[130]

As a result, for both the low cost and high cost scenarios, we assume an estimated cost of $50 per stow plan for those carriers that do not currently prepare stow plans electronically. We define these less sophisticated carriers as those that made relatively few vessel trips to the United States, assuming a threshold of 100 vessel trips per year ("small carriers"). In other words, for those carriers that made 100 or fewer vessel trips to the United States in 2005, an estimated cost of $50 per vessel trip or Vessel Stow Plan is assumed. This cost would apply to the small carriers and related vessel trips involving containerized cargo.

For those carriers that made more than 100 vessel trips to the United States in 2005 ("large carriers"), we assume different costs. For the low cost scenario, we assume that there are no incremental costs associated with providing Vessel Stow Plans to CBP because CBP will accept stow plans in their current form and method of transmission, namely as BAPLIE files attached to email transmissions. For the high cost scenario, we assume initial, one-time implementation costs of $50,000 per carrier amortized over the first 3 years of the analysis period (2009 through 2011) and recurring costs of $100 per vessel trip. These costs would apply to the number of large carriers and vessel trips involving containerized cargo. Exhibit 4-12 presents our estimate of the costs associated with Vessel Stow Plans.

[130] Note, however, that Ro-Ro carriers are exempt from submitting Vessel Stow Plans in the interim final rule. The estimate is shown for illustrative purposes.

EXHIBIT 4-12 ESTIMATED COSTS FOR VESSEL STOW PLANS, 2009 - 2018 (MILLION $, 2008)

ALTERNATIVES 1, 2, AND 4					
YEAR	NO. OF CONTAINER VESSEL TRIPS (BY SMALL CARRIERS)	NO. OF CONTAINER CARRIERS (LARGE)	NO. OF CONTAINER VESSEL TRIPS (BY LARGE CARRIERS)	LOW COST SCENARIO (MILLION $, UNDISCOUNTED)	HIGH COST SCENARIO (MILLION $, UNDISCOUNTED)
2009	5,251	74	19,952	$0.3	$3
2010	5,427	74	20,620	0.3	4
2011	5,609	74	21,311	0.3	4
2012	5,797	74	22,025	0.3	2
2013	5,991	74	22,763	0.3	3
2014	6,192	74	23,525	0.3	3
2015	6,399	74	24,313	0.3	3
2016	6,614	74	25,128	0.3	3
2017	6,835	74	25,970	0.3	3
2018	7,064	74	26,840	0.4	3
Total	**61,182**		**232,446**		
Present Value Total (3 Percent, Million $):				**$3**	**$27**
Present Value Total (7 Percent, Million $):				**$2**	**$23**

Notes: Columns may not sum due to rounding. Assumes small carriers are those that made 100 or fewer vessel trips to the United States in 2005. Assumes large carriers are those that made more than 100 vessel trips to the United States in 2005. Assumes the number of carriers does not increase over time. As discussed in Chapter 3 on estimating future baseline shipping activity, these cost estimates assume the number of vessel trips to the United States increases at a rate of 3.35 percent per year.
Source: IEc calculations.

As shown in Exhibit 4-12, we estimate an incremental present value cost ranging from $2 million to $27 million for providing Vessel Stow Plans to CBP, depending on the discount rate and cost scenario.

CONTAINER STATUS MESSAGES COSTS

As described in Chapter 2, carriers as well as MTOs, container owners/lessors, and end recipients/consignees use Container Status Messages (CSMs) to track and manage the movement of cargo containers. CSMs are generated every time there is an "event" to report regarding a container.

CBP's interim final rule requires that carriers, provided they already collect and maintain CSM data in their electronic equipment tracking systems, must submit CSMs for as many as nine events for containers containing cargo destined for the United States by vessel. When any of these events occurs, the carrier must transmit to CBP a report of that event within 24 hours after the message is entered into the carrier's equipment tracking system. CBP will also accept any CSMs from carriers other than for the required events as well as any CSMs for non-U.S. bound containers.

We obtained information from the World Shipping Council regarding likely costs and implementation of CSM requirements.[131] Our questions were general and not specifically tailored to the interim final rule, including whether the carriers would submit all CSMs for all containers ("global" CSMs) or all CSMs for just U.S.-bound containers, with no specific requirements on the timing (e.g., daily) or content (e.g., reportable events) of CSM submittals to CBP. Although their responses to these questions do not directly address the CSM requirements as currently defined in the interim final rule, we believe that the carrier responses are relevant and generally capture the incremental costs that would be incurred.

Of the carrier responses compiled and provided by the World Shipping Council, one carrier indicated that it would transmit global CSMs, two carriers indicated that they would transmit only U.S.-bound CSMs, and three carriers were undecided as to whether they would transmit global CSMs or just U.S.-bound CSMs. Regardless of which CSMs they would transmit, most of the carriers indicated that they would transmit their CSMs to CBP by establishing and operating a File Transfer Protocol (FTP) site. The associated initial, one-time costs estimated by the carriers vary from unknown to $4,000 for global CSMs and from unknown to $60,000 for U.S.-bound CSMs. The carriers that did not yet know whether they would transmit global or U.S.-bound CSMs estimated initial, one-time costs ranging from $17,400 to $250,000. In addition, recurring costs stated by the carrier respondents include none for a fully automated system, $4,800 per year to transmit U.S.-bound CSMs, and $55,000 per year to staff an additional systems processor to transmit and monitor global CSMs to CBP. One undecided carrier estimated that their initial, one-time cost for transmitting global CSMs would increase from $4,000 to $60,000 and their recurring costs would increase from $55,000 per year to $480,000 per year should they decide to send only U.S.-bound CSMs.

We do not have the information or data to estimate how many carriers already collect and maintain CSM data in their equipment tracking systems, and thus would be subject to the CSM requirements. We also do not have the information or data to estimate how many carriers will elect to transmit CSMs for just U.S.-bound containers or CSMs related to just the nine events required by the interim final rule. We assume that the smaller, less sophisticated carriers (i.e., as defined for Vessel Stow Plan costs, those that made 100 or fewer vessel trips to the United States in 2005) do not already collect and maintain CSM data and, therefore, would not be required to comply with the CSM requirements.

We assume that the large carriers (those that made more than 100 vessel trips to the United States in 2005) already collect and maintain CSM data and therefore would be required to comply with the CSM requirements. We assume that generally most of these large carriers will elect to transmit their global CSMs as the more cost-effective option. As a result, based on the input from the World Shipping Council, for the low cost scenario, we assume initial, one-time implementation costs of $4,000 per container carrier amortized over the first 3 years of the analysis period (2009 through 2011) and recurring

[131] Responses to our questions submitted to the World Shipping Council on March 9, 2007 were received on March 23, 2007.

costs of $0 per container carrier per year, assuming fully automated CSM reporting systems. For the high cost scenario, we assume initial, one-time implementation costs of $250,000 per container carrier amortized over the first three years of the analysis period (2009 through 2011) and recurring costs of $55,000 per container carrier per year. Exhibit 4-13 presents our estimate of the costs associated with CSMs.

EXHIBIT 4-13 ESTIMATED COSTS FOR CONTAINER STATUS MESSAGES, 2009 - 2018 (MILLION $, 2008)

ALTERNATIVES 1, 2, AND 4				
YEAR	NO. OF CONTAINER CARRIERS (SMALL)	NO. OF CONTAINER CARRIERS (LARGE)	LOW COST SCENARIO (MILLION $, UNDISCOUNTED)	HIGH COST SCENARIO (MILLION $, UNDISCOUNTED)
2009	350	74	$0.1	$10
2010	350	74	0.1	10
2011	350	74	0.1	10
2012	350	74	0	4
2013	350	74	0	4
2014	350	74	0	4
2015	350	74	0	4
2016	350	74	0	4
2017	350	74	0	4
2018	350	74	0	4
Total				
Present Value Total (3 Percent, Million $):			**$0.3**	**$54**
Present Value Total (7 Percent, Million $):			**$0.3**	**$48**

Notes: Columns may not sum due to rounding. Assumes small carriers are those that made 100 or fewer vessel trips to the United States in 2005. Assumes large carriers are those that made more than 100 vessel trips to the United States in 2005. Assumes the number of carriers does not increase over time.
Source: IEc calculations.

As shown in Exhibit 4-13, we estimate for the 10-year analysis period an incremental present value cost ranging from $0.3 million to $54 million for providing CSMs to CBP, depending on the discount rate and cost scenario.

SUMMARY OF IMPORTER SECURITY FILING AND ADDITIONAL CARRIER REQUIREMENTS COSTS

In summary, Exhibits 4-14 and 4-15 present the unit costs we developed for the low cost scenario and the high cost scenario, respectively, and then applied to the baseline shipping activity estimated in Chapter 3 for each year of the 10-year analysis period.

EXHIBIT 4-14 INCREMENTAL UNIT COSTS OF COMPLYING WITH THE INTERIM FINAL RULE, LOW COST SCENARIO (2008 DOLLARS)

COST TYPE	INITIAL, ONE-TIME COSTS (2009 - 2011)	RECURRING COSTS (2009 - 2018)
Security filing data collection and transmittal	$0 per importer importing only one shipment per year $25,000 per importer importing more than one shipment per year	As a transaction cost or fee: $10 - $50 per shipment $40 per FROB shipment
Supply chain	Assume no costs	
Vessel Stow Plan	Small container carriers: $0 per carrier Large container carriers: $0 per carrier	Small container carriers: $50 per vessel trip Large container carriers: $0 per vessel trip
Container Status Messages	Small container carriers: $0 per carrier Large container carriers: $4,000 per carrier	Small container carriers: $0 per carrier Large container carriers: $0 per carrier per year

EXHIBIT 4-15 INCREMENTAL UNIT COSTS OF COMPLYING WITH THE INTERIM FINAL RULE, HIGH COST SCENARIO (2008 DOLLARS)

COST TYPE	INITIAL, ONE-TIME COSTS (2009 – 2011)	RECURRING COSTS (2009 – 2018)
Security filing data collection and transmittal	$0 per importer importing only one shipment per year $25,000 per importer importing more than one shipment per year	As a transaction cost or fee: $15 - $75 per shipment $60 per FROB shipment
Supply chain	$860 million per day of delay and $2.40 billion per day of delay for consolidated container and full container shipments, respectively	
Vessel Stow Plan	Small container carriers: $0 per carrier Large container carriers: $50,000 per carrier	Small container carriers: $50 per vessel trip Large container carriers: $100 per vessel trip
Container Status Messages	Small container carriers: $0 per carrier Large container carriers: $250,000 per carrier	Small container carriers: $0 per carrier Large container carriers: $55,000 per carrier per year

Exhibits 4-16 through 4-19 present a summary of our estimated total incremental costs for the low and high cost scenarios for each alternative. As shown in Exhibit 4-16, for Alternative 1 (Importer Security Filings and Additional Carrier Requirements required, bulk cargo exempt) we estimate an incremental present value cost range from $6.9 billion to $56 billion for complying with the interim final rule, depending on the discount rate and cost scenario. Exhibit 4-17 summarizes for Alternative 2 (Importer Security Filings and Additional Carrier Requirements required, bulk cargo not exempt) our estimate of an incremental present value cost ranging from $7.0 billion to $56 billion. Exhibit 4-18 summarizes for Alternative 3 (only Importer Security Filings required, bulk cargo exempt) our estimate of an incremental present value cost ranging from $6.9 billion to $56 billion. Finally, Exhibit 4-19 summarizes for Alternative 4 (only Additional Carrier Requirements required) our estimate of an incremental present value cost ranging from $3 million to $80 million, depending on the discount rate and cost scenario. For the low cost scenario under Alternatives 1, 2, and 3, the largest component of the costs is the incremental cost related to providing CBP the importer data elements, and more specifically the importers' initial, one-time costs to collect and transmit the importer data elements required by the interim final rule. For the high cost scenario under Alternatives 1, 2, and 3, the largest component of the costs is the estimated welfare losses associated with potential supply chain delays.

EXHIBIT 4-16 SUMMARY OF ESTIMATED IMPORTER SECURITY FILING AND ADDITIONAL CARRIER REQUIREMENTS COSTS, ALTERNATIVE 1, 2009 - 2018 (MILLION $, 2008)

ALTERNATIVE 1 (CHOSEN ALTERNATIVE): IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO EXEMPT						
YEAR	LOW COST SCENARIO (UNDISCOUNTED)			HIGH COST SCENARIO (UNDISCOUNTED)		
	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	LOW COST SCENARIO TOTAL	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	HIGH COST SCENARIO TOTAL
2009	$1,900	$0.4	$1,900	$11,000	$14	$11,000
2010	1,900	0.4	1,900	7,100	14	7,100
2011	1,900	0.4	1,900	7,300	14	7,300
2012	290	0.3	290	4,600	7	4,600
2013	310	0.3	310	4,800	7	4,800
2014	320	0.3	320	5,100	7	5,100
2015	340	0.3	340	5,300	7	5,300
2016	360	0.3	360	5,600	7	5,600
2017	380	0.3	380	5,900	7	5,900
2018	400	0.4	400	6,200	7	6,200
Present Value Total (3 Percent, Million $):	**$7,500**	**$3**	**$7,600**	**$56,000**	**$80**	**$56,000**
Present Value Total (7 Percent, Million $):	**$6,900**	**$3**	**$6,900**	**$49,000**	**$71**	**$49,000**

Note: Columns may not sum due to rounding.
Source: IEc calculations.

EXHIBIT 4-17 SUMMARY OF ESTIMATED IMPORTER SECURITY FILING AND ADDITIONAL CARRIER REQUIREMENTS COSTS, ALTERNATIVE 2, 2009 - 2018 (MILLION $, 2008)

ALTERNATIVE 2: IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO NOT EXEMPT						
YEAR	LOW COST SCENARIO (UNDISCOUNTED)			HIGH COST SCENARIO (UNDISCOUNTED)		
	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	LOW COST SCENARIO TOTAL	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	HIGH COST SCENARIO TOTAL
2009	$1,900	$0.4	$1,900	$11,000	$14	$11,000
2010	1,900	0.4	1,900	7,100	14	7,100
2011	1,900	0.4	1,900	7,300	14	7,300
2012	290	0.3	290	4,600	7	4,600
2013	310	0.3	310	4,800	7	4,800
2014	320	0.3	330	5,100	7	5,100
2015	340	0.3	340	5,300	7	5,300
2016	360	0.3	360	5,600	7	5,600
2017	380	0.3	380	5,900	7	5,900
2018	400	0.4	400	6,200	7	6,300
Present Value Total (3 Percent, Million $):	**$7,600**	**$3**	**$7,600**	**$56,000**	**$80**	**$56,000**
Present Value Total (7 Percent, Million $):	**$7,000**	**$3**	**$7,000**	**$49,000**	**$71**	**$49,000**

Note: Columns may not sum due to rounding.
Source: IEc calculations.

EXHIBIT 4-18 SUMMARY OF ESTIMATED IMPORTER SECURITY FILING AND ADDITIONAL CARRIER REQUIREMENTS COSTS, ALTERNATIVE 3, 2009 - 2018 (MILLION $, 2008)

ALTERNATIVE 3: IMPORTER SECURITY FILINGS REQUIRED, BULK CARGO EXEMPT						
YEAR	LOW COST SCENARIO (UNDISCOUNTED)			HIGH COST SCENARIO (UNDISCOUNTED)		
	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	LOW COST SCENARIO TOTAL	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	HIGH COST SCENARIO TOTAL
2009	$1,900	$0	$1,900	$11,000	$0	$11,000
2010	1,900	0	1,900	7,100	0	7,100
2011	1,900	0	1,900	7,300	0	7,300
2012	290	0	290	4,600	0	4,600
2013	310	0	310	4,800	0	4,800
2014	320	0	320	5,100	0	5,100
2015	340	0	340	5,300	0	5,300
2016	360	0	360	5,600	0	5,600
2017	380	0	380	5,900	0	5,900
2018	400	0	400	6,200	0	6,200
Present Value Total (3 Percent, Million $):	**$7,500**	**$0**	**$7,500**	**$56,000**	**$0**	**$56,000**
Present Value Total (7 Percent, Million $):	**$6,900**	**$0**	**$6,900**	**$49,000**	**$0**	**$49,000**

Note: Columns may not sum due to rounding.
Source: IEc calculations.

EXHIBIT 4-19 SUMMARY OF ESTIMATED IMPORTER SECURITY FILING AND ADDITIONAL CARRIER REQUIREMENTS COSTS, ALTERNATIVE 4, 2009 - 2018 (MILLION $, 2008)

ALTERNATIVE 4: ADDITIONAL CARRIER REQUIREMENTS ONLY						
YEAR	LOW COST SCENARIO (UNDISCOUNTED)			HIGH COST SCENARIO (UNDISCOUNTED)		
	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	LOW COST SCENARIO TOTAL	IMPORTER SECURITY FILINGS	ADDITIONAL CARRIER REQUIREMENTS	HIGH COST SCENARIO TOTAL
2009	$0	$0.4	$0.4	$0	$14	$14
2010	0	0.4	0.4	0	14	14
2011	0	0.4	0.4	0	14	14
2012	0	0.3	0.3	0	7	7
2013	0	0.3	0.3	0	7	7
2014	0	0.3	0.3	0	7	7
2015	0	0.3	0.3	0	7	7
2016	0	0.3	0.3	0	7	7
2017	0	0.3	0.3	0	7	7
2018	0	0.4	0.4	0	7	7
Present Value Total (3 Percent, Million $):	**$0**	**$3**	**$3**	**$0**	**$80**	**$80**
Present Value Total (7 Percent, Million $):	**$0**	**$3**	**$3**	**$0**	**$71**	**$71**

Note: Columns may not sum due to rounding.
Source: IEc calculations.

CBP IMPLEMENTATION COST ESTIMATE

As discussed at the beginning of this Chapter, CBP anticipates that it will incur costs to implement systems to accept and process the security filing data elements. CBP will allow importers, carriers, and their designated agents to use existing CBP-approved systems such as Vessel AMS and ABI as the portals for entering the security filing data elements required by the interim final rule.[132] CBP's information systems would then feed these data to their Advanced Trade Data Initiative (ATDI) system and subsequently to their Automated Targeting System (ATS) for processing and high-risk targeting. The ATDI system will act as an interim system for collecting and assimilating the security filing data elements from the various system portals (Vessel AMS or ABI) until CBP's Automated Commercial Environment (ACE) system is fully implemented.

CBP's anticipated implementation costs include labor and equipment costs to design, test, install, and operate the information and data systems necessary to collect, coordinate, and process the security filing data elements required by the interim final rule (e.g., establish data connectivity between Vessel AMS, ABI, ATDI (in the interim), and ATS). The implementation will be conducted in two phases.[133] The first phase will involve setting up the systems to collect and feed the security filing data to ATS. The second phase will involve the reprogramming of CBP's ATS to process the security filing data. For the first phase, CBP estimates $1.9 million, $1.2 million, and $2.5 million as its labor, computer system, and computer storage costs, respectively. For the second phase, CBP estimates a labor cost of $720,000. Recurring systems operating and maintenance costs are estimated at $1 million per year. We assume that CBP will incur the first phase costs in 2009 (Year 1 of the 10-year analysis period) and the second phase costs in 2010. We assume that CBP will incur the recurring systems operating and maintenance costs in each year of the 10-year analysis period. Exhibit 4-20 presents the estimated government implementation costs. We assume these costs would be identical for the four regulatory alternatives, recognizing that this may overstate costs for some alternatives (e.g., Alternative 4, Additional Carrier Requirements only). Because CBP implementation costs are low relative to the other costs estimated in this analysis, the potential overstatement of government costs for some alternatives is not likely to disproportionately bias estimates of the total cost of the interim final rule.

[132] Personal communication with Office of International Trade, U.S. Customs and Border Protection, Department of Homeland Security, on May 16, 2007.

[133] Personal communication with Office of International Trade, U.S. Customs and Border Protection, Department of Homeland Security, on June 26, 2007.

EXHIBIT 4-20 CBP IMPLEMENTATION COSTS, 2009 - 2018 (MILLION $, 2008)

ALL ALTERNATIVES					
YEAR	COMPUTER SYSTEMS AND STORAGE	PERSONNEL	SYSTEMS OPERATION AND MAINTENANCE	LOW COST SCENARIO (MILLION $, UNDISCOUNTED)	HIGH COST SCENARIO (MILLION $, UNDISCOUNTED)
2009	$3.7	$1.9	$1	$7	$7
2010	0	0.7	1	2	2
2011	0	0	1	1	1
2012	0	0	1	1	1
2013	0	0	1	1	1
2014	0	0	1	1	1
2015	0	0	1	1	1
2016	0	0	1	1	1
2017	0	0	1	1	1
2018	0	0	1	1	1
Present Value Total (3 Percent, Million $):				**$15**	**$15**
Present Value Total (7 Percent, Million $):				**$14**	**$14**

Source: Personal communication with Office of International Trade, U.S. Customs and Border Protection, Department of Homeland Security, on June 26, 2007.

As shown in Exhibit 4-20, the incremental present value cost for government implementation is estimated to be $14 million to $15 million, depending on the discount rate.

SUMMARY OF ESTIMATED COSTS

The total costs of the interim final rule are summarized in Exhibit 4-21. The present value costs for Alternatives 1, 2, and 3 range from $7.0 billion to $56 billion over 10 years depending on the discount rate applied, the cost scenario, whether or not bulk shipments are exempt, and whether or not Additional Carrier Requirements are required. Under Alternative 2, which requires Importer Security Filings for both non-bulk cargo and bulk cargo, costs are not significantly higher because the number of bulk shipments is relatively small compared to the number of non-bulk shipments. Under Alternative 3, costs are not significantly lower because the estimated costs for the Additional Carrier Requirements are relatively small compared to the estimated costs for the Importer Security Filings. The estimated costs for Alternative 4 are significantly lower than the other three alternatives, ranging from $16 million to $95 million. In addition, government implementation costs are an insignificant component of the total costs.

Exhibit 4-22 presents the total annualized costs for the 10-year period. On an annualized basis, the costs for Alternatives 1 through 3 range from $890 million to $7.0 billion depending again on the discount rate applied, the cost scenario, whether or not bulk shipments are exempt, and whether or not Additional Carrier Requirements are required. The annualized costs for Alternative 4 are substantially lower, ranging from $2 million to $12 million.

EXHIBIT 4-21 SUMMARY OF PRESENT VALUE COSTS, 2009 – 2018 (2008 DOLLARS)

	ALTERNATIVE 1 (CHOSEN ALTERNATIVE): IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS, BULK CARGO EXEMPT	ALTERNATIVE 2: IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS, BULK CARGO NOT EXEMPT	ALTERNATIVE 3: IMPORTER SECURITY FILINGS, BULK CARGO EXEMPT	ALTERNATIVE 4: ADDITIONAL CARRIER REQUIREMENTS ONLY
3 PERCENT DISCOUNT RATE				
Importer and Carrier Costs	$7.6 billion to $56 billion	$7.6 billion to $56 billion	$7.5 billion to $56 billion	$3 million to $80 million
Government Implementation Costs	$15 million	$15 million	$15 million	$15 million
Total	**$7.6 billion to $56 billion**	**$7.6 billion to $56 billion**	**$7.6 billion to $56 billion**	**$0.02 billion to $0.1 billion**
7 PERCENT DISCOUNT RATE				
Importer and Carrier Costs	$6.9 billion to $49 billion	$7.0 billion to $49 billion	$6.9 billion to $49 billion	$2.5 million to $71 million
Government Implementation Costs	$14 million	$14 million	$14 million	$14 million
Total	**$7.0 billion to $49 billion**	**$7.0 billion to $49 billion**	**$7.0 billion to $49 billion**	**$0.02 billion to $0.09 billion**

Source: IEc calculations.

EXHIBIT 4-22 SUMMARY OF ANNUALIZED COSTS, 2009 – 2018 (2008 DOLLARS)

	ALTERNATIVE 1 (CHOSEN ALTERNATIVE): IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS, BULK CARGO EXEMPT	ALTERNATIVE 2: IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS, BULK CARGO NOT EXEMPT	ALTERNATIVE 3: IMPORTER SECURITY FILINGS, BULK CARGO EXEMPT	ALTERNATIVE 4: ADDITIONAL CARRIER REQUIREMENTS ONLY
3 PERCENT DISCOUNT RATE				
Importer and Carrier Costs	$890 million to $6.6 billion	$890 million to $6.6 billion	$880 million to $6.6 billion	$0.3 million to $9 million
Government Implementation Costs	$2 million	$2 million	$2 million	$2 million
Total	**$890 million to $6.6 billion**	**$890 million to $6.6 billion**	**$890 million to $6.6 billion**	**$2 million to $11 million**
7 PERCENT DISCOUNT RATE				
Importer and Carrier Costs	$990 million to $7.0 billion	$990 million to $7.0 billion	$990 million to $7.0 billion	$0.4 million to $10 million
Government Implementation Costs	$2 million	$2 million	$2 million	$2 million
Total	**$990 million to $7.0 billion**	**$990 million to $7.0 billion**	**$990 million to $7.0 billion**	**$2 million to $12 million**

Note: Columns may not sum due to rounding.
Source: IEc calculations.

Our analysis finds that the incremental costs of this regulation are relatively small compared to the median value of a shipment of goods despite the rather large absolute estimate of present value cost. Shipment data indicate that the median value of a shipment of goods imported into the United States is approximately $38,000.[134] As shown in Exhibit 4-23, the impacts will range from $48 to $390 per shipment, depending on the discount rate applied, the cost scenario, and whether or not bulk shipments are exempt. The added costs of this regulation are estimated to be only 0.13 percent to 1.03 percent of the median value of $38,000 per shipment.[135]

For the incremental costs of providing Vessel Stow Plans to CBP, we estimate that the total number of non-bulk vessel trips affected is approximately 294,000. As shown in Exhibit 4-23, the increase in costs of a vessel trip will range from $8 to $90, depending on the discount rate and cost scenario.

For the incremental costs of providing CSMs to CBP, we estimate that the total number of large carriers importing containerized cargo affected is 74. As shown in Exhibit 4-23, the increase in the total costs per carrier for the 10-year analysis period will range from $3,700 to $730,000, depending on the discount rate and cost scenario.

[134] As presented in Chapter 3, the median value of all shipments in 2005 is $35,160 and the median value of all non-bulk shipments is $34,895. Inflating these values using GDP Implicit Price Deflators from 2005 to 2008 results in median values of approximately $38,200 and $37,900.

[135] Note that the per shipment costs combine direct compliance costs (i.e., expenditures) and consumer surplus losses. They are compared to the median value per shipment to emphasize that the number of shipments significantly influences the magnitude of total costs.

EXHIBIT 4-23 COSTS PER SHIPMENT, MEDIAN VALUE OF SHIPMENT, VESSEL TRIP, AND CARRIER (2008 DOLLARS)

	3 PERCENT DISCOUNT RATE[1]	7 PERCENT DISCOUNT RATE[1]
IMPORTER SECURITY FILING COSTS: ALTERNATIVES 1 AND 3 (BULK CARGO EXEMPT)		
Total present value cost	$7.5 billion to $56 billion	$6.9 billion to $49 billion
Number of shipments (10-year total)	144 million	144 million
Equivalent per shipment cost[2]	$52 to $390	$48 to $341
Median value per shipment	$37,900	$37,900
Cost per median value of shipment	0.14 percent to 1.03 percent	0.13 percent to 0.90 percent
IMPORTER SECURITY FILING COSTS: ALTERNATIVE 2 (BULK CARGO NOT EXEMPT)		
Total present value cost	$7.6 billion to $56 billion	$7.0 billion to $49 billion
Number of shipments (10-year total)	145 million	145 million
Equivalent per shipment cost[2]	$52 to $388	$48 to $339
Median value per shipment	$38,200	$38,200
Cost per median value of shipment	0.14 percent to 1.02 percent	0.13 percent to 0.89 percent
VESSEL STOW PLAN COSTS: ALTERNATIVES 1, 2, AND 4		
Total present value cost	$3 million to $27 million	$2 million to $23 million
Number of container vessel trips, small and large carriers (10-year total)	294,000	294,000
Equivalent per vessel trip cost	$9 to $90	$8 to $78
CONTAINER STATUS MESSAGE COSTS: ALTERNATIVES 1, 2, AND 4		
Total present value cost	$0.3 million to $54 million	$0.3 million to $48 million
Number of container carriers, large	74	74
Equivalent per carrier cost[3]	$3,900 to $730,000	$3,700 to $650,000

Notes:

[1] The range presented in each cell results from varying assumptions about the estimated initial and transaction costs for Importer Security Filings, the potential for supply chain delays, and the estimated costs to transmit Vessel Stow Plans and CSMs to CBP.

[2] Per shipment cost includes both direct expenditures resulting from collecting and providing the required information to CBP and consumer surplus losses resulting from delays.

[3] We assume that the large carriers (those that made more than 100 vessel trips to the United States in 2005) already collect and maintain CSM data and therefore would be required to comply with the CSM requirements.

This cost analysis considers and evaluates the following four alternatives:

1. **Alternative 1 (the chosen alternative):** Importer Security Filings and Additional Carrier Requirements are required.[136] Bulk cargo is exempt from the Importer Security Filing requirements;
2. **Alternative 2:** Importer Security Filings and Additional Carrier Requirements are required. Bulk cargo is **not** exempt from the Importer Security Filing requirements;
3. **Alternative 3:** Only Importer Security Filings are required. Bulk cargo is exempt from the Importer Security Filing requirements; and
4. **Alternative 4:** Only the Additional Carrier Requirements are required.

Alternative 2 is the most comprehensive alternative, requiring Importer Security Filings for both non-bulk cargo and bulk cargo as well as the Additional Carrier Requirements. Alternative 1, the chosen alternative, exempts bulk cargo from the Importer Security Filing requirements. The estimated cost for Alternative 1 is not significantly lower than Alternative 2 because the number of bulk shipments is relatively small compared to the number of non-bulk shipments. The estimated costs for Alternative 3 are similar to Alternative 1 because the estimated costs for the Additional Carrier Requirements are small relative to the estimated costs for Importer Security Filings. Alternative 3 does not include the Additional Carrier Requirements, which requires data that verify the information on the cargo manifest and identify and track the movement, location, and status of cargo (and in particular, containerized cargo) from the time its transport is booked until its arrival in the United States. Without the Additional Carrier Requirements, CBP will not be able to assess the specific risks associated with the many individual movements and transfers involved in shipping cargo to the United States. Thus, an important element of CBP's layered, risk-based approach to cargo security would, consequently, be omitted. Finally, the estimated costs for Alternative 4 are significantly lower than the estimated costs for the other three alternatives. However, this alternative is the least stringent and effective option because it only collects data on the conveyance of the shipment. Further, it does not meet the statutory requirements of Section 203 of the SAFE Port Act. Further discussion of these alternatives with respect to their potential benefits (i.e., break-even risk reductions) is provided in Chapter 5.

Alternatives 3 and 4 are not chosen, in part, because it is CBP's judgment that neither of these options will be as effective as the selected option. Specifically, the Importer Security Filing requirements and the Additional Carrier Requirements work in tandem. The Additional Carrier Requirements focus on the conveyance of the goods and are distinct from the Importer Security Filing elements, which are focused on the merchandise and the parties involved in the acquisition process. Specifically, Vessel Stow Plans will assist CBP in validating other advanced cargo information submissions by allowing CBP to, among other things, better detect unmanifested containers without

[136] For each alternative, the Additional Carrier Requirements apply only to containerized cargo.

relying on physical verification methods that are manpower intensive and costly. CSMs will provide CBP with additional transparency into the custodial environment through which intermodal containers are handled and transported before arrival in the United States. Because CSMs are created independently of the manifest, CBP can utilize them to corroborate other advanced data elements, including Importer Security Filings and those elements related to container and conveyance origin. This corroboration with other advanced data messages, including Importer Security Filings, and an enhanced view into the international supply chain will contribute to the security of the United States and the international supply chain through which containers and imported cargo are shipped to U.S. ports.

Based on this analysis of alternatives, CBP has determined that Alternative 1 provides the most favorable balance between security outcomes and impacts to maritime transportation. As summarized in Exhibit 4-23 above, the cost per shipment is a small fraction of the value of a shipment, and the relatively high cost of the rule over 10 years is driven by the large volume of shipments rather than high per-transaction costs.

LIMITATIONS AND KEY SOURCES OF UNCERTAINTY

Our estimates of the incremental costs are subject to substantial uncertainty due to various assumptions about the estimated Importer Security Filing costs, the projected growth in importers and shipments, the potential for supply chain delays, and whether the carriers elect to transmit more than just the four required CSMs for U.S.-bound containers. Below, we discuss the key assumptions affecting the cost estimates. Appendix C presents a more detailed, quantitative analysis of uncertainty.

IMPORTER SECURITY FILING COSTS

We assume an average initial cost of $25,000 per importer, based on an estimate provided in public comments to the proposed rule. We do not have the data or information to quantify the extent to which the initial costs would vary from importer to importer. We do, however, assume that the most infrequent importers (i.e., those that import only one shipment per year) would choose not to incur the estimated initial costs and would instead seek alternative sources for their goods or cease importing altogether. Appendix C discusses the uncertainties associated with these assumptions.

We assume that the recurring Importer Security Filing transaction costs are primarily dependent on transaction volume. We consider other factors such as filing party, whether FROB is involved, whether Importer Security Filings and customs entry filings are made together, the level of importer technological sophistication, complexity of importer's supply chain and business style, whether multiple BOLs can be satisfied by one Importer Security Filing, cargo type, the number of goods contained in a particular shipment, and whether required Importer Security Filing updates are made. We do not have the data or information to quantify the extent to which the security filing costs would vary by these factors. We do, however, estimate higher unit costs for FROB shipments because carriers have expressed concern with meeting the security filing requirements for FROB.

We also assume that the estimated security filing costs, both initial and recurring, adequately account for all the costs that will be incurred by the various parties within the supply chain to modify, implement, and operate new information systems to collect, coordinate, and transmit the required security filing data elements to CBP. If the costs we assume exceed the actual costs incurred by the supply chain, then our analysis overstates costs. For example, there may be some brokers and NVOCCs that will charge their customers transaction fees for security filings that are higher than their incurred cost (i.e., a windfall). In addition, some importers may file their own security filings (self-filers) at per-shipment costs that are lower than the transaction costs we assume. On the other hand, if the estimated costs do not fully capture the actual costs incurred by the supply chain, then our analysis understates costs. For example, numerous smaller suppliers, vendors, and NVOCCs may incur costs to provide their importers the required data elements that may not be adequately captured in the transaction costs or fees. However, some of these entities are based overseas (foreign entities), and therefore their compliance costs do not represent the incremental costs borne by U.S. entities.

We also assume that the cost information provided by the supply chain parties we interviewed is representative of the entire supply chain. As shown in Exhibit 4-3, we interviewed more than 20 representatives from a broad range of the parties likely to affected by the interim final rule.

Finally, because CBP is adopting a "Structured Review and Flexible Enforcement Period" during which CBP will work with the trade following the effective date of the interim final rule to assist them in achieving compliance with minimal disruption and because the rule provides for flexibilities regarding certain elements of the Importer Security Filing, this analysis likely overstates the incremental costs.

PROJECTED GROWTH IN IMPORTERS AND SHIPMENTS

We assume no year-to-year growth in the number of affected importers, given the lack of data to make such projections. The number of importers may increase over time as the level of foreign trade increases or decreases over time if the level of imports decline, importer industries consolidate, or for other reasons. Furthermore, our estimate of the range of the total number of importers calculated in Chapter 3 (approximately 200,000 to 750,000) may understate the number affected importers and therefore the importer costs for complying with this interim final rule.

Our analysis assumes that containerized and non-containerized shipments will grow at an annual rate of 5.4 percent and 1.4 percent, respectively (from the U.S. Army Corps of Engineers (USACOE) study). As discussed in Chapter 3, these growth rates are the best available projections that we could find. The USACOE study was prepared in 2003. Recent economic developments, including the decline of the dollar relative to other currencies, however, would indicate that these projected growth rates might be overly

optimistic.[137] However, use of these optimistic growth estimates produces a conservative analysis that most likely overstates the incremental costs.

WELFARE LOSSES FROM POTENTIAL SUPPLY CHAIN DELAY

For the high cost scenario, we assume a supply chain delay of 2 or 3 days for the first year of the analysis period and 1 day for the subsequent 9 years of the analysis period. The supply chain parties we interviewed as well as public comments to the proposed rule provided estimates of supply chain delays ranging from no delay to as many as 7 days. Because CBP is adopting a "Structured Review and Flexible Enforcement Period" during which CBP will work with the trade following the effective date of the interim final rule to assist them in achieving compliance with minimal disruption, this analysis likely overstates the welfare losses. However, if problems with implementation and compliance occur beyond the first year and importers and suppliers continually experience a delay of more than 1 day to meet the requirements of the interim final rule (or those requirements imposed by their carriers or consolidators), then our analysis may understate welfare losses. Appendix C discusses the uncertainties associated with our assumption on the estimated days of delay.

Furthermore, the "Hummels parameters" by which we estimate welfare losses are based on a sample of traded goods that may be more valuable and time sensitive relative to the universe of imports transported by vessel. As a result, the transfer of these parameters to the shipments that are the focus of this analysis may overstate importers' willingness to pay to receive shipments 1 day earlier. We also assume that the impacts increase proportionately with each additional day of delay. In reality, threshold levels likely exist above which additional delay has little additional impact and below which importers are indifferent to additional time savings. The direction of bias resulting from this assumption is unknown. Additionally, the analysis does not account for lower-cost compliance options available to some importers, such as changing to another mode of shipping to reduce delay. While imposing costs, the impact is unlikely to be as great as the welfare loss associated with continuing to use ocean transit. Finally, second order effects, where a decrease in trade for imported goods prompts increased demand for domestically produced goods, or decreased domestic production in industries relying on intermediate goods manufactured overseas, has not been accounted for in the analysis.

We assume that potential supply chain delays primarily affect containerized cargo. We did not include other shipments that could be affected by supply chain delays such as bulk or break-bulk cargo. As a result, our analysis may understate welfare losses due to supply chain delays experienced by parties importing non-containerized cargo.

Additionally, to estimate the projected growth in total shipment value, we assume that the value per shipment remains constant throughout the 10-year analysis period and apply the projected annual increase in the number of shipments estimate of 5.4 percent. In other words, we assume that the total value of affected shipments increases at the shipment

[137] The decline of the dollar makes foreign goods more expensive in the United States. At the same time, U.S. produced goods may become more attractive to foreign purchasers.

growth rate of 5.4 percent. If the total value of affected shipments increases at a different rate, then our analysis may understate or overstate welfare losses. In addition, as described in Chapter 3, there is uncertainty in the shipment values provided in the PIERS data as some values appear to be unrealistically high.

Finally, the potential supply chain delays may increase the susceptibility of cargo tampering, theft, damage, or loss while containers await transmittal and CBP approval of security filing data before lading at the foreign port. However, we cannot quantify the increased likelihood or risk, if any, of such tampering, which will vary from container to container and port to port and is based on many factors such as container content, type, condition, location, and routing; existing and planned security measures; and the care and vigilance of the various supply chain parties involved in container handling and transportation. We assume that the supply chain parties will implement the necessary security measures to protect their cargo from the increased risk, if any, of such tampering as a result of the potential delay. Our estimate of the welfare losses using the Hummels parameters that measure the willingness to pay for reducing transit time should account for these additional security costs among other delay costs such as inventory carrying and holding costs, depreciation, and storage costs.

CONTAINER STATUS MESSAGES

We assume that small carriers do not already collect and maintain CSM data and, therefore, would not be required to comply with the CSM requirements. We assume that large carriers already collect and maintain CSM data and would be required to comply with the CSM requirements. If there are small carriers that do collect CSM data or large carriers that do not collect CSM data, then our analysis understates or overstates the incremental costs.

We estimate large carrier costs for complying with the interim final rule's CSM requirements using information provided by member carriers of the World Shipping Council. Using this information, we assume that generally most large carriers will elect to transmit their global CSMs as the more cost-effective option. However, we recognize that there are likely some carriers who will elect to transmit CSMs for just their U.S.-bound containers or CSMs related to just the nine events required by the interim final rule. As a result, our analysis may understate CSM costs. However, we believe that a large proportion of the carrier companies importing cargo into the United States are foreign, and thus our analysis likely overstates the incremental costs borne by U.S. carrier entities.

GOVERNMENT IMPLEMENTATION COST ESTIMATES

Estimates of government implementation costs were obtained from CBP; government costs may be lower or higher than those estimated in this report.

CHAPTER 5 | POTENTIAL BENEFITS

This rule requires the electronic submission of additional information beyond that already submitted for targeting purposes as required by the 24-Hour Advance Manifest Rule (24-Hour Rule).[138] U.S. Customs and Border Protection (CBP) uses the Automated Targeting System (ATS) to process cargo manifest data to identify and evaluate the risk of smuggling weapons of mass effect through the use of oceangoing cargo, while, at the same time, enabling CBP to further expedite low-risk shipments following their arrival in the United States. The benefit of this rule is to improve the ability of CBP to identify high-risk shipments so as to prevent smuggling and ensure cargo safety and security, thereby reducing the risk of future terrorist events in the United States.

In this chapter, we first discuss our approach to measuring the benefits of the rule. Next, we present the results of our "break-even" analysis of the reduction in the probability of an attack that would cause the benefits of the rule to equal the costs and test the sensitivity of our results to key assumptions. We conclude with a discussion of the key limitations of this analysis.

ANALYTIC APPROACH

This section describes our analytic approach to measuring the benefits of the interim final rule. First, we discuss the methods typically used in a regulatory impact analysis to measure benefits and describe existing limitations to applying this approach. Then, we outline an alternative, "break-even" framework, which provides the decision maker with information about the changes in the probability of specific types of terrorist attacks that, if achieved by the rule, would generate benefits equal to the rule's costs.

STANDARD APPROACH TO ESTIMATING DIRECT BENEFITS

Ideally, the quantification and monetization of the benefit of decreasing the risk of a terrorist attack involves two steps. First, we would estimate the incremental reduction in the risk of a successful terrorist attack resulting from implementation of the interim final rule. Then, we would identify individuals' willingness to pay for this incremental risk reduction and multiply it by the population experiencing the benefit. Below, we discuss

[138] As discussed in Chapter 2, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings.

these two steps in greater detail, noting where the steps rely on data that are not readily available for this rule.

ESTIMATING THE REDUCTION IN THE RISK OF AN ATTACK

OMB directs Federal agencies to estimate the benefits of the rule against a baseline.[139] The baseline represents the best estimate of current terrorism risk in the United States today, absent the implementation of the interim final rule. The difference between the baseline level of terrorism risk today and anticipated risk levels after implementation of the interim final rule represents the incremental risk reduction attributable to the regulation.

Terrorism risk is generally defined to include three components: the threat to a target; the target's vulnerability to the threat; and the consequences should the attack be successful.[140] Experts measure threat and vulnerability in terms of the probability that an attack will be attempted and the probability that if the attack is successful, it results in damage. They measure consequences in terms of the expected magnitude and type of damage resulting from a successful attack. In other words, "terrorism risk represents the expected consequences of attacks taking into account the likelihood that attacks occur and that they are successful if attempted," illustrated in the following formula:[141]

*Risk of a terrorist attack = p(successful terrorist attack) * consequences of an attack*

The total terrorism risk in the United States can be estimated from the sum of the risk associated with all potential attacks.

To isolate the incremental risk reduction likely to result from the interim final rule, we must understand how the risk of terrorism will be affected by the implementation of the rule. Terrorism risk may be altered by changing either the probability or consequence of attacks, or both. However, great uncertainty exists as to how a security regulation will influence these factors. At this time, we are unable to identify sufficient studies of how this type of regulation will affect terrorist motivations or capabilities and, ultimately, the overall incremental change in terrorism risk.

VALUING REDUCTIONS IN TERRORISM RISK

Assuming the incremental risk reduction resulting from a regulation can be quantified, the second step in an analysis of benefits is to place a monetary value on this risk reduction. The practice of benefits valuation is based on the discipline of welfare economics, in which value is measured by the "satisfaction" or "utility" individuals

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[139] Office of Management and Budget, *Circular A-4*, September 17, 2003, p. 15.

[140] This paragraph taken from Willis, H., Morral, A.R., Kelly, T.K., and J.J. Medby, *Estimating Terrorism Risk*, RAND Corporation, 2005, pp. xvi, 6-10.

[141] Quotation obtained from Willis, H., Morral, A.R., Kelly, T.K., and J.J. Medby, *Estimating Terrorism Risk*, RAND Corporation, 2005, p. 10.

derive from an improvement in security. Individuals reveal these values through their willingness to pay for effects of these types of changes. Willingness to pay is the maximum amount of money an individual would voluntarily exchange to obtain an improvement (e.g., a reduction in the risk of a successful terrorist attack), given his or her available financial resources and desired spending on other goods and services.

Willingness to pay is not the same as price or cost. Price is determined by the interactions of buyers and sellers in the marketplace, while cost is a function of the materials, processes, and labor used to create the good and service. Some individuals' willingness to pay for a particular good or service will exceed the market price, in which case they benefit from the ability to buy the good or service at the (lower) market price. Other individuals' willingness to pay will be less than the market price, in which case they would not buy the good or service.

Where willingness to pay for the effect of a regulation (e.g., reduced terrorism risk) is difficult to directly observe in the marketplace, economists use other methods to elicit the value society places on the effect. For example, stated preference methods estimate willingness to pay for a given outcome by asking individuals to make choices based on hypothetical questions in a survey. Economists also use revealed preference methods to infer the value placed on these effects by looking at individuals' behavior in related markets (e.g., estimating willingness to pay to decrease mortality risks by observing purchases of items that reduce the risk of dying in an accident).[142]

We conducted a review of the economics literature to identify existing studies of individuals' willingness to pay to reduce the risk of a terrorist attack. Several articles discuss characteristics of terrorist attacks that might influence willingness to pay to reduce these risks, and one study solicits information about willingness to pay for terrorism detection, response, and recovery technologies and services.[143] However, given the publicly available data, we are unable to identify estimates of willingness to pay for specific reductions in the risk of terrorist attack in the United States.[144]

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[142] For additional information on methods for estimating willingness to pay for non-market goods, see U.S. Environmental Protection Agency, "Guidelines for Preparing Economic Analyses," EPA 240-R-00-003, September 2000.

[143] For example, see Sunstein, C., "Terrorism and Probability Neglect," *Journal of Risk and Uncertainty*, 26:2/3, 2003, pp. 121-136; Fischhoff, B., Gonzalez, R.M., Small, D.A., and J.S. Lerner, "Judged Terror Risk and Proximity to the World Trade Center," *Journal of Risk and Uncertainty*, 26:2/3, 2003, pp. 137-151; and Donahue, A.K., Robbins, M.D. and B. Simonsen, "Taxes, Time, and Support for Security," *Public Budgeting and Finance*, Summer 2008, pp. 69-86.

[144] Although we are unable to identify estimates of willingness to pay for the risk reduction potentially achieved by this regulation, the academic literature provides information about how the public's perception of terrorist risks might influence their desire for policy action, and ultimately, their willingness to pay for such regulation. A substantial body of psychometric literature attempts to measure how the perception of risk affects attitudes towards risk reduction. The work of Slovic et al. clarifies dimensions of risk that influence individual rankings of the importance of reducing these risks (see Slovic, P., Fischhoff, B., and S. Lichtenstein, "Perceived Risk: Psychological Factors and Social Implications," *Proceedings of the Royal Society of London. Series A: Mathematical and Physical Sciences*, Vol. 430, No. 1878, 1981, pp. 17-34. Also evaluated in Slovic, P., "Perception of Risk," *Science*, Vol. 236, April 1987, pp. 280-285). The authors find that the most important determinant of how the public ranks risk is the degree of "dread" associated with

Where it is not possible to obtain a single value estimate that comprises the bundle of benefits derived from the regulation in question, analysts estimate separately the value of individual effects resulting from the regulation and sum them to estimate total benefits. Certain effects are more easily measured than others. For example, substantial literature exists estimating the value of changes in fatal and nonfatal risks. In addition, opportunity costs associated with supply chain effects can be determined from market data.

Other effects may be more difficult to quantify or monetize. For example, the regulation may cause people to feel safer, or conversely, have less fear. Several researchers argue that reductions in fear result in a social good that should be quantified. However, in a recent paper, Sunstein states, "the problem of quantifying and monetizing fear and its consequences…has yet to be seriously engaged in the relevant literature."[145] In addition, people's willingness to pay to protect national historic treasures may exceed the simple costs of repairing or rebuilding these sites. Effects that are not easily monetized using readily available information may be discussed qualitatively.

In summary, we were unable to identify studies that estimate how this type of regulation will affect terrorist motivations or capabilities, and ultimately, overall terrorism risk. As a result, we cannot estimate the incremental risk reduction attributable to the interim final rule. In addition, we are unable to identify studies estimating willingness to pay for the risk reductions anticipated from the interim final rule. It may be possible to value the individual effects of reducing terrorism risk (i.e., reduced fatalities, injuries, property value losses, or other market effects) should information about incremental risk reductions become available in the future.

USING BREAK-EVEN ANALYSIS TO INFORM THE RULEMAKING PROCESS

As a result of the data limitations discussed above, we undertake a "break-even" analysis to inform decision makers of the incremental risk reduction required for the benefits of this regulation to equal the costs calculated in Chapter 4. OMB recommends conducting such an analysis when it is not possible to quantify or monetize the important incremental

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the risk. Slovic defines dreaded risks by a "perceived lack of control,…catastrophic potential, fatal consequences, and the inequitable distribution of risks and benefits" (Slovic, P., "Perception of Risk," *Science*, Vol. 236, April 1987, p. 283). In other words, the public is less willing to tolerate risks related to incidents they dread, such as nuclear accidents or terrorist attacks, than incidents that are not dreaded but that pose similar or higher risks, such as riding a motorcycle. Slovic et al. state that the more dreaded an activity, "(a) the higher its perceived risk, (b) the more people want its risk reduced, and (c) the more they want to see strict regulation employed to achieve the desired reduction in risk" (Slovic, P., Fischhoff, B. and S. Lichtenstein, "Perceived Risk: Psychological Factors and Social Implications," *Proceedings of the Royal Society of London. Series A: Mathematical and Physical Sciences*, Vol. 430, No. 1878, 1981, p. 29). Based on existing risk perception literature, it is reasonable to hypothesize that people would be willing to pay more to reduce risks associated with a terrorist attack than similar risks associated with hazards that are familiar, controllable, and that do not have catastrophic consequences. However, additional research is required to estimate the value of terrorism-related risk reductions.

[145] Sunstein, C., "Terrorism and Probability Neglect," *Journal of Risk and Uncertainty*, 26:2/3, 2003, pp. 132-133.

benefits of a regulation.[146] Below, we provide a conceptual description of break-even analysis.

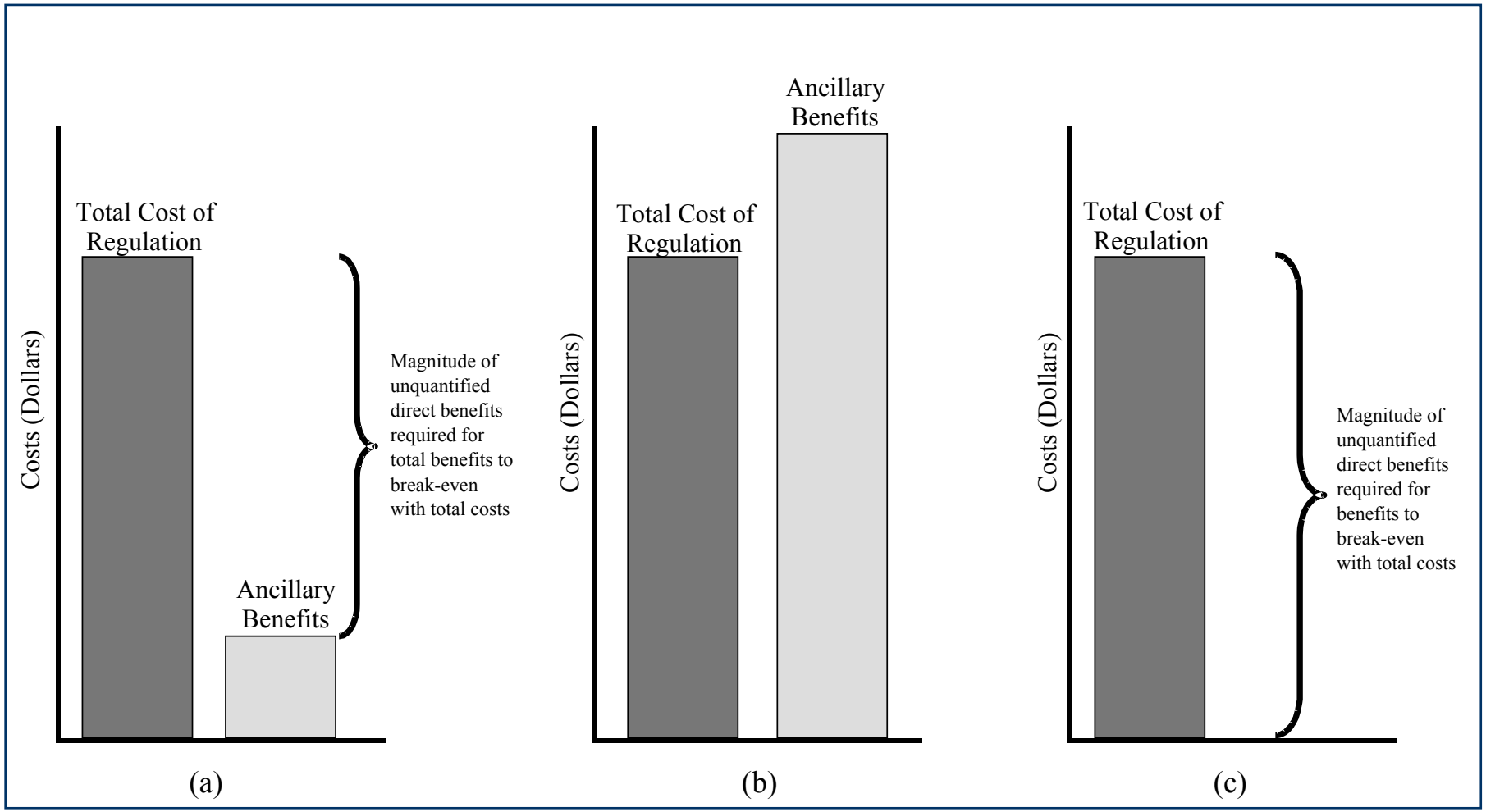
First, we would ideally estimate any ancillary benefits resulting from the interim final rule. Such ancillary benefits might include long-term improvements in supply-chain efficiency resulting from the sharing of higher quality information in a more timely fashion among supply chain participants. In addition, improved visibility into the supply-chain might make the transportation of illegal goods, such as merchandise fraudulently advertised as being the product of well-known U.S. companies more difficult. While such benefits are possible, their quantification is beyond the scope of this analysis.

Next, if we were able to monetize additional categories of benefits, we would subtract them from the costs of the regulation calculated in Chapter 4. The resulting estimate of net costs equals the magnitude of benefits required for the total benefits of the rule to equal the total costs. In other words, this value represents the threshold at which benefits would "break-even" with the costs of the regulation. Exhibit 5-1(a) illustrates this concept.[147] If quantified reductions in ancillary benefits exceed the costs of the regulation, as shown in Exhibit 5-1(b), then no additional break-even analysis is required (i.e., even without quantifying the direct benefits of the regulation, benefits exceed costs). If reductions in ancillary benefits are not quantified, due to a lack of such benefits or a lack of sufficient data to monetize these benefits, then for the purposes of this analysis, the magnitude of direct benefits required for the rule to break-even is assumed to equal the total costs of the regulation, as shown in Exhibit 5-1(c).

[146] U.S. Office of Management of Budget, Circular A-4, September 17, 2003, p. 3.

[147] Please note that the exhibit is not drawn to scale and is intended only to be illustrative of the framework for the analysis. The actual, relative proportions of other ancillary benefits to costs and ancillary benefits to direct benefits likely differ from the proportions in the exhibit.

EXHIBIT 5-1 ILLUSTRATION OF THE CONCEPT OF A BREAK-EVEN ANALYSIS



To help the decision maker assess whether it is possible for the benefits of the interim final rule to reach the magnitude required to break-even with costs, we undertake a third step. First, we identify representative terrorist attacks potentially prevented by this regulation. Then, we estimate the economic impacts of these events, such as the costs of damage to property, the opportunity cost of disruptions in economic activity, and/or the value of mortality and morbidity effects.[148] The benefits of avoiding a terrorist attack can be expressed as the reduction in the probability that a successful terrorist attack will occur multiplied by the economic consequences of such an attack:

$$Benefits = \Delta p(successful\ terrorist\ attack) * Attack\ Consequences$$

If the costs and benefits of the rule are equal, we have:

$$Net\ Costs = \Delta p(successful\ terrorist\ attack) * Attack\ Consequences$$

and the change in probability (Δp) associated with this break-even point is:

$$\Delta p(successful\ terrorist\ attack) = Net\ Costs / Attack\ Consequences$$

We solve for this change in probability (Δp) separately for each of the terrorist attack scenarios evaluated, making the simplifying assumption in each case that the rule reduces the risk of a single event of that type of attack only. In reality, the rule would be expected to reduce the risk of multiple numbers and types of attacks. In the absence of a quantifiable estimate of the incremental reduction in the probability of a terrorist attack resulting from the interim final rule, this "break-even" probability can still be useful to the decision makers and the public. For example, if decision makers believe that the rule could plausibly achieve *one or more* of the risk reduction targets calculated in our analysis, this information may lead them to adopt the regulation on the grounds that a reasonable estimate of the benefits of the rule are likely to exceed a reasonable estimate of the costs. On the other hand, if decision makers believe the incremental change in probability for all the types of attacks we analyzed is likely to be less than the break-even probability, this information may lead them to recommend rejecting the regulation on the

[148] As discussed later in this chapter, we apply a value of statistical life (VSL) to the deaths resulting from the representative incidents included in this analysis. A statistical life is the sum of individual risk reductions spread across an entire exposed population. Economists estimate VSL by measuring individual willingness to pay to avoid small changes in individual risk of premature death. Therefore, VSL does not represent the value of any particular person. Although our analysis relies on hypothetical scenarios that predict deaths of people included in the scenarios, the analysis is fundamentally probabilistic in nature (i.e., we assume that each scenario has some unknown probability of occurring in the future). Therefore, the use of a VSL measure to estimate the value of these losses is appropriate in this context.

grounds that the costs of the rule are likely to exceed the benefits. An important caveat is that this analysis is only useful if the attack scenarios appropriately reflect the types of attacks prevented by this regulation.

APPLICATION OF BREAK-EVEN ANALYSIS

This section describes our break-even analysis. First, we review the available literature to provide a context for the type of terrorist attacks potentially prevented by the interim final rule. Then we summarize the economic costs (i.e., the consequences) associated with three representative events. Next, using the regulatory costs for the four alternatives estimated in Chapter 4, we calculate the break-even probabilities for each individual attack scenario. Finally, we conduct a sensitivity analysis using the costs of a hypothetical event with less significant consequences.

POTENTIAL TYPES OF TERRORIST ATTACKS

We reviewed the available literature to identify terrorist threats associated with ocean shipments. Several sources discuss both the potential for terrorists to use the container shipping industry for attacks in the United States and the resulting consequences of these attacks. We discuss these sources briefly, below.

In his book *America the Vulnerable: How Our Government Is Failing to Protect Us from Terrorism*, retired Coast Guard commander and recognized terrorism expert Stephen Flynn notes that the potential scenarios for terrorist attacks in the United States are almost unlimited.[149] Flynn describes a scenario in which al-Qaeda funded terrorists use containers to smuggle radioactive material into the United States and detonate dirty bombs in Detroit, Los Angeles, Miami, and Elizabeth.

The Organization for Economic Co-operation and Development (OECD) released a report in 2003 that analyzes the vulnerabilities of the global container shipping industry to terrorism.[150] In this report, the OECD Maritime Transport Committee describes two scenarios: the 2002 closure of all West Coast ports and a hypothetical event in which terrorists smuggle dirty bombs into the United States. The committee also notes that the cost of inaction with regard to these vulnerabilities is potentially tremendous. "The maritime transport system is vulnerable to being targeted and/or exploited by terrorists. A large attack, especially a well-coordinated one, could have the result of shutting down the entire system as governments scramble to put in place appropriate security measures. These may be drastic, such as the complete closure of ports, and inefficient, such as duplicative and lengthy cargo checks in both originating and receiving ports."[151]

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[149] Flynn, S., *America the Vulnerable: How Our Government Is Failing to Protect Us from Terrorism*, Harper Collins Publishers, 2004, p. 17.

[150] OECD, Directorate for Science, Technology, and Industry, Maritime Transport Committee, "Security in Maritime Transport: Risk Factors and Economic Impact," July 2003.

[151] OECD, Directorate for Science, Technology, and Industry, Maritime Transport Committee, "Security in Maritime Transport: Risk Factors and Economic Impact," July 2003, p. 3.

In a report published in 2002, the Brookings Institution investigates the potential for future terrorist attacks in the United States and what can be done to prevent them.[152] The authors present two tables that are significant to our analysis. The first identifies six types of potential terrorist attacks and ranks these attacks based on the projected fatalities and likelihood of occurrence. A biological attack, a nuclear attack, and an attack on a nuclear or chemical facility are prime examples. The second table identifies seven types of attacks and describes the associated economic costs of such events. The authors state that a weapon of mass destruction arriving via a container would have potential costs reaching $1 trillion. The release of a biological agent in a major city center could reach $750 billion in costs, and widespread terror against key elements of the economy (e.g., malls, restaurants, theaters) could cost $250 billion.

POTENTIAL CONSEQUENCES OF AN ATTACK

Because it is difficult to predict both the type of terrorist attack avoided as a result of the interim final rule and the consequences of such an attack, we review a sample of actual and hypothetical events from the available literature. Our goal is to identify examples of incidents with consequences similar to a terrorist attack, regardless of the cause of the event. For example, costs associated with the closure of a U.S. port caused by a labor dispute serve as a proxy for costs that might result if the port is closed as a result of a terrorist incident. For this analysis, we include (1) the labor dispute between the International Longshore and Warehouse Union (ILWU) and the 29 West Coast ports represented by the Pacific Maritime Association (PMA), which resulted in the closure of all PMA ports for 12 days in October 2002; (2) the hypothetical detonation of a 20 kiloton nuclear weapon in Elizabeth, New Jersey, Washington, DC, or Boston; and (3) the hypothetical dispersal of biological agent in Los Angeles, New York, or Boston. Available reports describing each of these events contain detailed estimates of the resulting economic consequences. We outline these estimates in the paragraphs below.

West Coast Port Closure

Cohen describes the closure of West Coast ports "as a major risk for crisis in financial markets as well as a major shock to the U.S. economy, to the struggling economies of the Asian nations and to Mexico."[153] Cohen notes that despite the large volumes of supplied goods handled, the network of West Coast ports is surprisingly inflexible. An extended shutdown at one (or many) West Coast ports would likely have a significant economic impact, both in the United States and abroad.

The West Coast ports process a large portion of U.S. container imports. Cohen states that nearly 95 percent of containers bound for the central and mountain states and almost half of containers bound for the north Atlantic states are processed by these ports. Carriers operating in the Pacific often rely on ships carrying an excess of 8,000 20-foot equivalent

[152] O'Hanlon, M.E., Orszag, P.R., Daalder, I.H., Destler, I.M., Gunter, D.L., Litan, R.E., and J.B. Steinberg, The Brookings Institution, *Protecting the American Homeland: A Preliminary Analysis*, Brookings Institution Press, 2002.

[153] Cohen, S., "Economic Impact of a West Coast Dock Shutdown," University of California at Berkeley, January 2002, p. 1.

units. If re-routed to ports on the Gulf or East Coasts, these ships, unable to traverse the Panama Canal, must instead use the Suez Canal, which delays shipments for days or weeks.

In October 2002, the labor dispute between the ILWU and PMA led to a closure of all West Coast ports for nearly 2 weeks. While not in response to a terrorist attack, this closure is a good example of the potential scope of costs related to such an event.[154] Two studies calculate costs of the closure, and estimates range from $140 million to $2 billion per day. For our analysis, we rely on a study conducted by Anderson Economic Group (Anderson), whose estimate totals $1.7 billion over the 12-day period.[155]

The authors consider only actual changes in economic income net of offsetting effects such as substitution of other goods and services in their estimate. Before the closure ended, Anderson calculated a preliminary estimate based on a closure of 4 weeks (i.e., $4.7 billion).[156] Costs incurred by workers, producers, and consumers are included in this total. After the closure, the authors revised this estimate to reflect the actual duration of the closure. Exhibit 5-2 outlines these estimates.

EXHIBIT 5-2 ECONOMIC IMPACTS OF THE WEST COAST PORT CLOSURE

	28-DAY CLOSURE (MILLIONS)	12-DAY CLOSURE (MILLIONS)
Workers (lost wages)	$84.0	$36.0
Maritime industry producers (lost profits)	48.0	20.6
Export producers (lost exports)	1,600.0	685.7
Industrial consumers (lost production)	2,880.0	925.7
Retail consumers (higher prices)	57.6	6.2
TOTAL	**$4.669.6**	**$1,674.2**

Source: Anderson, P.L. and I.K. Geckil, "Flash Estimate: Impact of West Coast Shutdown," Anderson Economic Group, October 15, 2002, p. 2.

Nuclear Attack

Abt Associates (Abt) describes a scenario in which a nuclear weapon is smuggled undetected into the United States in a container and either detonated in port or in a major city center.[157] The authors identify three potential targets: Port Elizabeth, New Jersey,

[154] Note that importers had advance notice of the closure and were therefore able to prepare. If the closure had been unexpected impacts likely would have been larger.

[155] Anderson, P.L. and I.K. Geckil, "Flash Estimate: Impact of West Coast Shutdown," Anderson Economic Group, October 15, 2002, p. 1.

[156] Anderson, P.L., "Lost Earnings Due to the West Coast Port Shutdown – Preliminary Estimate," Anderson Economic Group, October 7, 2002, p. 1.

[157] Abt, C.C., "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, April 30, 2003.

downtown Washington, DC, and the Port of Boston. Assuming a 20-kiloton nuclear weapon, the authors estimate the potential costs associated with loss of life, property damage, and disruption in trade, as well as other indirect costs. According to the report, a successful attack would cause 50,000 to 1,000,000 fatalities, property damage of $50 billion to $500 billion, trade disruption of $100 billion to $200 billion, and other indirect costs of $300 billion to $1,400 billion.[158] We summarize these estimates in Exhibit 5-3. Abt notes that these estimates represent only initial costs; long-term costs, although not estimated, would be substantially greater. In addition, although these estimates involve considerable uncertainty, "the economic consequences of an attack are so large that substantial increases or reductions in the estimated values would not affect the major conclusions" of the authors.[159]

EXHIBIT 5-3 IMPACTS OF A NUCLEAR ATTACK IN ELIZABETH, BOSTON, OR WASHINGTON, DC

LOSS CATEGORY	ESTIMATED IMPACT
Fatalities	50,000 - 1,000,000
Property Damage	$50 - 500 billion
Trade Disruption	$100 - 200 billion
Other Indirect Costs	$300 - 1,400 billion

Source: Abt, C.C., "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, April 30, 2003, p. 4.
Note: The summary figures presented by Abt appear to include additional consequences not specified later in the report.

Port Elizabeth/Midtown Manhattan

The Abt report states that New York is a high-priority target for terrorists because a successful attack could cause both maximum destructive impact and deaths. In this scenario, terrorists could smuggle a nuclear weapon into Port Elizabeth in a container and detonate the weapon in port, or once unloaded, transport the container to New York and detonate the weapon in midtown Manhattan. Port Elizabeth is the largest container port on the East Coast and is only 6 miles from New York; either explosion would have significant consequences.

To estimate the costs associated with such an attack, the authors first estimate the number of fatalities based on a U.S. Atomic Energy Commission report describing the extent of nuclear explosions and population data for Elizabeth. The authors estimate 20,000 fatalities in Elizabeth. Abt assumes a value of a statistical life (VSL) of $3 million, translating fatalities into costs of $60 billion.

[158] According to the report, indirect costs are calculated by applying a multiplier of two to the total costs for property damage and trade disruption. No additional information is provided by the authors regarding these costs.

[159] Abt, C.C., "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, April 30, 2003 p. 20.

The costs associated with property damage are calculated based on estimates of the total assets of the city and the proportion of those assets that were destroyed. Total assets are derived from the U.S. Bureau of Economic Analysis' *Fixed Asset Tables* and the U.S. Census Bureau's *Statistical Abstract of the United States*. In Elizabeth, the authors estimate that 100 percent, or $25 billion, of the city's assets are destroyed. They also estimate that 2 percent, or $20 billion, of New York's assets are destroyed in the boroughs of Manhattan and Staten Island.

To estimate the explosion's disruption to international trade, the report assumes that infrastructure damage and response to the attack (i.e., closing all domestic ports) will halt U.S. imports and exports for 2 weeks. Considering the international air and sea trade is valued at $2 trillion annually, this totals approximately $75 billion over the 2-week period. In addition, the report estimates that specific disruption at Port Elizabeth will equal 5 percent of the $2 trillion international trade over the 2-week period, or $100 billion, for a total of $175 billion.

Finally, the authors apply a multiplier of two to the combined property damage and trade disruption estimates to calculate any potential indirect costs. This equals over $400 billion, which we show in Exhibit 5-4.

EXHIBIT 5-4 ECONOMIC IMPACTS OF A NUCLEAR ATTACK AT PORT ELIZABETH

LOSS CATEGORY	ESTIMATED IMPACT
Fatalities	$60 billion
Property Damage	$45 billion (including Manhattan and Staten Island)
Trade Disruption	$175 billion
Other Indirect Costs	$440 billion

Source: Abt, C.C., "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, April 30, 2003, p. 20.

Downtown Washington, DC

According to the report, Washington, DC, is not a significant port but is nonetheless a significant target for terrorists. The city is a national symbol and a major population and transportation center. In this scenario, terrorists could smuggle a nuclear weapon into the nearby Port of Baltimore and move the weapon by truck, railroad, or boat within close range of the Capitol, the White House, the Pentagon, Reagan National Airport, and numerous monuments and government offices.

The authors calculate a total of 100,000 fatalities in Washington. Assuming a VSL of $3 million, this translates into costs of $300 billion. In addition, the report estimates that 50 percent, or $150 billion, of the city's assets are destroyed by the attack. With regard to trade disruption, the authors assume that infrastructure damage and response to the attack will cripple trade for 2 weeks at a cost of $75 billion. In addition, the specific disruption to nearby ports (e.g., the Port of Baltimore) will equal 0.1 percent of the $2 trillion

international trade, or $2 billion. Combined, the report estimates trade disruption of $77 billion. As shown in Exhibit 5-5, indirect costs total approximately $450 billion.

EXHIBIT 5-5 ECONOMIC IMPACTS OF A NUCLEAR ATTACK IN DOWNTOWN WASHINGTON, DC

LOSS CATEGORY	ESTIMATED IMPACT
Fatalities	$300 billion
Property Damage	$150 billion
Trade Disruption	$77 billion
Other Indirect Costs	$454 billion

Source: Abt, C.C., "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, April 30, 2003, p. 20.

Port of Boston

Logan International Airport, the financial district, an important railroad terminal, an interstate highway, and a major residential area are within close range of Boston's container port. The authors state that the Port of Boston is similar to the ports of Baltimore, Miami, Oakland, and Seattle. In this scenario, terrorists could smuggle a nuclear weapon into the port in a container and detonate the weapon in port.

Due to the proximity of the Port of Boston to the city center, the authors estimate a total of 150,000 deaths at a cost of $450 billion (assuming a VSL of $3 million). They also estimate that 70 percent of the city's $260 billion in assets, or $170 billion, are destroyed by the explosion. The report assumes specific disruption of $40 billion at the Port of Boston (i.e., 2 percent of $2 trillion) in addition to the baseline disruption of $75 billion. Assuming a multiplier of two, the authors calculate indirect costs of $550 billion. We show these estimates in Exhibit 5-6.

EXHIBIT 5-6 ECONOMIC IMPACTS OF A NUCLEAR ATTACK AT THE PORT OF BOSTON

LOSS CATEGORY	ESTIMATED IMPACT
Fatalities	$450 billion
Property Damage	$170 billion
Trade Disruption	$115 billion
Other Indirect Costs	$570 billion

Source: Abt, C.C., "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, April 30, 2003, p. 20.
Note: Abt reports a total trade disruption cost of $105 billion. We believe this to be an arithmetic error.

Biological Attack

In a separate report, Abt describes a scenario in which a biological agent is smuggled undetected into the United States in a container and either released in a port or in a major city center.[160] The report states that "bioterrorism presents an urgent danger not just to these systems and the seaport cities in which they are located, but to the entire population of the U.S."[161] In fact, "the threat of bioterrorism today rivals the nuclear threat that has overshadowed this country for the last fifty years."[162] The authors identify three potential targets: the Port of Los Angeles, midtown Manhattan, and Boston Harbor. Assuming differing biological weapons (e.g., anthrax, smallpox), the report estimates the potential costs associated with loss of life, property damage, and disruption in trade, as well as other indirect costs. According to the authors, a successful attack would cause 30,000 to 3,000,000 fatalities, property damage of $1 billion to $10 billion, trade disruption of $20 billion to $200 billion, and other indirect costs of $42 billion to $420 billion.[163] We summarize these costs in Exhibit 5-7. The report notes that these estimates represent only first-year costs; long-term costs are not estimated but are believed to be greater than short-term costs.

EXHIBIT 5-7 IMPACTS OF A BIOLOGICAL ATTACK IN LOS ANGELES, NEW YORK, OR BOSTON

LOSS CATEGORY	ESTIMATED IMPACT
Fatalities	30,000 - 3,000,000
Property Damage	$1 - 10 billion
Trade Disruption	$20 - 200 billion
Other Indirect Costs	$42 - 420 billion

Source: Abt, C.C., Rhodes, W., Casagrande, R., and G. Gaumer, "The Economic Impacts of Bioterrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, May 9, 2003, p. 3.

Port of Los Angeles

The authors describe a scenario in which 1,000 liters of liquid *B. anthracis* is packed around an explosive charge and fitted inside a container bound for the Port of Los Angeles. Once unloaded at the port, the explosive is detonated remotely. After the

[160] Abt, C.C., Rhodes, W., Casagrande, R., and G. Gaumer, "The Economic Impacts of Bioterrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, May 9, 2003.

[161] Abt, C.C., Rhodes, W., Casagrande, R., and G. Gaumer, "The Economic Impacts of Bioterrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, May 9, 2003, p. 4.

[162] Abt, C.C., Rhodes, W., Casagrande, R., and G. Gaumer, "The Economic Impacts of Bioterrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, May 9, 2003, p. 4.

[163] Because the authors do not provide detailed cost estimates for each scenario, we are unable to replicate the aggregate impacts shown in Exhibit 5-7.

explosion, traces of anthrax are found up to a mile downwind, and heavy contamination is found throughout the port within 1,000 feet of the container. While only 2 dockworkers are killed by the explosion, the Port of Los Angeles is closed for several months for decontamination. The authors state that the consequences of this scenario are relatively easy to determine because the anthrax strain used in the attack was not contracted by humans. However, the report does not provide detailed cost estimates. Instead, the authors compare decontamination costs at the port to those at the Hart Senate Office Building in 2001 and base the daily cost of port closure on estimates derived during the West Coast port closures in 2002, as described earlier in this section.

Midtown Manhattan

In this scenario, 2 security officers escaped Iraq in 1991 with 10-liter tanks filled with concentrated smallpox virus. In Turkey, they load these tanks into a container bound for the United States. When the container arrives in New York, they retrieve the tanks and release the virus undetected at Penn Station in midtown Manhattan. Approximately 500,000 commuters pass through Penn Station daily.

To estimate the direct costs associated with such an attack, the report first determines the spread of the virus using a model developed by the Centers for Disease Control and Prevention (CDC). Based on a range of infection and transmission rates, they estimate a total of 183 to 96,186 infections and 55 to 28,856 fatalities. Assuming a VSL of $3 million, this translates into costs of $160 million to $86.6 billion.

In addition, while the cost of quarantine is uncertain, the report assumes that all those infected are quarantined for a period of 13 days at a cost of $300 per day in lost wages. This totals $710,000 to $375 million. Because lost wages are not the only cost from quarantine, the authors also calculate the cost of treatment assuming that 90 percent of those affected will be treated at home (at a cost of $100 per day) and 10 percent will be treated in hospitals (at $300 per day) for a period of 15 days. Treatment, both at home and in hospitals, totals $330,000 to $173 million. In addition to those infected, the report states that others are vaccinated to prevent contraction of the virus. The authors estimate that 10 times the number of people infected will be vaccinated at a cost of $200 per vaccination. Based on 183 to 96,186 infections, vaccinations total $170,000 to $172 million. We show these estimates in Exhibit 5-8.

EXHIBIT 5-8 ECONOMIC IMPACTS OF A BIOLOGICAL ATTACK AT PENN STATION IN NEW YORK

LOSS CATEGORY	ESTIMATED IMPACT
Fatalities	$160 million - 86.6 billion
Prevention and Treatment	$1.2million - 720.6 million

Source: Abt, C.C., Rhodes, W., Casagrande, R., and G. Gaumer, "The Economic Impacts of Bioterrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, May 9, 2003, p. 21-25.

The report does not describe its methodology for calculating property damage and trade disruption, as well as other indirect costs, for this scenario. We assume that costs associated with property damage are minimal while costs associated with trade disruption are significant. The authors note that the number of infections could exceed 20 million as the disease is transmitted worldwide.

Boston Harbor

The authors describe a scenario for Boston similar to that described above for New York. Instead of escaping with 10-liter tanks of concentrated smallpox virus, the 2 Iraqi security officers escape with 50-liter tanks and load these tanks into a container bound for the United States. When the container arrives in Boston, they retrieve the tanks, rent a small boat, and release the virus undetected while floating in Boston Harbor. While the authors state that hundreds of thousands are potentially infected in this scenario, the report does not describe cost estimates in detail.

ESTIMATED PROBABILITY REDUCTIONS

The economic impacts described in the previous section illustrate the potential magnitude of avoided losses associated with shipping-related terrorist incidents. As described in the Analytic Approach section of this chapter, benefits of the regulation are calculated by combining information on the consequences of terrorist incidents with the probability of such events. In this section, we combine information about costs of each regulatory alternative, presented in Chapter 4, with information about the potential consequences of avoided events to determine the break-even probabilities for each alternative. First, we summarize the consequence scenarios used in the analysis. Then, we describe the formula used to calculate the break-even probability reductions and present the results of the analysis.

Consequence Scenarios Applied in the Break-even Analysis

Using the information provided by Anderson and Abt, we develop three terrorist incident scenarios for our break-even analysis. These scenarios are intended to be representative of the types of attacks and associated consequences potentially avoided as a result of the interim final rule. In developing these scenarios, we attempt to use only economic impacts that are measures of changes in social welfare, such as direct costs (lost profits, lost wages, property damage) or opportunity costs measured in terms of willingness to pay to avoid fatal risks. Other types of economic impacts may also result from these attacks (e.g., temporary disruption of trade that is compensated for by relying on other sources of goods and services).

Scenario 1 describes a hypothetical closure of all West Coast ports for a period of 12 days. The consequences and costs of this scenario are based on the actual port closure that occurred in October 2002. In its report describing the event, Anderson estimates costs incurred by workers, producers, and consumers. As shown in Exhibit 5-2, the authors estimate total costs of $1.7 billion over the 12-day period. This estimate includes indirect costs incurred by non-maritime workers, industrial consumers, and retail consumers. Because we have limited information regarding these additional costs, we

remove them from our analysis. As shown in Exhibit 5-9, our revised estimate totals $1,507 million over the 12-day period. When compared to the costs of the remaining scenarios in our break-even analysis, these costs represent a low-end estimate.

EXHIBIT 5-9 REVISED CONSEQUENCE SCENARIOS

BENEFITS SCENARIO	DESCRIPTION	REVISED ESTIMATES (MILLIONS)	
1	West Coast Port Shutdown	Lost Income	$1,507
		Total	$1,507
2	Hypothetical Nuclear Attack	Fatalities	$270,000
		Property Damage	$125,667
		Trade Disruption	$12,426
		Total	$408,092
3	Hypothetical Biological Attack	Fatalities	$43,367
		Prevention and Treatment	$371
		Total	$43,738

Scenario 2 describes a hypothetical nuclear attack in Elizabeth, Washington, DC, or Boston. The consequences and costs of this scenario are based on the Abt report described above. As shown in Exhibit 5-3, the authors estimate a successful attack would cause 50,000 to 1,000,000 fatalities, property damage of $50 billion to $500 billion, trade disruption of $100 billion to $200 billion, and other indirect costs of $300 billion to $1,400 billion.

We take several steps to revise the costs for Scenario 2. First, the authors calculate indirect costs by applying a multiplier of two to the combined property damage and trade disruption estimates for each scenario. Because we have limited information regarding these costs, we remove them from our analysis. Second, the authors state that for trade disruption, "it is clear that much trade would be diverted or delayed rather than lost, and some goods would be consumed locally, so that the reduction in gross domestic product (GDP) would be only a fraction of the value of the disruption."[164] Because the authors suggest that 10 percent is a reasonable approximation of welfare losses resulting from a disruption in trade, we apply this figure to each of the trade disruption estimates provided in the report. In the Elizabeth scenario, for example, this adjustment reduces the costs associated with trade disruption from $177 billion to $17.7 million. Finally, because the relative likelihood that an attack will occur in Elizabeth, Washington, or Boston is unknown, we average the costs associated with each scenario to determine the total costs

[164] Abt, C.C., "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Abt Associates, Contract #DTRS57-03-P-80130, Prepared for U.S. DOT/RSPA/Volpe National Transportation Systems Center, April 30, 2003, p. 22.

of a hypothetical attack.[165] As shown in Exhibit 5-9, at $408 billion, these costs represent a high-end estimate in our analysis.

Scenario 3 describes a hypothetical biological attack in Los Angeles, New York, or Boston. The consequences and costs of this scenario are based on the latter Abt report described above. While this report includes costs associated with fatalities, property damage, trade disruption, and other indirect costs (see Exhibit 5-7), because the authors provide insufficient detail for each category of costs, we are unable to recreate the estimates summarized in the report. Instead, we employ the range of estimates provided for the scenario involving the release of small pox at Penn Station in New York. Using a CDC model, the authors calculate the number of fatalities and infections resulting from the attack and use these figures to estimate the associated costs. In our estimate we include costs related to both fatalities ($165 million to $86.6 billion) and disease prevention and treatment ($1 million to $741 million).[166] Combined, these costs total $166 million to $87.3 billion, or an average of $43.7 billion. We show this estimate in Exhibit 5-9.

Results of the Analysis

As discussed, the benefits of the interim final rule equal the probability of an avoided terrorist attack multiplied by the consequences of the attack. Net costs equal the costs of the regulation minus any quantifiable ancillary benefits. For the purposes of this analysis, net costs equal the costs of the regulation because we are unable to quantify or monetize ancillary benefits (see Exhibit 5-1(c)). Consequences of an attack equal the economic impact of the consequence scenarios presented in the previous section. Using these two pieces of information, we solve the following equation for the break-even reduction in the probability (Δp) that a successful terrorist attack will occur in the United States. In other words, we solve the following formula:

$$\Delta p(\text{successful terrorist attack}) = \frac{\text{net costs}}{\text{consequences of an attack}}$$

We compare annualized costs to the consequences of each attack scenario because we assume that the rule results in a constant probability reduction that occurs in every year following the rule's implementation. In other words, we assume that the risk reduction resulting from this regulation is constant each year. Furthermore, we present the reduction in the probability of experiencing a single event in a given year. To better assist the reader in understanding these probabilities, we present them as both probability reductions and as "odds" (e.g., a 0.25 reduction in the probability of an event occurring in a single year implies that one additional event must be avoided in a 4-year period).

[165] The report's authors note that it may be inappropriate to add fatality, property damage, and trade disruption estimates to determine a "total cost" for each scenario. We agree with this statement, and our exclusion of certain cost categories attempts to address some of these concerns.

[166] These estimates differ slightly from those calculated by the authors (and presented in Exhibit 5-8). The difference is likely due to rounding.

Exhibits 5-10a and 5-10b present our results for the four regulatory alternatives. Exhibit 5-10a shows results based on annualized costs calculated using a 3 percent discount rate, while Exhibit 5-10b shows results based on a 7 percent discount rate.

For each alternative, Exhibits 5-10a and b provide a range of annualized costs and a corresponding range of break-even risk reductions for each of the three attack scenarios (port shutdown, nuclear attack, and biological attack). For each attack scenario, the table indicates what would need to occur for the costs of each alternative to equal its benefits, *assuming the alternative only reduces the risk of a single event of that type of attack.* In addition, the exhibits provide a qualitative stringency ranking for each alternative; Alternatives 1, 2, and 3, which require Importer Security Filings, are the most stringent alternatives. Alternative 4, which requires only the Additional Carrier Requirements, is the least stringent.

The break-even risk reductions for Alternative 4 are significantly lower than the other three alternatives, reflecting the significantly lower costs associated with requiring only 2 data elements. However, this alternative is the least stringent and effective option because it only collects data on the conveyance of the shipment. Further, it does not meet the statutory requirements of Section 203 of the SAFE Port Act.

The break-even results for the remaining three alternatives are similar because the costs of these options are not very different. For Scenario 2 (nuclear attack), and for Scenario 3 (biological attack), the benefits of avoiding a single attack are large relative to annualized costs of the regulation. As a result, the benefits of the rule will equal costs if the rule avoids this type of nuclear attack once in 60 to 500 years. Alternatively, the rule would also break even if it prevents one biological attack in a period of 6 to 50 years. In Scenario 1 (West Coast port shutdown), the estimated costs of a single incident are closer in value to the annualized costs of the final regulation. As a result, *if the rule only reduced the risk of a single attack on a port*, a shutdown would need to be avoided at a rate of once in 3 months to 2 years for the benefits of the rule to equal costs.[167] The results expressed as absolute reductions in baseline risk also show higher reductions needed if port attacks only are mitigated (about 0.59 to 4.65) and lesser reductions associated with prevention of the more catastrophic events.

[167] As noted earlier, the West Coast port shutdown was anticipated, giving importers time to prepare. An unexpected shutdown would likely result in higher costs, decreasing the time frame over which such an event must be avoided for benefits to break-even with costs.

EXHIBIT 5-10a REQUIRED REDUCTIONS IN THE PROBABILITY OF A SUCCESSFUL TERRORIST ATTACK FOR THE BENEFITS OF THE REGULATION TO EQUAL ITS COSTS (3 PERCENT DISCOUNT RATE)

ALTERNATIVE	STRINGENCY (1=MOST STRINGENT)	ANNUALIZED COST ($, BILLIONS)[1]		TERRORIST ATTACK SCENARIO	ECONOMIC CONSEQUENCES OF ATTACK ($ BILLIONS)	RISK REDUCTIONS FOR WHICH BENEFITS = COSTS[2]				PREFERRED ALTERNATIVE?	COMMENTS
						ABSOLUTE REDUCTION IN BASELINE RISK REQUIRED		NUMBER OF EVENTS AVOIDED REQUIRED			
		Low	High			Low	High	Low	High		
1. ISF and ACR required (bulk cargo exempt)	1	0.89	6.60	Port Shutdown	2	0.59	4.38	1 in 2 yrs	1 in 3 months	✓	Most favorable combination of cost and stringency.
				Nuclear Attack	400	<0.01	0.02	1 in 500 yrs	1 in 60 yrs		
				Bio-terror Attack	40	0.02	0.15	1 in 50 yrs	1 in 7 yrs		
2. ISF and ACR required (bulk cargo not exempt)	1	0.89	6.61	Port Shutdown	2	0.59	4.39	1 in 2 yrs	1 in 3 months		Limited expected additional benefit for increased cost.
				Nuclear Attack	400	<0.01	0.02	1 in 500 yrs	1 in 60 yrs		
				Bio-terror Attack	40	0.02	0.15	1 in 50 yrs	1 in 7 yrs		
3. ISF only (bulk cargo exempt)	2	0.89	6.59	Port Shutdown	2	0.59	4.37	1 in 2 yrs	1 in 3 months		Similar cost to Alternative 1 with decreased effectiveness. ISFs and ACRs are not working in tandem.
				Nuclear Attack	400	<0.01	0.02	1 in 500 yrs	1 in 60 yrs		
				Bio-terror Attack	40	0.02	0.15	1 in 50 yrs	1 in 7 yrs		
4. ACR only	3	<0.01	0.01	Port Shutdown	2	<0.01	0.01	1 in 700 yrs	1 in 100 yrs		Least cost, but also least effective alternative. Does not meet the statutory requirements of Section 203 of the SAFE Port Act nor provide data on shipment history. ISFs and ACRs are not working in tandem.
				Nuclear Attack	400	<0.01	<0.01	1 in 200,000 yrs	1 in 40,000 yrs		
				Bio-terror Attack	40	<0.01	<0.01	1 in 20,000 yrs	1 in 4,000 yrs		

[1] IEc calculations (annualized cost estimates from Chapter 4).

[2] Results assume regulation reduces risk of one type of attack only. The interim final rule will most likely affect more than one type of risk simultaneously, and additional risk reduction scenarios involving combinations of lesser risk reductions may also achieve the break-even criterion.

"ISF" refers to Importer Security Filings. "ACR" refers to Additional Carrier Requirements (i.e., Vessel Stow Plans and Container Status Messages)

EXHIBIT 5-10b REQUIRED REDUCTIONS IN THE PROBABILITY OF A SUCCESSFUL TERRORIST ATTACK FOR THE BENEFITS OF THE REGULATION TO EQUAL ITS COSTS (7 PERCENT DISCOUNT RATE)

ALTERNATIVE	STRINGENCY (1=MOST STRINGENT)	ANNUALIZED COST ($, BILLIONS)[1]		TERRORIST ATTACK SCENARIO	ECONOMIC CONSEQUENCES OF ATTACK ($ BILLIONS)	RISK REDUCTIONS FOR WHICH BENEFITS = COSTS[2]				PREFERRED ALTERNATIVE?	COMMENTS
						ABSOLUTE REDUCTION IN BASELINE RISK REQUIRED		NUMBER OF EVENTS AVOIDED REQUIRED			
		Low	High			Low	High	Low	High		
1. ISF and ACR required (bulk cargo exempt)	1	0.99	6.99	Port Shutdown	2	0.66	4.64	1 in 2 yrs	1 in 3 months	✓	Most favorable combination of cost and stringency.
				Nuclear Attack	400	<0.01	0.02	1 in 400 yrs	1 in 60 yrs		
				Bio-terror Attack	40	0.02	0.16	1 in 50 yrs	1 in 6 yrs		
2. ISF and ACR required (bulk cargo not exempt)	1	0.99	7.00	Port Shutdown	2	0.66	4.65	1 in 2 yrs	1 in 3 months		Limited expected additional benefit for increased cost.
				Nuclear Attack	400	<0.01	0.02	1 in 400 yrs	1 in 60 yrs		
				Bio-terror Attack	40	0.02	0.16	1 in 50 yrs	1 in 6 yrs		
3. ISF only (bulk cargo exempt)	2	0.99	6.98	Port Shutdown	2	0.66	4.63	1 in 2 yrs	1 in 3 months		Similar cost to Alternative 1 with decreased effectiveness. ISFs and ACRs are not working in tandem.
				Nuclear Attack	400	<0.01	0.02	1 in 400 yrs	1 in 60 yrs		
				Bio-terror Attack	40	0.02	0.16	1 in 50 yrs	1 in 6 yrs		
4. ACR only	3	<0.01	0.01	Port Shutdown	2	<0.01	0.01	1 in 600 yrs	1 in 100 yrs		Least cost, but also least effective alternative. Does not meet the statutory requirements of Section 203 of the SAFE Port Act nor provide data on shipment history. ISFs and ACRs are not working in tandem.
				Nuclear Attack	400	<0.01	<0.01	1 in 200,000 yrs	1 in 30,000 yrs		
				Bio-terror Attack	40	<0.01	<0.01	1 in 20,000 yrs	1 in 4,000 yrs		

[1] IEc calculations (annualized cost estimates from Chapter 4).

[2] Results assume regulation reduces risk of one type of attack only. The interim final rule will most likely affect more than one type of risk simultaneously, and additional risk reduction scenarios involving combinations of lesser risk reductions may also achieve the break-even criterion.

"ISF" refers to Importer Security Filings. "ACR" refers to Additional Carrier Requirements (i.e., Vessel Stow Plans and Container Status Messages).

The results in Exhibits 5-10a and b indicate that Alternative 1 provides the most favorable combination of cost and stringency. While Alternative 2 might be considered more stringent because it does not exempt bulk cargo from the Importer Security Filing requirements, the impact of this is expected to be slight because the number of bulk shipments is relatively small compared to the number of non-bulk shipments. Alternative 3 is expected to have costs similar to Alternative 1, but will be less stringent because it only requires Importer Security Filings and does not include data that verify the information on the cargo manifest and identify and track the movement, location, and status of cargo (and in particular, containerized cargo) from the time its transport is booked until its arrival in the United States. Without the Additional Carrier Requirements, CBP will not be able to assess the specific risks associated with the many individual movements and transfers involved in shipping cargo to the United States. Thus, an important element of CBP's layered, risk-based approach to cargo security would, consequently, be omitted.

Alternatives 3 and 4 are not chosen, in part, because it is CBP's judgment that neither of these options will be as effective as the selected option. Specifically, the Importer Security Filing requirements and the Additional Carrier Requirements should work in tandem. The Additional Carrier Requirements focus on the conveyance of the goods and are distinct from the Importer Security Filing elements, which are focused on the merchandise and the parties involved in the acquisition process. Specifically, Vessel Stow Plans will assist CBP in validating other advanced cargo information submissions by allowing CBP to, among other things, better detect unmanifested containers without relying on physical verification methods that are manpower intensive and costly. CSMs will provide CBP with additional transparency into the custodial environment through which inter-modal containers are handled and transported before arrival in the United States. Because CSMs are created independently of the manifest, CBP can utilize them to corroborate other advanced data elements, including Importer Security Filings and those elements related to container and conveyance origin. This corroboration with other advanced data messages, including Importer Security Filings, and an enhanced view into the international supply chain will contribute to the security of the United States and the international supply chain through which containers and imported cargo are shipped to U.S. ports.

As an illustration of the sensitivity of the break-even analysis to our hypothetical attack scenarios, we conduct the break-even analysis using a smaller-impact event. Using the data provided by Anderson, we create a scenario assuming that the West Coast ports are closed for only 2 days. To estimate the impacts of such a closure, we revise our estimate of the 12-day West Coast port closure. Because it is unlikely that costs would be incurred by both industrial and retail consumers during such a brief period, we remove these two categories of costs. In addition, we adjust the duration of impact to reflect 2 days rather than 12 days. Our calculation suggests that the costs of a 2-day closure are approximately $120 million. Applying this scenario to the break-even calculation for the preferred alternative, we estimate that the interim final rule would need to prevent one event of this

magnitude every 1 to 7 weeks, depending on the discount rate and regulatory cost scenario applied, and assuming no other risk reductions due to the rule.

In conclusion, the three attack scenarios included in our primary analysis are illustrative of the potential consequences of a terrorist incident in the United States. To the extent that the interim final rule reduces the probability of different types of events with consequences of similar magnitude, the reduction in the number of such events that would cause benefits to equal costs would be similar to those reported in the exhibits above. If the probability of any of the analyzed events (or similar events) is reduced by more than the amount reported above, then benefits will exceed costs. On the other hand, if it is likely that the reductions in the probabilities of all of these events will be less than the amount reported in these exhibits, then the costs of the regulation may not exceed the benefits.

LIMITATIONS AND KEY SOURCES OF UNCERTAINTY

In this section, we discuss the key limitations of our analysis and the degree to which they may lead us to under- or overstate the potential benefits of the interim final rule. We discuss the selection of consequence scenarios and methods used to value those consequences. Then, we address uncertainty related to the simultaneous threat of multiple types of attacks. The analysis is also limited in that it focuses on the interim final rule's ability to reduce the probability of attacks, rather than the consequences of those attacks. Next, we discuss the uncertain baseline probability of such events occurring and the unquantified ancillary benefits of the interim final rule. Finally, we describe why our analysis does not allow for an assessment of the cost-effectiveness of the interim final rule.

- **Consequence scenarios:** We select the consequence scenarios applied in the break-even analysis based on available literature describing container-related terrorist threats and economic evaluations of the impact of related events. These scenarios may not capture the full range of attack modes or targets affected by the interim final rule. For example, we were not able to obtain impact estimates for attacks relying on bulk or break-bulk vessels. As shown in the sensitivity analysis, if the consequences of events prevented by this regulation are smaller than those estimated in the three scenarios, the break-even probability reduction is understated. Conversely, if the consequences of avoided events are larger than estimated in this analysis, then the break-even probability reduction is overstated.
- **Valuation of consequences.** We rely on the cost estimates provided in the available literature for our consequence scenarios. Where the authors provided limited descriptions of methods for calculating costs, we conservatively exclude those costs from this analysis. In addition, certain elements of damage are not included in the authors' cost estimates (e.g., the value of losing a historically significant landmark). If the total cost of the consequence scenarios is underestimated, then the break-even analysis likely overstates the probability reduction required for the benefits of the regulation to equal the costs of the regulation. In addition, we make no attempt to adjust the costs of certain elements

of terrorist attack consequences estimated in the literature, such as the value of fatalities.[168] Adjustments to the available cost estimates could result in increases or decreases in the incremental probabilities estimated in our break-even analysis.

- **Simultaneous threat of multiple attacks:** The break-even analysis compares the consequences of a single attack to the annualized costs of the interim final rule, which only identifies the break-even probability reduction in the risk of one type of attack. In reality, the rule likely affects the risk of multiple types of attacks simultaneously; thus, even if the rule only partially achieved each of the targets in Exhibits 5-10a and b, it might still break even if the sum of the monetized risk-reduction benefits across all events equaled its cost. Ultimately, it is difficult to predict the direction of bias of the results of our break-even analysis without knowing more about the specific types of attack scenarios affected and whether and how the terrorists will shift their focus from one type of attack to another.
- **Focus on probability rather than consequences:** As discussed earlier in this chapter, this regulation has the potential to affect both the probability that particular types of attacks will be attempted and successful, as well as the consequences of attacks. For example, if the rule prevents nuclear material from entering the United States via ocean shipments, terrorists may be forced to use weapons with less destructive power. The effect of this focus on probability to the exclusion of changes in consequences is unknown.
- **Baseline probability unknown:** This approach does not provide the decision maker with any information about the baseline probability that these types of attacks will occur. As a result, the decision maker is expected to use his or her judgment to determine whether the break-even risk reductions for individual attack scenarios are feasible. For example, given that no attacks shutting down West Coast ports have occurred, we cannot say whether it is possible that a similar event will be attempted, and thwarted, by the interim final rule once every 2 years. In other cases where required baseline frequencies may be higher, break-even judgments may be clearer.
- **Unquantified ancillary benefits:** Our interviews with potentially affected entities and supply chain experts suggest that the supply chain clarity provided by implementation of the interim final rule will likely have ancillary benefits to importers, particularly those who currently have little insight into the process. For example, importers will be able to more effectively allocate security resources by identifying points along the supply chain where their cargo is most susceptible to theft. The data may also assist in tracing contraband cargo, such as counterfeit versions of well-known designer goods, manufactured overseas and sold illegally

[168] Abt uses a VSL of $3 million generally applied, at that time, by the U.S. Department of Transportation (DOT) in its assessment of vehicular safety-related regulations. More recently, DOT revised its guidance on VSL, directing its economists to apply a VSL estimate of $5.8 million (dollars not specified). (U.S. DOT, Office of the Secretary of Transportation, Memorandum to Secretarial Officers, Modal Administrators, Re: Treatment of the Economic Value of a Statistical Life in Department Analyses, February 5, 2008, available at http://ostpxweb.dot.gov/policy/reports/080205.htm.)

in the United States. At this time, we are unable to quantify or monetize ancillary benefits associated with the interim final rule. To the extent that such benefits exist, our break-even analysis overstates the probability reduction necessary for the benefits of the regulation to equal the costs of the regulation.

- **Cost-effectiveness analysis:** In its guidance to Federal agencies addressing the requirements of Executive Order 12866, OMB recommends an assessment of the cost-effectiveness of major rulemakings for which the primary benefits are improved public health and safety.[169] Cost-effectiveness analysis allows decision makers to compare the results of different regulations so that resources can be allocated to the regulations or programs that are most effective at reaching a desired outcome. Cost-effectiveness analysis is only useful when costs are compared to a meaningful metric (e.g., number of lives saved or terrorist attacks prevented, as opposed to the number of shipments analyzed in ATS). Because we are unable to quantify the incremental effects of this regulation, we are unable to assess the cost-effectiveness of the interim final rule.

[169] U.S. Office of Management and Budget, *Circular A-4*, September 17, 2003.

CHAPTER 6 | RFA/SBREFA

Under the requirements of the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) and Executive Order (EO) 13272, entitled "Proper Consideration of Small Entities in Agency Rulemaking," agencies must consider the potential impact of regulations on small businesses, small governmental jurisdictions, and small organizations during the development of their rules.

Under RFA/SBREFA, CBP is required to prepare a regulatory flexibility analysis and take other steps to assist small entities, unless the Agency certifies that a rule will not have a "significant economic impact on a substantial number of small entities."[170] The U.S. Department of Homeland Security (DHS) and the Small Business Administration (SBA) provide guidelines on the analytical process to assess the impact of a particular rulemaking on small entities.[171]

The requirements for completing RFA/SBREFA analyses include first conducting a screening analysis. Then, if necessary, an initial and final Regulatory Flexibility Analysis are undertaken. Exhibit 6-1 summarizes the steps within the informal screening analysis process to determine whether a rule is likely to have a significant economic impact on a substantial number of small entities.

[170] Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act, 5 U.S.C. 601 et seq.

[171] Guidelines for the RFA/SBREFA analysis obtained from the U.S. Department of Homeland Security, "Department of Homeland Security Procedures for Compliance with the Regulatory Flexibility Act and Executive Order 13272," http://www.tsa.gov/interweb/assetlibrary/DHSSecurityProceduresforCompliancewithRFAandEO13272.pdf. See also SBA, Office of Advocacy, "A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, Implementing the President's Small Business Agenda and Executive Order 13272," May 2003.

EXHIBIT 6-1 DHS PROCEDURES FOR RFA/SBREFA SCREENING ANALYSIS

1. Identify the types of small entities subject to the rule's requirements (e.g. businesses, nonprofit organizations, governments, etc.).

2. Identify the actions a small entity will have to take to comply with the requirements of the rule (e.g. installation of new technology, revised record keeping system) to determine whether the potential impacts are sufficient magnitude and scope to warrant preparation of an initial regulatory flexibility analysis (IRFA).

3. A "rule of thumb" may be employed to determine whether the regulation will impose a "significant impact."

4. If DHS has other reasons for believing that the rule may have a significant economic impact on small entities, prepare an IRFA.

5. If, at the time of publication of the final rule, DHS still determines that it cannot certify the rule, prepare a FRFA.

The types of entities subject to the interim final rule's requirements include all importers receiving shipments via vessel and all vessel operating common carriers (VOCCs) transporting containerized shipments via vessel to the United States. One, the other, or both of the types of entities will be affected depending on the alternative under consideration. Previous chapters have described the provision in the four alternatives considered by CBP.

If the results of the screening analysis indicate that a rule may significantly impact a substantial number of small importers or carriers, CBP is required to conduct an IRFA to further assess these impacts. The IRFA provides a detailed analysis of the potential impact of the proposed rule on small entities and is made available for public comment at the same time as the proposed rule. CBP made its screening analysis and IRFA available for public comment on January 2, 2008.[172]

At the publication of the interim final rule, if CBP still determines that it cannot certify the rule, then it must prepare and make available a Final Regulatory Flexibility Analysis (FRFA). As discussed in detail later in this chapter, CBP cannot certify that the rule will not have a significant impact on a substantial number of small importers. It can certify the rule relative to the impact on small carriers; however, for the purpose of simplicity, the FRFA presented in this chapter includes both importers and carriers. The analytic components of a FRFA are provided in Exhibit 6-2.

[172] Industrial Economics, Incorporated, "Regulatory Assessment and Initial Regulatory Flexibility Analysis for the Notice of Proposed Rulemaking: Importer Security Filing and Additional Carrier Requirements," prepared for U.S. Customs and Border Protection, U.S. Department of Homeland Security, December 3, 2007. Comment number USCBP-2007-0077-0003.

EXHIBIT 6-2 COMPONENTS OF AN FRFA

1. A succinct statement of the need for, and objectives of, the rule;

2. A summary of the significant issues raised by the public comments in response to the IRFA, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;

3. A description and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;

4. A description of the projected reporting, record-keeping and other compliance requirements of the rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

5. A description of the steps the agency has taken to minimize the significant adverse economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each of the other significant alternatives to the rule considered by the agency was rejected.

For the remainder of this chapter we first update our screening analysis to reflect the new costs estimated in Chapter 4. Then, we present the results of the FRFA, which incorporates public comment on the IRFA and discusses steps taken to minimize the potentially significant adverse impact on small entities.

SCREENING ANALYSIS

The screening analysis required under RFA/SBREFA involves determining whether the impacts on small importers or small VOCCs are likely to be significant and substantial. Responding to this question requires understanding both the economic impact on affected small entities and the number of such entities affected. Given that hundreds of industries conduct importing activities, collecting and analyzing data to isolate costs per small entity in each industry is challenging. Assuming that the majority of affected importers are small businesses, we compare per shipment compliance costs with shipment value. For VOCCs, we compare per business annual compliance costs with small carriers' average annual revenues.

It should be noted that while other entities, such as non-vessel operating common carriers (NVOCCs), freight-forwarders, and consolidators, may make security filings for importers, our analysis assumes that they would charge the importer a transaction fee for this service. Therefore, we assume importers ultimately bear the costs of the regulation. Our interviews with potentially affected VOCCs, described in Chapter 4, suggest that

they are unlikely pass the costs of collecting and transmitting the additional carrier elements on to their customers.

CONTAINERIZED IMPORTERS

Substantial Test

The regulation will affect importers in the form of initial, one-time costs and transaction fees for collecting and transmitting the security filing as well as consumer surplus losses if the interim final rule delays the supply chain. For the purposes of this screening analysis, importers are not an industry as defined by SBA. Rather, many industries import goods subject to the rule. We must determine the number of importers that belong to each of these industries, and then determine the appropriate industry-specific measure of a "small entity."

Our PIERS dataset includes information on over 200,000 unique importers. We took a random sample of importers from the dataset and collected market data on the entities from Dun & Bradstreet until we had information describing 400 entities.[173] Exhibit 6-3 details the top industries, identified by the North American Industrial Classification System (NAICS) code, in our sample and ranks them by number of occurrences. The complete list of industries reporting containerized imports in our PIERS sample is provided in Exhibit E-1 of Appendix E.

[173] Drawing 400 names from the importer list provides a statistically significant sample (5 percent margin of error) of the population of importers in our 96-day PIERS data sample set.

EXHIBIT 6-3 TOP INDUSTRIES FROM IMPORTERS SAMPLE (CONTAINERIZED)

NAICS CODE	NUMBER OF OCCURRENCES	PERCENT OF SAMPLE	INDUSTRY DESCRIPTION
424900	20	5.00%	Miscellaneous Nondurable Goods Merchant Wholesalers
999990	19		*UNKNOWN INDUSTRY*
423830	13	3.25%	Industrial Machinery and Equipment Merchant Wholesalers
442110	11	2.75%	Furniture Stores
488510	10	2.50%	Freight Transportation Arrangement
423220	8	2.00%	Home Furnishing Merchant Wholesalers
423120	7	1.75%	Motor Vehicle Supplies and New Parts Merchant Wholesalers
423710	7	1.75%	Hardware Merchant Wholesalers
424320	7	1.75%	Men's and Boys' Clothing and Furnishings Merchant Wholesalers
424330	7	1.75%	Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers
424490	7	1.75%	Other Grocery and Related Products Merchant Wholesalers
423910	6	1.50%	Sporting and Recreational Goods and Supplies Merchant Wholesalers
326199	5	1.25%	All Other Plastics Product Manufacturing
423690	5	1.25%	Other Electronic Parts and Equipment Merchant Wholesalers
423990	5	1.25%	Other Miscellaneous Durable Goods Merchant Wholesalers
424310	5	1.25%	Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers
561499	5	1.25%	All Other Business Support Services
423210	4	1.00%	Furniture Merchant Wholesalers
423430	4	1.00%	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
423440	4	1.00%	Other Commercial Equipment Merchant Wholesalers
423450	4	1.00%	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers
424460	4	1.00%	Fish and Seafood Merchant Wholesalers
424480	4	1.00%	Fresh Fruit and Vegetable Merchant Wholesalers
442299	4	1.00%	All Other Home Furnishings Stores
453220	4	1.00%	Gift, Novelty, and Souvenir Stores
236115	3	0.75%	New Single-Family Housing Construction (except Operative Builders)
315191	3	0.75%	Outerwear Knitting Mills
325620	3	0.75%	Toilet Preparation Manufacturing
332510	3	0.75%	Hardware Manufacturing
333911	3	0.75%	Pump and Pumping Equipment Manufacturing
423320	3	0.75%	Brick, Stone, and Related Construction Material Merchant Wholesalers
423390	3	0.75%	Other Construction Material Merchant Wholesalers
423940	3	0.75%	Jewelry, Watch, Precious Stone, and Precious Metal Merchant Wholesalers

NAICS CODE	NUMBER OF OCCURRENCES	PERCENT OF SAMPLE	INDUSTRY DESCRIPTION
424130	3	0.75%	Industrial and Personal Service Paper Merchant Wholesalers
424340	3	0.75%	Footwear Merchant Wholesalers
441310	3	0.75%	Automotive Parts and Accessories Stores
	207	51.75%	ALL OTHER INDUSTRIES RECORDED IN SAMPLE

Source: Importer descriptive information obtained from Dun and Bradstreet, Company Reports, http://www.dnp.com.

In most industries, information on revenues or number of employees is used to define whether an entity is "small" for the purpose of RFA/SBREFA analyses. For the top 10 industries appearing in our sample, Exhibit 6-4 reports SBA's thresholds used to define "small" entities in each industry and the share of entities in the United States that meet that definition. For each industry, the share of entities considered small is at least 50 percent. For most industries, the share of entities considered small is at least 75 percent.

EXHIBIT 6-4 SHARE OF SMALL ENTITIES IN EACH OF THE TOP 10 INDUSTRIES (CONTAINERIZED IMPORTERS)

NAICS CODE	INDUSTRY DESCRIPTION	PERCENT OF SAMPLE	"SMALL" THRESHOLD	SHARE OF SMALL ENTITIES IN THE UNITED STATES
424900	Miscellaneous Nondurable Goods Merchant Wholesalers	5.00%	100 employees	93%
423830	Industrial Machinery and Equipment Merchant Wholesalers	3.25%	100 employees	92%
442110	Furniture Stores	2.75%	$6.5 million	50%
488510	Freight Transportation Arrangement	2.50%	$6.5 million	75%
423220	Home Furnishing Merchant Wholesalers	2.00%	100 employees	75%
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers	1.75%	100 employees	71%
423710	Hardware Merchant Wholesalers	1.75%	100 employees	86%
424320	Men's and Boys' Clothing and Furnishings Merchant Wholesalers	1.75%	100 employees	83%
424330	Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers	1.75%	100 employees	100%
424490	Other Grocery and Related Products Merchant Wholesalers	1.75%	100 employees	86%

Source: Importer descriptive information obtained from Dun and Bradstreet, Company Reports, http://www.dnp.com.
Threshold information obtained from U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.

Exhibit 6-5 reports summary statistics on our sample of 400 importers. For example, it shows that four industries appeared more than 10 times in the sample, accounting for 54 individual firms. Within the United States, there are 81,923 entities in those 4 industries, and 96.4 percent of those businesses meet SBA's definition of a small entity.

EXHIBIT 6-5 CONTAINERIZED IMPORTERS, SUMMARY STATISTICS

NUMBER OF APPEARANCES IN SAMPLE	NUMBER OF INDUSTRIES IN SAMPLE	NUMBER OF FIRMS IN SAMPLE	TOTAL NUMBER OF ENTITIES IN UNITED STATES IN THESE INDUSTRIES	NUMBER OF SMALL ENTITIES IN UNITED STATES IN THESE INDUSTRIES	SHARE SMALL
10+	4	54	81,923	78,977	96.4%
6-9	7	49	1,371,759	1,341,422	97.8%
5	5	25	33,931	32,558	96.0%
4	8	32	72,596	70,829	97.6%
3	11	33	44,448	42,977	96.7%
2	27	54	467,998	461,318	98.6%
1	152	153	834,709	812,717	97.4%
Total	**214**	**400**	**2,907,364**	**2,840,798**	**97.7%**

Source: IEc analysis of PIERS database.
Number of entities from U.S. Small Business Administration, as viewed at http://www.sba.gov/advo/research/data_uspdf.xls on July 16, 2007.
Threshold information from U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.

Based on these summary statistics, we conclude that the majority of firms in industries conducting importing activities are likely to be small entities. Therefore, a substantial number of small entities are likely to be affected by the interim final rule under Alternative 1 (bulk cargo exempt from Importer Security Filing requirement), Alternative 2 (bulk cargo not exempt from Importer Security Filing requirement), or Alternative 3 (VOCCs exempt). Under Alternative 4 (importers exempt from Importer Security Filing requirement), importers are not affected by the requirements. Next, we estimate whether the costs to these importers of implementing the regulation are likely to be significant.

Significance Test

Typically, Federal agencies compare per business compliance costs to annual revenues of small entities in various size classes to determine the impact of the regulation on small entities. For this rule, such a comparison requires a significant amount of data given that the rule potentially affects hundreds of industries. Annual compliance costs are driven by the number of shipments an importer makes security filings on each year. To estimate the number of shipments per small entity, we ideally would: (1) take our PIERS dataset of shipments and group the shipments by business; (2) group the businesses by NAICS code; (3) determine the number of businesses in each NAICS code that meet the

definition of a small entity; (4) and then look at the number and value of shipments by those entities.

As discussed in Chapter 3, we have completed the first step, identifying approximately 200,000 importers in our sample dataset. As discussed in the previous section, we were able to use Dun and Bradstreet data to identify the appropriate NAICS code for 400 of these 200,000 importers; collecting these data for just 400 industries represented a major effort. Next, we conservatively assume that the majority of importers in each NAICS code are small entities. However, estimating the typical number of shipments in each industry is problematic. In 75 percent of the industries identified in our sample of 400 importers, the number of entities affected is less than 5. Although we have shipment data for these businesses, these data are unlikely to provide a meaningful sample of shipment volume or value on an industry by industry basis.

Alternatively, when we extrapolate our PIERS dataset to estimate shipments for the entire year, we are able to calculate lower and upper bound estimates of the number of importers and stratify these importers by shipping volume. However, we cannot reliably translate this stratification on a per industry basis. More importantly, we do not believe that shipment volume is necessarily a good predictor of whether an entity is considered to be a small business in its industry. For example, a small entity with a business model that is heavily dependent on overseas manufacturers may import many shipments a month, while a large entity relying primarily on domestic suppliers may import only 1 shipment a year.

For these reasons, we are unable to estimate average shipment volume for small entities, preventing us from comparing compliance costs to importers' revenues. Instead, we compare per shipment compliance costs to the average value of all affected shipments. This comparison may overstate or understate small entities' per shipment compliance costs if their shipment value is higher or lower than the average. In addition, the ratio of compliance costs to shipment value may understate or overstate the significance of the costs depending on the purpose of those shipments and their re-sale value in the United States.

We calculate information on the mean value of shipments from the PIERS database for all industries identified in our sample. We include all shipments associated with an entity identified within a certain industry. Exhibit 6-6 presents the mean shipment value and the number of shipments for each of the top 10 industries. These mean values are provided simply for illustration of our data limitations and to provide a sense of the range of mean shipment values.

EXHIBIT 6-6 MEAN VALUE PER SHIPMENT IN THE TOP 10 INDUSTRIES (CONTAINERIZED IMPORTERS)

NAICS CODE	NUMBER OF IMPORTERS	TOTAL NUMBER OF SHIPMENTS	MEAN VALUE PER SHIPMENT ($)
424900	20	114	$173,683
423830	13	51	47,250
442110	11	27	22,081
488510	10	175	107,828
423220	8	76	45,342
423120	7	60	72,895
424330	7	25	181,893
424320	7	121	130,213
423710	7	49	36,614
424490	7	10	18,354

Source: IEc analysis of PIERS database.

Exhibit 6-7 reports the initial, one-time costs (reported on a per-shipment basis) and the security filing fee for importer frequency classes (see Chapter 4).[174] In addition, the exhibit reports the percentage share that the cost of the security filing requirements plays as a part of the mean value per shipment. In each case presented below, the security filing cost represents an increase of less than 4.7 percent of the value of the shipment. We recognize that small entities' mean value per shipment may be higher or lower than $103,164; therefore, the impact to small entities may be greater than the percentages reported in the exhibit. The results suggest that costs of complying with the interim final rule may be significant relative to the value of an affected shipment.

In our upper-bound impact estimate, importers of containerized shipments may also experience a loss in consumer surplus associated with delays. While these losses represent lost value, they do not represent actual expenditures. The impact of these losses on small entities is unknown.

[174] Entities importing more than one shipment per year will incur initial, one-time costs. For the purposes of this small business analysis, we make the simplifying assumption that all small entities incur initial, one-time costs of $25,000 because our data are not sufficient to characterize the number of shipments made annually by small importers.

EXHIBIT 6-7 RELATIVE COST OF SECURITY FILING REQUIREMENTS (CONTAINERIZED IMPORTERS)

NAICS CODE	NUMBER OF ENTITIES	NUMBER OF SHIPMENTS	SECURITY FILING FEE	INITIAL, ONE-TIME FEE (EXPRESSED AS PER ENTITY PER SHIPMENT)	TOTAL COST AS SHARE OF MEAN VALUE
LOWER BOUND ESTIMATE					
Once per year	0	0	$75.00		0.07%
Twice yearly to less than monthly	134,000	697,000	$60.00	$4,817	4.73%
Monthly to less than weekly	44,100	1,230,000	$45.00	$900	0.92%
Weekly to less than daily	9,900	2,190,000	$30.00	$113	0.14%
Daily or greater	615	2,360,000	$15.00	$7	0.02%
Anonymous	38,000	1,300,000	$22.50	$730	0.73%
UPPER BOUND ESTIMATE					
Once per year	370,000	456,000	$75.00		0.07%
Twice yearly to less than monthly	262,000	1,380,000	$60.00	$4,740	4.65%
Monthly to less than weekly	66,900	1,640,000	$45.00	$1,017	1.03%
Weekly to less than daily	18,100	1,810,000	$30.00	$250	0.27%
Daily or greater	1,480	1,180,000	$15.00	$31	0.04%
Anonymous	144,000	1,300,000	$22.50	$2,776	2.71%

Source: IEc analysis.
Note: Mean shipment value for containerized cargo is $103,164, after adjusting for inflation from 2005 to 2008.

BULK IMPORTERS

Substantial Test

The PIERS dataset includes information on over 1,800 unique bulk importers. We took a random sample of our PIERS dataset and collected financial information on the entities from Dun & Bradstreet until we had data on 75 entities. Exhibit 6-8 details the top industries in our sample ranked by number of occurrences. The complete list of industries identified in our sample importing bulk shipments is provided in Exhibit E-2 of Appendix E.

EXHIBIT 6-8 TOP INDUSTRIES FROM IMPORTERS SAMPLE (BULK)

NAICS CODE	NUMBER OF OCCURRENCES	PERCENT OF SAMPLE	INDUSTRY DESCRIPTION
488510	7	9.33%	Freight Transportation Arrangement
423510	6	8.00%	Metal Service Centers and Other Metal Merchant Wholesalers
423310	5	6.67%	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
327310	4	5.33%	Cement Manufacturing
423320	4	5.33%	Brick, Stone, and Related Construction Material Merchant Wholesalers
221210	3	4.00%	Natural Gas Distribution
424690	3	4.00%	Other Chemical and Allied Products Merchant Wholesalers
999990	2		INDUSTRY UNKNOWN
325188	2	2.67%	All Other Basic Inorganic Chemical Manufacturing
311712	2	2.67%	Fresh and Frozen Seafood Processing
424720	2	2.67%	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)
	37	49.33%	ALL OTHER INDUSTRIES RECORDED IN SAMPLE

Source: Importer descriptive information obtained from Dun and Bradstreet, Company Reports, http://www.dnp.com.

We present the share of entities considered small in each of the top ten industries from our PIERS sample. Exhibit 6-9 reports those definitions of "small" from the SBA and the share of entities that are small. For most industries, the share of entities considered small is at least 75 percent. Therefore, we assume that under Alternative 2 (where bulk shipments are not exempt from the Importer Security Filing requirement), a substantial number of small entities would be affected. Under Alternative 1 (bulk cargo exempt from the Importer Security Filing requirement), Alternative 3 (VOCCs exempt), and Alternative 4 (importers exempt), bulk importers would not be affected.

Exhibit 6-10 reports summary statistics on our sample of 75 importers. Only three industries appeared in the sample more than five times, accounting for 18 firms. For all industries importing bulk shipments, over 90 percent of the firms in the United States in those industries are small entities.

EXHIBIT 6-9 SHARE OF SMALL ENTITIES IN EACH OF THE TOP 10 INDUSTRIES (BULK IMPORTERS)

NAICS CODE	INDUSTRY DESCRIPTION	PERCENT OF SAMPLE	"SMALL" THRESHOLD	SHARE OF SMALL ENTITIES
488510	Freight Transportation Arrangement	9.33%	$6.5 million	0%
423510	Metal Service Centers and Other Metal Merchant Wholesalers	8.00%	100 employees	83%
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers	6.67%	100 employees	100%
327310	Cement Manufacturing	5.33%	750 employees	75%
423320	Brick, Stone, and Related Construction Material Merchant Wholesalers	5.33%	100 employees	100%
221210	Natural Gas Distribution	4.00%	500 employees	100%
424690	Other Chemical and Allied Products Merchant Wholesalers	4.00%	100 employees	100%
325188	All Other Basic Inorganic Chemical Manufacturing	2.67%	100 employees	100%
311712	Fresh and Frozen Seafood Processing	2.67%	500 employees	0%
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)	2.67%	100 employees	100%

Source: Importer descriptive information obtained from Dun and Bradstreet, Company Reports, http://www.dnp.com.
Threshold information from U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.

EXHIBIT 6-10 BULK IMPORTERS, SUMMARY STATISTICS

NUMBER OF APPEARANCES IN SAMPLE	NUMBER OF INDUSTRIES IN SAMPLE	NUMBER OF FIRMS IN SAMPLE	TOTAL NUMBER OF ENTITIES IN UNITED STATES	NUMBER OF SMALL ENTITIES IN UNITED STATES	SHARE SMALL
6+	2	13	198,796	190,710	95.9%
5	1	5	6,414	5,985	93.3%
4	2	8	3,011	2,815	93.5%
3	2	6	7,133	6,709	94.1%
2	3	6	3,424	3,097	90.4%
1	37	37	178,814	172,104	96.2%
Total	**47**	**75**	**397,592**	**381,420**	**95.9%**

Source: IEc analysis of PIERS database.
Number of entities from U.S. Small Business Administration, as viewed at http://www.sba.gov/advo/research/data_uspdf.xls on July 16, 2007.
Threshold information from U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.

Significance Test

Exhibit 6-11 details the mean shipment value and the number of shipments for each of the top 10 industries. These mean values are provided simply for illustration of our data limitations and to provide a sense of the range of mean shipment values. Mean shipment values range from approximately $100,000 to $10 million per shipment.

EXHIBIT 6-11 MEAN VALUE PER SHIPMENT IN THE TOP 10 INDUSTRIES (BULK IMPORTERS)

NAICS CODE	NUMBER OF IMPORTERS	TOTAL NUMBER OF SHIPMENTS	MEAN VALUE PER SHIPMENT ($)
488510	7	22	$7,910,418
423510	6	219	99,484
423310	5	8	139,655
327310	4	42	904,306
423320	4	54	732,560
221210	3	19	1,131,113
424690	3	36	1,231,004
325188	2	13	709,038
311712	2	3	9,920,459
424720	2	23	8,633,829

Source: IEc analysis of PIERS database.

Exhibit 6-12 reports the initial, one-time costs (reported on a per-shipment basis) and the security filing fee for importer frequency classes (see Chapter 4). In addition, the exhibit reports the percentage share that the cost of the security filing requirements plays as a part of the mean value per shipment. In each case presented below, the security filing cost represents an increase of less than 0.15 percent of the value of the shipment. We recognize that small entities' mean value per shipment may be higher or lower than $4,060,052; therefore, the filing costs may represent a smaller or larger percentage of total value. We also note that under Alternative 1 (bulk cargo exempt from the Importer Security Filing requirement), Alternative 3 (VOCCs exempt), and Alternative 4 (importers exempt), bulk importers would not be affected.

EXHIBIT 6-12 RELATIVE COST OF SECURITY FILING REQUIREMENTS (BULK IMPORTERS)

NAICS CODE	NUMBER OF ENTITIES	NUMBER OF SHIPMENTS	SECURITY FILING FEE	INITIAL, ONE-TIME FEE (EXPRESSED AS PER ENTITY PER SHIPMENT)	TOTAL COST AS SHARE OF MEAN VALUE
LOWER BOUND ESTIMATE					
Once per year	0	0	$75.00		0.00%
Twice yearly to less than monthly	1,180	4,860	$60.00	$6,040	0.15%
Monthly to less than weekly	511	11,900	$45.00	$1,070	0.03%
Weekly to less than daily	123	25,500	$30.00	$121	0.00%
Daily or greater	10	35,500	$15.00	$7	0.00%
Anonymous	260	11,200	$22.50	$584	0.01%
UPPER BOUND ESTIMATE					
Once per year	2,790	2,790	$75.00		0.00%
Twice yearly to less than monthly	3,020	12,600	$60.00	$5,993	0.15%
Monthly to less than weekly	855	20,000	$45.00	$1,068	0.03%
Weekly to less than daily	228	29,400	$30.00	$194	0.01%
Daily or greater	19	13,100	$15.00	$36	0.00%
Anonymous	990	11,200	$22.50	$2,220	0.06%

Source: IEc analysis.
Note: Mean shipment value for bulk cargo is $4,060,052, after adjusting for inflation from 2005 to 2008.

BREAK-BULK IMPORTERS

Substantial Test

The PIERS dataset includes information on over 4,600 unique break-bulk importers. We took a random sample from that dataset and collected financial information on the entities from Dun & Bradstreet until we had data on 75 entities. Exhibit 6-13 details the top industries in our sample ranked by number of occurrences. The complete list of industries identified in our PIERS dataset importing break-bulk shipments is provided in Exhibit E-3 of Appendix E.

EXHIBIT 6-13 TOP INDUSTRIES FROM IMPORTERS SAMPLE (BREAK-BULK)

NAICS CODE	NUMBER OF OCCURRENCES	PERCENTAGE	INDUSTRY DESCRIPTION
423510	8	10.67%	Metal Service Centers and Other Metal Merchant Wholesalers
423310	6	8.00%	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
336611	4	5.33%	Ship Building and Repairing
999990	4		INDUSTRY UNKNOWN
424480	3	4.00%	Fresh Fruit and Vegetable Merchant Wholesalers
488510	3	4.00%	Freight Transportation Arrangement
423830	2	2.67%	Industrial Machinery and Equipment Merchant Wholesalers
424410	2	2.67%	General Line Grocery Merchant Wholesalers
424470	2	2.67%	Meat and Meat Product Merchant Wholesalers
424490	2	2.67%	Other Grocery and Related Products Merchant Wholesalers
424690	2	2.67%	Other Chemical and Allied Products Merchant Wholesalers
511110	2	2.67%	Newspaper Publishers
	39	52.00%	ALL OTHER INDUSTRIES RECORDED IN SAMPLE

Source: Importer descriptive information obtained from Dun and Bradstreet, Company Reports, http://www.dnp.com.

We present the share of entities considered small in each of the top ten industries from our PIERS sample. Exhibit 6-14 reports those definitions of "small" from the SBA and the share of entities that are small. For most industries, the share of entities considered small is at least 75 percent. Therefore, we assume that a substantial number of small break-bulk importers will be affected by the interim final rule under Alternative 1 (bulk cargo exempt from the Importer Security Filing requirement), Alternative 2 (bulk cargo not exempt from the Importer Security Filing requirement), or Alternative 3 (VOCCs exempt). Under Alternative 4 (importers exempt), break-bulk importers would not be affected.

Exhibit 6-15 reports summary statistics on our sample of 75 break-bulk importers. Only 2 industries appeared in the sample more than 5 times, accounting for 14 firms. For all industries importing break-bulk shipments, over 93 percent of the firms in that industry are small entities.

EXHIBIT 6-14 SHARE OF SMALL ENTITIES IN THE TOP 10 INDUSTRIES (BREAK-BULK IMPORTERS)

NAICS CODE	INDUSTRY DESCRIPTION	PERCENT OF SAMPLE	"SMALL" THRESHOLD	SHARE OF SMALL ENTITIES
423510	Metal Service Centers and Other Metal Merchant Wholesalers	10.67%	100 employees	63%
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers	8.00%	100 employees	100%
336611	Ship Building and Repairing	5.33%	1,000 employees	75%
424480	Fresh Fruit and Vegetable Merchant Wholesalers	4.00%	100 employees	33%
488510	Freight Transportation Arrangement	4.00%	$6.5 million	0%
423830	Industrial Machinery and Equipment Merchant Wholesalers	2.67%	100 employees	100%
424410	General Line Grocery Merchant Wholesalers	2.67%	100 employees	100%
424470	Meat and Meat Product Merchant Wholesalers	2.67%	100 employees	100%
424490	Other Grocery and Related Products Merchant Wholesalers	2.67%	100 employees	100%
424690	Other Chemical and Allied Products Merchant Wholesalers	2.67%	100 employees	50%

Source: Importer descriptive information obtained from Dun and Bradstreet, Company Reports, http://www.dnp.com.
Threshold information from U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.

EXHIBIT 6-15 BREAK-BULK IMPORTERS, SUMMARY STATISTICS

NUMBER OF APPEARANCES IN SAMPLE	NUMBER OF INDUSTRIES IN SAMPLE	NUMBER OF FIRMS IN SAMPLE	TOTAL NUMBER OF ENTITIES IN UNITED STATES	NUMBER OF SMALL ENTITIES IN UNITED STATES	SHARE SMALL
6+	2	14	13,771	12,883	93.6%
5	0	0	-	-	N/A
4	1	4	1,670	1,642	98.3%
3	2	6	16,228	15,552	95.8%
2	6	12	49,028	46,938	95.7%
1	34	39	196,116	186,854	95.3%
Total	**45**	**75**	**276,813**	**263,869**	**95.3%**

Source: IEc analysis of PIERS database.
Number of entities from U.S. Small Business Administration, as viewed at http://www.sba.gov/advo/research/data_uspdf.xls on July 16, 2007.
Threshold information from U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.

Significance Test

Exhibit 6-16 details the mean shipment value and the number of shipments for each of the top 10 industries. These mean values are provided simply for illustration of our data limitations and to provide a sense of the range of mean shipment values.

EXHIBIT 6-16 MEAN VALUE PER SHIPMENT IN THE TOP TEN INDUSTRIES (BREAK-BULK IMPORTERS)

NAICS CODE	NUMBER OF IMPORTERS	TOTAL NUMBER OF SHIPMENTS	MEAN VALUE PER SHIPMENT ($)
423510	8	922	$145,731
423310	6	28	303,095
336611	4	10	509,161
424480	3	238	77,106
488510	3	31	520,999
423830	2	2	743,823
424410	2	10	140,086
424470	2	16	40,493
424490	2	13	76,597
424690	2	68	56,595

Source: IEc analysis of PIERS database.

Exhibit 6-17 reports the initial, one-time costs (reported on a per-shipment basis) and the security filing fee for importer frequency classes (see Chapter 4). In addition, the exhibit reports the percentage share that the cost of the security filing requirements plays as a part of the mean value per shipment. In each case presented below, the security filing cost represents an increase of less than 2 percent of the value of the shipment. In most cases, the security filing cost represents an increase of less than 0.4 percent of the value of the shipment. We recognize that small entities' mean value per shipment may be higher or lower than $309,174; therefore, the filing costs may represent a smaller or larger percentage of the total value.

The security filing cost as a share of the mean value of shipments made by other industries (outside of the top 10) is in many instances higher than 1 percent. Therefore, we would ideally compare each entity's total annual compliance costs to annual revenues. However, based on our 96-day PIERS data sample set (see Chapter 3 for a full description), we are not able to predict the number of break-bulk shipments made each year by these entities. Therefore, we cannot predict annual compliance costs and are unable to make a determination as to whether the effects of the interim final rule are significant for a substantial number of small break-bulk importers.

EXHIBIT 6-17 RELATIVE COST OF SECURITY FILING REQUIREMENTS (BREAK-BULK IMPORTERS)

NAICS CODE	NUMBER OF ENTITIES	NUMBER OF SHIPMENTS	SECURITY FILING FEE	INITIAL, ONE-TIME FEE (EXPRESSED AS PER ENTITY PER SHIPMENT)	TOTAL COST AS SHARE OF MEAN VALUE
LOWER BOUND ESTIMATE					
Once per year	0	0	$75.00		0.02%
Twice yearly to less than monthly	2,740	11,400	$60.00	$6,013	1.96%
Monthly to less than weekly	693	15,700	$45.00	$1,104	0.37%
Weekly to less than daily	216	42,400	$30.00	$127	0.05%
Daily or greater	14	60,000	$15.00	$6	0.01%
Anonymous	272	9,630	$22.50	$707	0.24%
UPPER BOUND ESTIMATE					
Once per year	7,870	7,870	$75.00		0.02%
Twice yearly to less than monthly	4,470	18,200	$60.00	$6,157	2.01%
Monthly to less than weekly	1,050	25,400	$45.00	$1,032	0.35%
Weekly to less than daily	490	56,100	$30.00	$218	0.08%
Daily or greater	30	21,900	$15.00	$35	0.02%
Anonymous	1,040	9,630	$22.50	$2,686	0.88%

Source: IEc analysis.
Note: Mean shipment value for break-bulk cargo is $309,174, after adjusting for inflation from 2005 to 2008.

RO-RO IMPORTERS

We do not complete the same analysis for roll-on/roll-off (Ro-Ro) importers. We referenced Dun & Bradstreet for information on approximately 100 importers and found that information was only available for six entities. A closer examination of the 100 importers suggested that the majority are private individuals, which are not considered small entities.

CARRIERS

Defining "Small Entity"

According to the SBA-defined small business size standards for VOCCs, which fall under NAICS 483111 (Deep Sea Freight Transportation), firms with fewer than 500 employees are considered to be small entities.[175] Dun and Bradstreet's Market Identifiers reports 492 entities operating within NAICS 483111. Of these 492 entities, 477 are firms that report fewer than 500 employees.

[175] U.S. Small Business Administration, "Small Business Size Standards matched to North American Industry Classification System," Effective January 28, 2004, http://www.sba.gov/size/sizetable2002.html.

We have concerns about the reliability of the Dun & Bradstreet data in the case of this particular business area. First, as we note in Chapter 3, the Vessel Automated Manifest System (Vessel AMS) database identifies 1,179 carriers importing shipments to the United States in 2005. This is more than double the number of entities identified in the Dun & Bradstreet list or the 487 entities identified by the U.S. Census Bureau.[176] It would appear that a considerable number of VOCCs do not have deep sea cargo transportation as their primary area of business, and that this NAICS classification is missing a significant number of entities. Second, we understand the focus of the RFA/SBREFA analysis to be on U.S., and not foreign, small businesses. There is no expeditious and economical method of assessing the corporate nationality of either the Vessel AMS or Dun & Bradstreet list of shipping companies. We are aware, however, that the majority of the shipping lines carrying containers into the United States, regardless of size, operate under foreign ownership.

In the absence of alternative data sources, we proceed to conduct the screening analysis relying on descriptive financial information about NAICS 483111 entities found in the Dun & Bradstreet database and the number of VOCCs identified in Vessel AMS. We also conclude that a substantial number of small entities are likely to be directly affected by the regulation under Alternative 1 (bulk cargo exempt from the Importer Security Filing requirement), Alternative 2 (bulk cargo not exempt from the Importer Security Filing requirement), or Alternative 4 (importers exempt). Under Alternative 3 (VOCCs exempt), VOCCs would not be affected.

Revenue and Employee Data

For data on revenues and employees, we use the Dun & Bradstreet data for the 477 entities with fewer than 500 employees. Exhibit 6-18 summarizes the total annual average 2004 revenues for firms within NAICS 483111, organized by ranges of employee-size classes. Specifically, we organize the Dun & Bradstreet company data by the employee-size classes and then calculate the average revenue of companies within that size class. Businesses with zero to 100 employees have average annual revenues of $6 million, those with 101 to 250 employees have average annual revenues of $59 million, and those with 251 to 500 employees have average annual revenues of $105 million.

[176] U.S. Census Bureau, "2002 Economic Census Industry Series Report," http://www.census.gov/eped/ec97/industry/E483111.htm.

EXHIBIT 6-18 AVERAGE ANNUAL REVENUE ESTIMATES (CARRIERS)

CARRIER SIZE	NUMBER OF BUSINESS ENTITIES	AVERAGE ANNUAL REVENUES
0-100 employees	456	$6,000,000
101-250 employees	13	59,000,000
251-500 employees	8	105,000,000
501-5,000 employees	15	450,000,000

Source: Dun & Bradstreet File 516 Dun's Market Identifiers for NAICS 483111 Deep Sea Freight Transportation.
Note: Shaded rows are classified as small businesses based on the SBA criteria.

Determining the Significance of Impacts

The first of the two Additional Carrier Requirements is the Vessel Stow Plan, which will be required of carriers carrying containerized cargo. Our calculations from Chapter 4 assume that the cost to a small entity of submitting a Vessel Stow Plan will depend on the number of vessel trips completed. Carriers that complete between one and 100 vessel trips per year are assigned a cost of $50 per trip. Larger carriers, those that complete at least 101 vessel trips per year are assigned a one-time fixed cost of $50,000 and a variable cost of $100 per trip.[177] Because we do not know the number of vessel trips undertaken by carriers in the various size classes, we conservatively assume that for every trip volume, some of the carriers may be small entities.

We estimate that the average annual revenue of small carriers is $9.1 million, which represents the average of the average annual revenues of small business entities identified in Exhibit 6-18, weighted by the number of business entities. In Exhibit 6-19, we present each category of carrier (based on the annual number of vessel trips) with their corresponding annual worst case cost of submitting Vessel Stow Plans. We then divide these costs by the average annual revenue of $9.1 million, and as shown in Exhibit 6-19, we estimate that the average share of revenue of submitting Vessel Stow Plans for small carriers is 0.25 percent, which does not represent a significant cost to carriers.

[177] The fixed cost, when amortized over 3 years, is equal to $16,667 per year.

EXHIBIT 6-19 VESSEL STOW PLAN COSTS

VESSEL TRIPS	CONTAINER CARRIERS	WORST CASE ANNUAL COSTS	COSTS AS SHARE OF REVENUE
1	51	$50	0.00%
2-10	116	500	0.01%
11-100	183	5,000	0.05%
101-1,000	70	116,667	1.28%
1,001+	4	136,667	1.50%
Total	**424**	**$22,851**	**0.25%**

Source: IEc analysis of PIERS database.
Note: We assume in the "1,001+" category that each carrier makes 1,200 vessel trips. This assumption was made based on an analysis of the PIERS database.

The second of the two Additional Carrier Requirements is the Container Status Message (CSM), which will be required of carriers carrying containerized cargo provided they already collect and maintain CSM data in their electronic equipment tracking systems. Our calculations from Chapter 4 assume that the cost to a small entity associated with submitting CSMs will depend on the number of vessel trips completed. Carriers that complete between 1 and 100 vessel trips per year will experience no cost associated with submitting CSMs. Larger carriers, those that complete at least 101 vessel trips per year, are assigned a one-time fixed cost of $250,000 and a variable cost of $55,000 per year.[178] In Exhibit 6-20, we present each category of carrier (based on the annual number of vessel trips) with their corresponding annual worst case cost of submitting CSMs. We then divide these costs by the average annual small carrier revenue of $9.1 million, as calculated previously for Vessel Stow Plans. As shown in Exhibit 6-20, we estimate that the average share of revenue of submitting CSMs for small carriers is 0.16 percent, which does not represent a significant cost to carriers.

EXHIBIT 6-20 CONTAINER STATUS MESSAGE COSTS

VESSEL TRIPS	CONTAINER CARRIERS	WORST CASE ANNUAL COSTS	COSTS AS SHARE OF REVENUE
1	58	$0	0.00%
2-10	162	0	0.00%
11-100	175	0	0.00%
101-1,000	45	138,333	1.52%
1,001+	2	138,333	1.52%
Total	**442**	**$14,710**	**0.16%**

Source: IEc analysis of PIERS database.
Note: We assume in the "1,001+" category that each carrier makes 1,200 vessel trips. This assumption was made based on an analysis of the PIERS database.

[178] The fixed cost, when amortized over 3 years, is equal to $83,333 per year.

The two costs for two additional carrier elements are additive for containerized cargo, so the average cost share would be 0.41 percent (0.25 percent plus 0.16 percent). Therefore, the additional data elements required for the VOCCs filing are unlikely to result in a significant cost to small entities.

FRFA

Due to the uncertainty regarding whether impacts to small importers are significant, we provide information in this section for a FRFA. As discussed at the beginning of the chapter, CBP intends to certify the rule with regard to impacts to small carriers. However, for simplicity sake, we include both importers and carriers in this FRFA. The complete list of points for discussion in an FRFA are found in Exhibit 6-2. To avoid repetition with other sections of this report, we refer the reader to relevant information in other chapters.

1. A succinct statement of the need for, and the objectives of, the rule

Section 203(b) of the Security and Accountability for Every Port Act (SAFE Port Act) of 2006 states that the Secretary of Homeland Security "shall require the electronic transmission to the Department of additional data elements for improved high-risk targeting, including appropriate elements of entry data…to be provided as advanced information with respect to cargo destined for importation into the United States prior to loading of such cargo on vessels at foreign ports." The information required is that which is reasonably necessary to enable high-risk shipments to be identified so as to prevent smuggling and ensure cargo safety and security pursuant to the laws enforced and administered by CBP. In addition, section 343(a) of the Trade Act of 2002 states that the Secretary of Homeland Security "shall promulgate regulations providing for the transmission … of information pertaining to cargo destined for importation into the United States…." Refer to Chapter 1 and the interim final rule for further detail.

2. A summary of the significant issues raised by the public comments in response to the IRFA, a summary of the assessment of the agency of such issues, and a statement of any changes made in the rule as a result of such comments

CBP received four comments specifically addressing impacts to small entities.

- One commenter suggested that CBP should consider an exemption of small business from some requirements of the rule. CBP believes that the language of the SAFE Port Act does not allow it to exempt small entities from the regulation. Furthermore, all though we do not have explicit information regarding the portion of importers who are small entities, the information provided in the screening analysis suggests that the majority of affected entities are likely to be small businesses. Exempting most importers would significantly diminish the effectiveness of the rule.
- One commenter suggested that CBP attempt to calculate the number of entities that will cease operations as a result of the requirements of the rule. As discussed

earlier, data are not readily-available that would allow us to segregate all the importers in the PIERS dataset by NAICS code. This step is necessary to identify the proportion of small entities affected by the interim final rule. Furthermore, we are unable to estimate a distribution of the number of shipments by industry and size category. Therefore, we are currently unable to estimate the magnitude of the impact to small entities in each industry and the number of businesses that may be forced to cease operations as a result of the rule.

- One commenter reported that the costs associated with software purchase were underestimated for small entities. We revised the analysis to include initial, one-time costs of $25,000 to address this perceived understatement of costs in the analysis that accompanied the proposed rule. Note that we assume importers transporting only one shipment annually do not experience this cost.
- One commenter suggested that CBP conduct a prototype test with small entity volunteers to better understand the potential impact to these businesses. CBP is adopting a "Structured Review and Flexible Enforcement Period" whereby CBP will work with the trade following the effective date of the interim final rule to assist them in achieving compliance with minimal disruption.

3. A description and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available

As discussed earlier in this chapter, the interim final rule applies to all entities importing containerized, break-bulk, or Ro-Ro shipments into the United States. Under the chosen alternative, bulk shipments are exempt from the interim final rule. The regulation also applies to VOCCs transporting shipments via vessel to the United States. The majority of the affected entities are likely to be small.

4. A description of the projected reporting, recordingkeeping, and other compliance requirements of the rule, including an estimate of the classes of small entities that will be subject to the requirement and the types of professional skills necessary for preparation of the report or record

The requirements of the interim final rule are expected to be submitted electronically by importers or VOCCs (or an agent representing either). Refer to Chapter 2 for further detail regarding the requirements for compliance and to Chapter 4 for further detail on the expected costs of compliance. Professional skills necessary for preparation of the report or record include basic administrative and recordkeeping skills used to manage data transaction, shipment, manifest, security, and other data used in the commercial supply chain environment, along with a working knowledge of import shipment arrangements, brokerage, conveyance/shipping, and consolidation customs procedures and regulation.

5. A description of the steps the agency has taken to minimize the significant adverse economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each of the other significant alternatives to the rule considered by the agency was rejected

Chapter 4 describes the reasons for selecting the alternative adopted and why each of the other alternatives was rejected. Given the prevalence of small entities conducting importing activities and the need for all entities to participate for the rule to be effective, CBP is not exempting small entities from the regulation.

CONCLUSION

In summary, because the interim final rule affects all importers and carriers bringing goods to the United States, it likely affects a substantial number of small entities in each industry conducting these activities. Based on the data limitations discussed in this chapter and the sources of uncertainty discussed below, we are uncertain whether these effects will be significant on a per-entity basis for importers. Therefore, based on the results of this analysis, CBP cannot certify that the interim final rule will not have a significant impact on a substantial number of small importing entities. As a result, we have conducted a FRFA. Based on the analysis presented in this chapter, we believe that a substantial number of small VOCCs is not likely to be significantly affected.

KEY SOURCES OF UNCERTAINTY

Our analysis in this chapter is limited by many of the key uncertainties described in detail in Chapter 3. Specifically, the key uncertainty in our analysis is reporting errors in the PIERS and Vessel AMS databases on which our affected population and costs are based. This includes misspelled importer names resulting in an overstatement of the number of importers, misspelled vessel names resulting in an overstatement of the number of vessel trips, missing BOL numbers, missing wholesale values, and unrealistically high wholesale values.

Additional sources of error in our analysis include miscategorizing shipments into the different non-containerized shipment categories, sampling error in our PIERS data (which manifests itself when we extrapolate from 96 days to a full year), and our series of simplifying assumptions (e.g., all importers with the same name are the same entity, the carrier issuing the most BOLs for shipments on a vessel is the vessel operator). We also may have missed cruise ships and ferries that filed declarations in Vessel AMS yet are exempt from filing the security elements, which would cause us to overstate the number of vessels and carriers subject to the rule.

In addition, this part of the analysis relies heavily on information collected from Dun & Bradstreet on industry classification, employee count, and revenue value. It is unknown if there is some level of systemic bias against small entities in Dun & Bradstreet's data collection processes.

Finally, data limitations make it difficult for us to identify the volume of shipping activity for entities defined as "small" by SBA, so that we can compare our volume-based compliance costs with annual revenues for these firms. As a result, for small importers, we assume the highest possible per shipment compliance cost and compare it with average shipment values in that industry. For VOCCs, we assume small entities operate in every category of shipping volume used to generate compliance cost estimates. The effect of these assumptions on the results of our analysis is unknown.

CHAPTER 7 | OTHER REQUIREMENTS

The previous chapter of this report addresses the requirements of the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) and Executive Order 13272. This chapter addresses the remaining analytical requirements under administrative law and executive order. Specifically, it provides a discussion of potential effects of concern under Executive Order 13211, entitled, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use." The interim final rule is exempt from the requirements of Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), which states that the Act "shall not apply to…any provision in a proposed or final Federal regulation that is necessary for the national security…."[179]

IMPACTS ON ENERGY SUPPLY, DISTRIBUTION, OR USE

Pursuant to Executive Order 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions."[180] The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."[181] OMB provides guidance for implementing this order that outlines nine outcomes that may constitute "a significant adverse effect" of a regulatory action under consideration:

- Reductions in crude oil supply in excess of 10,000 barrels per day;
- Reductions in fuel production in excess of 4,000 barrels per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 million Mcf per year;
- Reductions in electricity production in excess of 1 billion kilowatt-hours per year or in excess of 500 megawatts of installed capacity;

[179] Unfunded Mandates Reform Act of 1995 (UMRA), 2 U.S.C. 1503.

[180] "Executive Order 13211 of May 18, 2001: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, and Use," *Federal Register*, Vol. 66, No. 98, May 21, 2001, p. 28355.

[181] U.S. Office of Management and Budget (OMB), The Executive Office of the President, *Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing EO 13211, M-01-27*, July 13, 2001.

- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of 1 percent;
- Increases in the cost of energy distribution in excess of 1 percent; or
- Other similarly adverse outcomes.[182]

The interim final rule will not have a significant adverse effect on the supply, distribution, and use of energy. The rule will not affect fuel supply or production. In addition, the rule will require little additional energy use.

[182] U.S. Office of Management and Budget (OMB), The Executive Office of the President, *Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing EO 13211, M-01-27*, July 13, 2001.

CHAPTER 8 | CHANGES FROM ANALYSIS SUPPORTING THE PROPOSED RULE

The proposed rule for implementation of the Importer Security Filing and Additional Carrier Requirements was published on January 2, 2008 (73 FR 90). Based on new information provided in public comments and U.S. Customs and Border Protection (CBP) and Department of Homeland Security (DHS) review of those comments, we revised the analysis presented in this report to include more recent data and to provide additional information about the potential impacts of the rule.[183] The substantial changes include:

- **Updated Importer Security Filing costs:** We have added initial, one-time costs estimated to be incurred by ISF Importers and their designated security filing agents to implement the security filing requirements of the interim final rule. Several comments indicated that our previous analysis did not adequately account for upfront implementation activities such as information systems upgrades or modifications, research, or business restructuring. Our estimates are based on comments to the proposed rule. We applied this estimated cost, on a per importer basis, to the baseline number of importers. However, we did not apply this estimated cost to the most infrequent importers (i.e., those that import only one shipment per year) because we assume that these importers would choose to stop importing or seek alternative sources for their goods given that the estimated initial costs are likely to be much higher than the total value of their imported goods. The costs to these importers of ceasing their importing activity is assumed to be de minimis.
- **Updated Supply Chain costs:** We have updated our analysis of the costs estimated for potential delays in the supply chain. Several comments asserted that relatively longer supply chain delays ranging from 2 to 7 days would result from implementation of the rule. In addition, they suggested use of an alternative methodology to estimate the cost of delays, namely to apply the 0.8 percent per

[183] As discussed in Chapter 2, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings. However, because of data limitations, we cannot estimate the changes in cost attributable specifically to CBP's restraint in enforcing the rule during the initial 12 months or the flexibilities that the rule provides. We therefore estimate the incremental costs of the interim final rule assuming that importers will be fully compliant upon the effective date of the rule (i.e., ISF Importers or their designated agents will transmit all of their required Importer Security Filing data elements to CBP no later than 24 hours prior to lading at a foreign port), which likely overstates costs.

day of delay *ad valorem* factor derived by Dr. David Hummels of Purdue University to the total value of imported goods. They also commented that supply chain delays would affect not only consolidated containers but also non-consolidated (or full) containers as well.

In light of the public comments and additional research, we adopted a new methodology to estimate the supply chain impacts, namely by estimating the economic welfare losses to U.S. importers. Our revised analysis relies on Hummels' results as a measure of the willingness to pay for reducing transit time. However, as described in Chapter 4 and Appendix B, the transfer of Hummels' results to this policy question is imperfect and likely overstates the impact. For the low cost scenario, we continue to assume that there will not be a delay and therefore no associated costs in the supply chain. For the high cost scenario, we assume an initial delay of 3 days and 2 days for consolidated container shipments and unconsolidated (full) container shipments, respectively, for the first year of implementation. For subsequent years, we assume 1 day of delay.

- **Effective Date of the Interim Final Rule:** The projected effective date of the regulation was changed from April 1, 2008, to 60 days from the date of the interim final rule's publication in the Federal Register. For purposes of our analysis, we assume an effective date of January 1, 2009. Accordingly, we adjusted the 10-year cost analysis period to the years 2009 through 2018.
- **Updated Vessel Stow Plan Requirements:** CBP informed us that the interim final rule would also exempt vessel trips carrying exclusively break-bulk and Ro-Ro cargo from the Vessel Stow Plan requirements. The proposed rule exempted only vessel trips carrying exclusively bulk cargo. Our revised cost analysis reflects this change; namely, that the Vessel Stow Plan requirements would only apply to those vessel trips carrying containerized cargo.
- **Uncertainty Analysis:** Because our revised cost analysis results in impacts exceeding $1 billion annually, we provided a formal quantitative analysis of uncertainty in accordance with U.S. Office of Management and Budget's (OMB's) *Circular A-4* guidelines. As discussed in Appendix C, we analyze the uncertainties likely to have the largest potential impact on the estimated total costs. These include our estimates of the initial, one-time costs for importers and the length of supply chain delay.

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APPENDIX A | INTERVIEWEES

EXHIBIT A-1 LIST OF INTERVIEWEES

LIST OF INTERVIEWEES
A.N. Deringer, Inc.
American Association of Exporters and Importers
Argents Air Express, Ltd.
Del Monte Corporation
Expeditors Tradewin, LLC
Fednav International Ltd.
General Motors, Inc.
Horizon Lines, LLC
Integration Point, Inc.
John S James Co.
Johnson Diversey Inc.
Kuehne & Nagel, Inc.
The Burton Corporation
Trade Innovations, Inc.
Trade Bridge International, Inc.
Tradex International, Inc.
Wallenius Wilhelmsen Logistics AS
World Shipping Council

APPENDIX B | DETAILED DISCUSSION OF OUR ESTIMATION OF THE COST OF TIME DELAY

This appendix provides a detailed discussion of the calculations used to estimate an upper-bound on the costs associated with delaying shipments by 1 to 3 days.[184] Costs are measured in terms of welfare losses forecast to result from the interim final rule.[185] Specifically, we are interested in the change in consumer surplus resulting from an upwards shift in the supply curve for foreign imports. We estimate this shift based on research by Dr. David Hummels of Purdue University. This appendix first describes Dr. Hummels' study and the limitations associated with the transfer of his results to this policy question. The appendix then describes the estimation process used to generate the consumer surplus losses presented in Exhibit 4-11.

HUMMELS' PARAMETER ESTIMATES

Our analysis relies on work conducted by Dr. Hummels in 2001 and 2007.[186] Below, we first provide a brief summary of his approach and results. In this section, we describe how we transfer the results of Dr. Hummels' study to our analysis.

OVERVIEW OF HUMMELS' STUDIES

Hummels (2001) and Hummels *et al.* (2007) analyze data on imported goods that are shipped by air and by vessel. Specifically, Hummels *et al.* (2007) examines trade

[184] As discussed in Chapter 2, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings. However, because of data limitations, we cannot estimate the changes in cost attributable specifically to CBP's restraint in enforcing the rule during the initial 12 months or the flexibilities that the rule provides. We therefore estimate the incremental costs of the interim final rule assuming that importers will be fully compliant upon the *effective* date of the rule (i.e., ISF Importers or their designated agents will transmit all of their required Importer Security Filing data elements to CBP no later than 24 hours prior to lading at a foreign port), which likely overstates the welfare losses.

[185] The theory of welfare analysis is explained in Chapter 4 and illustrated in Exhibit 4-10.

[186] Hummels, David, "Time as a Trade Barrier," unpublished manuscript, 2001; and Nathan Associates Inc., "Calculating Tariff Equivalents for Time in Trade," prepared for USAID, March 2007. The value of time in trade parameters were produced by David Hummels of Purdue University and Nathan Associates with support from USAID's Bureau of Economic Growth, Agriculture and Trade (EGAT) under Contract No. GS-10F-0619N, Task Order No. EEM-M-00-06-00028-00. It was produced for the paper "Calculating Tariff Equivalents for Time in Trade," by David Hummels, Peter Minor, Matthew Reisman, and Erin Endean, USAID/Nathan Associates, 2007."

characteristics and shipping time data.[187] Trade volume data were obtained from a database of U.S. merchandise imports from 1991 to 2005 that reports monthly quantities, values, and transportation modes by product category for entry ports into the United States. Shipping times are derived from 1998 schedule data from www.shipguide.com and from the "Port2Port Evaluation Tool" by ComPair Data, Inc. for the fourth quarter of 2006.

Hummels *et al.* (2007) estimates the marginal value for a day of reduced shipping time as a percentage of value (*ad valorem)*. The premium is computed from the ratio of regression coefficients for differences in *ad valorem* shipping costs relative to the number of days in transit, given the propensity to ship by air. Time premium parameters are estimated for 1,248 HTS-4 categories.[188] Of those 1,248, 750 of the estimates (hereafter called "Hummels' parameters") are statistically significant. The Hummels' parameters represent the marginal value of reducing travel time by 1 day for an individual category of imported goods. We interpret this premium to provide a reasonable estimate of individuals' marginal willingness to pay to avoid an extra day of time in transit, given the associated costs of transportation (e.g., security, warehousing, inventory carrying costs) and the sensitivity of the market to receiving goods at a certain time (e.g., to take advantage of seasonal shopping trends).

COMPARISON OF HUMMELS' STUDY TO OUR POLICY QUESTION

The parameters derived for Hummels *et al.* (2007) are not a perfect match for our policy question. Fundamentally, Hummels *et al.* (2007) only looks at the value of delay for a subset of the types of shipments of concern in our analysis. The shipments included in this subset have characteristics that may not be representative of the universe of shipments potentially affected by this regulation.

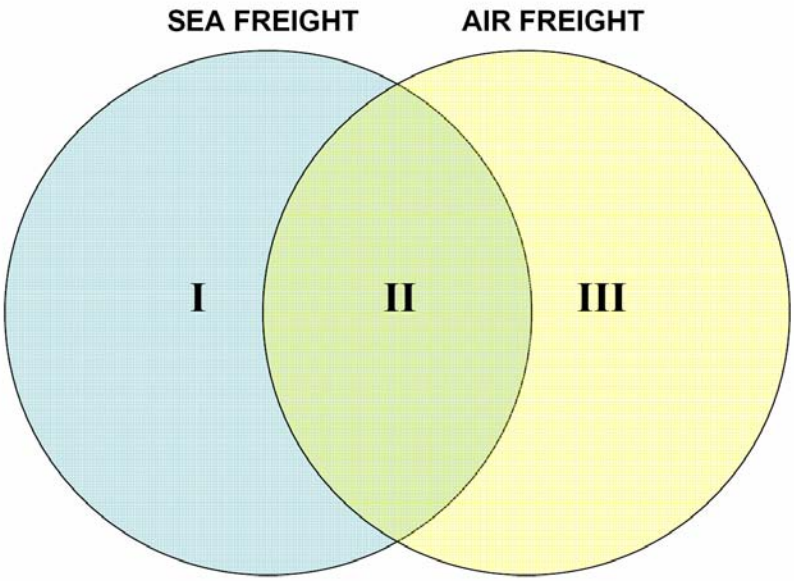
Exhibit B-1 illustrates the relationship of the sample of shipment data used to derive the Hummels' parameters reported in Hummels *et al.* (2007) and the shipments relevant to the interim final rule. The first circle (Areas I + II) represents all types of freight that are shipped by vessel; these are the goods that would be affected by the interim final rule. The second circle (Areas II + III) represents all types of goods that are shipped by air. The Hummels' parameters are derived from the overlap, Area II.[189] These are goods that are shipped by both vessel and air, and are a sub-set of the cargo shipped by vessel only.

[187] Hummels (2001) pioneers the methodology later used in Nathan Associates, Inc. (2007) which estimates the parameters used in this analysis.

[188] HTS-4 refers to 4 digit Harmonized Tariff Schedule (HTS) categories. The most detailed HTS categorization is HTS-10 (ten digits). As the number of digits decreases, the categories become more aggregated.

[189] Note that this figure is not drawn to scale; it is meant to be illustrative.

EXHIBIT B-1 VENN DIAGRAM OF CARGO SHIPMENT TYPES



Hummels *et al.* (2007) acknowledges that omission of categories of goods that travel only by air or only by sea may bias the parameters, though *a priori*, there is no expectation of such a bias in the case where both all air and all sea shipments are also assessed.[190] That is, if we consider shipments in Areas, I, II, and III of the above diagram, then an estimate based on observations in Area II may not be a biased estimate of the value of delay for all shipments. In this rule, however, we are concerned only with shipments in Areas I and II - shipments in Area III are unaffected. If shipments traveling only by vessel (Area I) are less time sensitive than those represented by those in Area II, then it is reasonable to assume that individual willingness to pay to avoid delay is likely to be lower for those shipments. Parameters estimating the value of avoiding a day's delay are not currently available for the goods falling in Area I. We therefore conclude that applying the Hummels parameters based on Area II observations to these goods in Area I likely

[190] Hummels et al. (2007) states, "For approximately one-third of j-k-d-t observations both air and ocean transportation are employed. These represent roughly 70 percent of trade by value, and the estimation is based on these observations. For the remaining observations only one mode is observed. Since we do not see shipping prices for these goods they are dropped from the estimation. This could cause biased estimates if there is heterogeneity in the parameters a^k, τ^k across observations within a product. For example, suppose that some observations have systematically higher values of τ^k than average, resulting in them being shipped only by air. Omitting these observations would then bias τ^k downward. Similarly, suppose some observations have systematically lower values of τ^k than the average, resulting in them being shipped only by ocean. Omitting these observations would then bias τ^k upward. Ultimately, the number of omitted observations is evenly distributed over all air or all ocean modes, suggesting that the estimation biases might balance out." (See page A-5 and A-6, Appendix A of Nathan Associates (2007))

overstates the overall willingness to pay to avoid delay, therefore overstating welfare losses.[191]

TRANSFERRING HUMMELS' PARAMETERS TO THIS ANALYSIS

In order to transfer Hummels' parameters to our analysis, we make two major assumptions. First, we apply the Hummels' parameters to all seaborne goods in the relevant HTS-4 category, regardless of whether all of the goods would ever be shipped by air. Essentially, we assume that all goods within a category are equally time sensitive. Second, we apply a weighted average of the Hummels' parameters to the seaborne cargo categories not included in his studies. Here, we assume that cargo not studied by Hummels (i.e., cargo never transported by air) is equally time sensitive to cargo that is sometimes shipped as air freight. Both steps are discussed further below.

HTS-4 Categories Overlapping the PIERS Dataset

Dr. Hummels provides his parameters for goods characterized at the HTS-4 level. This level allows estimation of the value of time delays with greater precision than estimation based on more aggregated trade categories. However, the 750 categories are still sufficiently broad that within our PIERS dataset some goods in these categories will be shipped by both air and vessel, and some by vessel only. The bias that is introduced here is an unavoidable, constructed attribution of the cost of delay for some seaborne-only cargo.

In order to apply the Hummels' parameters to all seaborne container cargo, it is necessary to assume that the cost of time delay for vessel and airborne cargo within a category spanned by the Hummels' parameters is relevant for all cargo within that category. For Exhibit B-1, this means that if a category has goods that fall in both Area I and Area II, then the goods in Area I will be treated as if they are all in Area II. As a result, some goods that are seaborne only will be given the Hummels' parameter value for other goods (that ship by both air and vessel) within their HTS-4 category. This assigns a higher cost of time delay to goods that are likely to be less time sensitive and, therefore, that have lower costs of time delay. Since no data are available describing the correspondence between traded quantities in Hummels' dataset and quantities affected by the interim final rule, this assumption is necessary in order to estimate welfare benefits.

Remaining HTS-4 Categories in the PIERS Dataset

Exhibit B-2 presents a comparison of the shipments from our PIERS dataset that fall into the 750 relevant HTS-4 categories analyzed by Hummels and all of the shipments (1,300 HTS-4 categories) affected by the interim final rule. Exhibit B-2 provides the total value,

[191] We confirmed with the author that the Hummels et al. (2007) parameters provided to us include only Type II categories. However, we note that Hummels (2001) included all three types, and an in-progress study by Dr. Hummels that was unavailable to us at the time of this analysis also addresses all three. Therefore, additional information on this issue is likely to be forthcoming. Furthermore, Dr. Hummels notes that within HTS-4 category groups, some of the goods are only ocean shipped because they aren't time sensitive. Data limitations prevent him from determining in his analysis whether goods that are observed to only go by ocean have a low time sensitivity or are very expensive or difficult to put on a plane. (Personal communication with Dr. David Hummels, Purdue University, October 15, 2008.)

total volume (measured in 20-foot equivalent units ((TEUs)), and average value per TEU for the shipments in Hummels' HTS-4 categories (area II from Exhibit B-1) and the total shipments affected by the interim final rule (areas I and II from Exhibit B-1).

EXHIBIT B-2 SAMPLE COMPARISON

	CONSOLIDATED CONTAINERS		FULL CONTAINERS (NOT CONSOLIDATED)	
	PIERS SHIPMENTS FALLING IN HUMMELS' HTS CATEGORIES	ALL PIERS SHIPMENTS	PIERS SHIPMENTS FALLING IN HUMMELS' HTS CATEGORIES	ALL PIERS SHIPMENTS
Relative to Exhibit B-1	Area II	Area I + II	Area II	Area I + II
Value of Goods (2008$) ($Q_1 * P_1$)	$234,461,455,000	$268,895,501,000	$591,551,826,000	$747,563,898,000
Volume of Goods Shipped (TEUs) (Q_1)	3,478,000	4,639,000	11,267,000	16,066,000
Average Value Per TEU	$67,400	$58,000	$52,500	$46,500

The value of the full sample of all PIERS consolidated container shipments is only 15 percent greater than the value of the PIERS shipments for which there are Hummels' parameters. However, the volume of the full sample of PIERS consolidated container shipments is 33 percent greater than the volume of the PIERS shipments with Hummels' parameters.[192] The higher average value of goods for those shipments with Hummels' parameters ($67,400) relative to the full sample value ($58,000) accounts for this difference.

This disparity is also evident for PIERS full container shipments. The value of goods in the full sample is only 26 percent higher than for the sample with Hummels' parameters while the total volume of goods is 43 percent higher. Again, this reflects the higher average value per TEU among goods falling into HTS categories with Hummels' parameters.

Exhibit B-2 illustrates that the cargo for which Hummels' parameters are available have higher average values than the rest of the PIERS seaborne cargo shipments. This finding is consistent with our expectations; cargo regularly shipped by both modes may have higher values.

To develop a time delay value parameter for Area I consolidated and unconsolidated seaborne cargo, we estimated both value and quantity-weighted averages of the Hummels' parameters for Area II cargo. The weighted averages of the Hummels'

[192] Note that an upward bias is already present in the data presented in Exhibit B-2 due to the cross-HTS category attribution problem discussed in the previous section.

parameters across the 750 HTS categories were all very close, and round to 0.008.[193] While the attribution of Hummels' parameters to the rest of the PIERS seaborne data is a valid mathematical procedure, it is important to remember that results based on the attribution described above may have an upward bias relative to the true costs of the time delay for seaborne cargo.

WELFARE IMPACT ESTIMATION

As discussed in Chapter 4, where regulations are anticipated to have a measurable effect on market equilibrium, Federal agencies typically measure the impacts of those regulations in terms of changes in consumer and producer surplus. This analysis assumes that time delays may significantly affect not only the costs of importing goods into the United States but also the amount of goods imported. Dr. Hummels' studies provide a means to estimate the shift in the cost of supplying imports, thereby allowing us to estimate the reduced quantity demanded and associated lost welfare. Below, we first provide a general overview of our methodology. Next, we describe our calculations in detail.

GENERAL OVERVIEW OF OUR METHODOLOGY

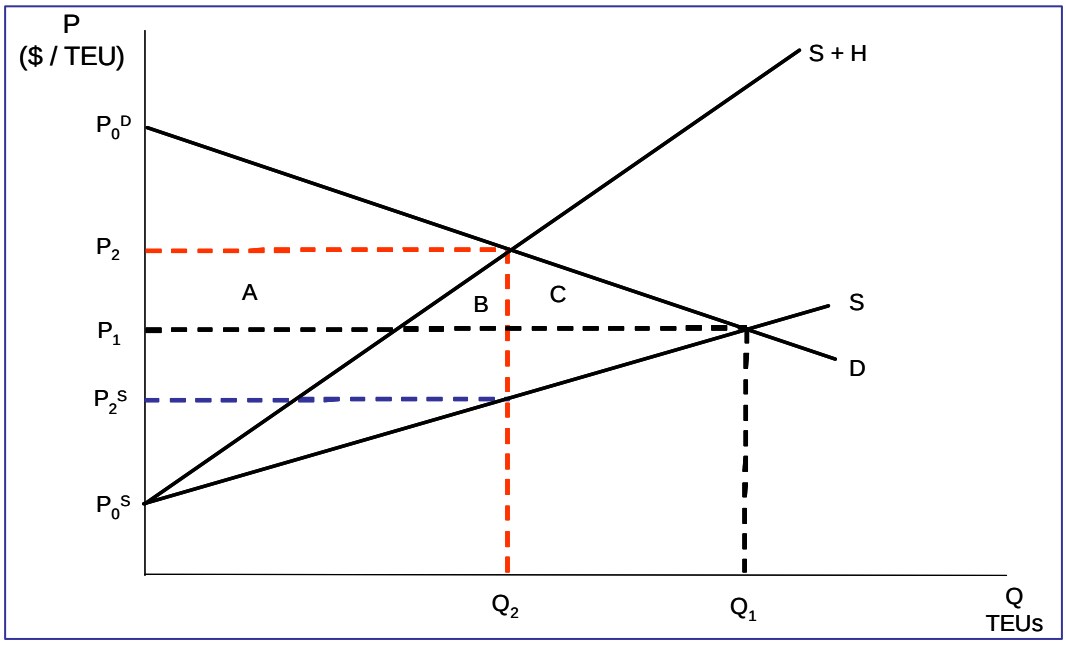
The welfare impacts of delay are illustrated in Exhibit B-3 (also included in Chapter 4). Each HTS-4 category of goods is modeled separately. Quantity of imports is represented along the horizontal axis, and is measured in TEUs. Price of those imports, measured as dollars per TEU, is represented along the vertical axis.

We assume that the constant percentage (*ad valorem*) impact to prices causes a shift in the supply curve such that it moves inward and becomes steeper, from S to S+H. The losses to consumer surplus are generated as the sum of the deadweight (Area C) and transfer losses (Areas A and B) due to the 1 day delay causing an impact equal to the Hummels' parameter. As discussed in Chapter 4, producer surplus losses (i.e., lost profits) are assumed to be borne by foreign entities, therefore we do not include them in this analysis.

The root unit of delay is 1 day. We assume that consumer surplus losses for additional days of delay are simple linear multiples of the 1-day delay. In reality, there are likely to be thresholds above which an additional day of delay does not matter, and below which transporting the goods more quickly is not highly desired. The direction of bias inherent in this assumption is unknown.

[193] Note that this parameters is approximately equal to the weighted average of 0.008 reported by Nathan Associates, Inc. (2007).

EXHIBIT B-3 SUPPLY AND DEMAND FOR FOREIGN IMPORTS SHIPPED TO THE UNITED STATES VIA VESSEL



To estimate the areas A + B + C, we rely on several data sources. Dr. Hummels provided us with his parameters for the 750 relevant HTS-4 categories.[194] The equilibrium quantity and total value per HTS-4 category were obtained from our PIERS dataset (see Chapter 3 for a detailed discussion of these data).[195] Dr. Hummels' parameters and the PIERS' baseline quantity and price data are combined with demand and supply elasticity estimates to estimate simple linear demand and supply curves.[196] Exhibit B-3 differs from Exhibit 4-10 in Chapter 4 in that it shows the price intercepts for demand (P_O^D) and supply (P_O^S) as well as the price level where supply intercepts (P_2^S) the quantity in the new equilibrium. All of these parameters must be calculated to estimate the value of Q_2 as described below.

[194] Personal communication with Dr. David Hummels, Purdue University on April 29, 2008.

[195] The "price" per TEU is calculated by dividing the total value of all shipments in the relevant HTS-4 category by the number of TEUs comprising those shipments.

[196] The import demand elasticities used in the estimation are from C. Broda and D. Weinstein, "Globalization and the Gains from Variety," *Quarterly Journal of Economics*, Vol. 121, No. 2, May 2006, publicly available at http://faculty.chicagogsb.edu/christian.broda/website/research/unrestricted/TradeElasticities/TradeElasticities.html. The import supply elasticities were provided by Professor Christian Broda at the University of Chicago Graduate School of Business (Personal communication with Dr. Christian Broda, University of Chicago Graduate School of Business, on May 6, 2008). These elasticities were matched to 3-digit HTS codes for the shipment data used in this cost analysis (PIERS data sample set). The 3-digit HTS codes were used for matching due to Professor Broda's caution that these estimates were more precise than estimates for finer categories (4 or more digit HTS codes).

DETAILED CALCULATIONS OF CONSUMER SURPLUS LOSSES

The loss of consumer surplus is estimated by computing the area below the demand curve and above the original equilibrium price for the reduction in quantity due to the time delay (see Exhibit B-3). Area C is the deadweight loss of consumer surplus that is the value lost because the delay in transportation will cause fewer goods and services to be traded. The amount of consumer surplus that is lost due to the increase in prices caused by the time delay (areas A and B) is a transfer of consumer surplus to producer surplus (Area A) and to increased production costs (Area B).

These areas were computed by assuming that the demand and supply are linear between the first and second equilibriums, and adding up the area of the geometric shapes representing the changes in consumer surplus. Weitzman (1988) finds that the "triangle-and-rectangle methodology can be rigorously defended as an exact appropriation to a theoretically meaningful measure as long as prices are appropriately deflated."[197] The forecasts assume constant dollars; hence Weitzman's deflation requirement is met.

The calculations are produced consistent with an inverse demand specification, as modeled in Exhibit B-3. Inverse demand and supply elasticities, from Broda and Weinstein (2006) and supplied by Broda are first used to estimate straight-line demand and supply curves that pass through the original equilibrium point, Q1, P1.[198] While it may be unlikely that demand and supply are linear throughout their range, a linear approximation in proximity to the original equilibrium is a reasonable approximation for small changes from that equilibrium. The following computations are made for each category of good within the total volume of trade goods. The total welfare measures are then obtained by summing the welfare measures for each category of imported goods.

To compute linear demand, solve for the price-intercept, P_O^D, given the equilibrium price and quantity, P_1 and Q_1. The slope for linear demand, M_D, is recovered from the elasticity:

$$M_D = \frac{(P_O - P_1)/P_1}{(Q_O - Q_1)/Q_1} \times \left(\frac{P_1}{Q_1}\right) = \frac{(P_O - P_1)}{(Q_O - Q_1)}, \quad so \quad M_D = \varepsilon_D \times \left(\frac{P_1}{Q_1}\right)$$

This is then used to solve for the price intercept:

$$P_1 = -M_D \times \left(\frac{P_1}{Q_1}\right) \times Q_1 + P_O^D = -\varepsilon_D \times P_1 + P_O^D$$

[197] Weitzman, Martin L. (1988) "Consumer's Surplus as an Exact Approximation When Prices are Appropriately Deflated," *Quarterly Journal of Economics*, vol. 103, no. 3, pp. 543-553.

[198] The inverse of applicable elasticity estimates is computed to be consistent with the inverse demand framework for the model (price as a function of quantity). ε_D and ε_S denote inverse demand and inverse supply elasticities throughout this appendix.

The next steps are to collect like terms and solve for P_O^D:

$$P_O^D = P_1 + \varepsilon_D \times P_1 = P_1 \times (1 + \varepsilon_D)$$

The price intercept for supply is calculated in the same manner:

$$P_1 = +M_S \times \left(\frac{P_1}{Q_1}\right) \times Q_1 + P_O^S = \varepsilon_S \times P_1 + P_O^S$$

The next steps are to collect like terms and solve for P_O^S,

$$P_O^S = P_1 - \varepsilon_S \times P_1 = P_1 \times (1 - \varepsilon_S)$$

It is also known that $P_2 = P_2^S + H \times P_2^S = P_2^S (1 + H)$, where H is the Hummels parameter and P_2^S is the price where the supply curve intercepts Q_2, the quantity in the new equilibrium.

The next step is to set supply and demand equal to Q_2, and then set them equal to each other and solve for P_2^S:

Demand: $P_2 = P_O^D - M_D \times Q_2 \quad \Rightarrow \quad Q_2 = \frac{P_O^D - P_2}{M_D}$, and

Supply: $P_2^S = P_O^S + M_S \times Q_2 \quad \Rightarrow \quad Q_2 = \frac{P_2^S - P_O^S}{M_S}$.

Setting them equal to each other and substituting for the slopes of demand and supply gives:

$$\frac{P_O^D - P_2}{\varepsilon_D \times \left(\frac{P_1}{Q_1}\right)} = \frac{P_2^S - P_O^S}{\varepsilon_S \times \left(\frac{P_1}{Q_1}\right)}$$

Which further reduces to:

$$\frac{P_O^D - P_2}{\varepsilon_D} = \frac{P_2^S - P_O^S}{\varepsilon_S}$$

Multiplying through and substituting in $P_2 = P_2^S(1+H)$ gives:

$$\varepsilon_S P_O^D - \varepsilon_S\left(P_2^S(1+H)\right) = \varepsilon_D P_2^S - \varepsilon_D P_O^S$$

Solve for P_2^S:

$$\varepsilon_D P_2^S + \varepsilon_S\left(P_2^S(1+H)\right) = \varepsilon_D P_O^S + \varepsilon_S P_O^D$$

$$P_2^S(\varepsilon_D + \varepsilon_S(1+H) = \varepsilon_D P_O^S + \varepsilon_S P_O^D$$

$$P_2^S = \frac{\left(\varepsilon_D P_O^S + \varepsilon_S P_O^D\right)}{(\varepsilon_D + \varepsilon_S(1+H))}$$

This allows the solution of $P_2 = P_2^S(1+H)$ and Q_2 from the demand function:

$$P_2 = -M_D \times \left(\frac{P_1}{Q_1}\right) \times Q_2 + P_O^D \Rightarrow Q_2 = \frac{P_2 - P_O^D}{\varepsilon_D\left(\frac{P_1}{Q_1}\right)}$$

Using the solutions derived above for the new equilibrium price and quantity, the changes in consumer surplus were computed for each category of good. The deadweight loss of consumer surplus is simply the triangle C in Exhibit B-3, which is $(P_2 - P_1) \times (Q_2 - Q_1) \times \frac{1}{2}$. The consumer surplus loss which is transferred to the producer through higher prices, the rectangle made up of A and B in Exhibit B-3, is $(P_2 - P_1) \times Q_2$. The sum of these parts of consumer surplus lost is the total lost consumer surplus. These quantities were calculated for each category of goods individually.

The lost consumer surplus for each category of goods was then summed to produce the total consumer surplus losses reported in Exhibit 4-11. Computation of the values of interest by category grouping avoids aggregation errors that would be produced by using the average Hummels parameter and elasticity values for total trade volumes.

LIMITATIONS AND KEY SOURCES OF UNCERTAINTY

Several assumptions were necessary to conduct this analysis. This section addresses these assumptions and other potential limitations of the study. Where possible, this section addresses how violations of the assumptions may affect the welfare estimates we calculated.[199]

There are important differences in the data between the actual cargo considered by the interim final rule and the data used to generate the Hummels' estimates.

- The transfer of the Hummels *et al.* (2007) parameters to this policy question is imperfect. The Hummels parameters were derived from information about goods that are valuable and time-sensitive enough to be transported by either air or vessel. However, many of the goods in our PIERS dataset are never shipped by air because their value relative to air freight shipping rates is too low, and/or the demand for these goods is not time sensitive enough to warrant a faster, more expensive mode of transportation. Thus, the Hummels parameters describe time preferences for a subset of higher value, more time sensitive imports than is characteristic of the universe of shipments affected by the interim final rule. These differences make it likely that the welfare measurements based on the Hummels' parameters overstate the true welfare impacts.
- Our application of the Hummels data assumes that all exporters will comply with the rule by incurring an additional day of delay, without changing their shipping mode. It is reasonable to conclude, however, that some exporters will chose to comply with the rule by switching from shipping their goods by ocean to shipping by air. Available data from the Hummels work suggests that there are a significant fraction of goods for which an air shipping option would lead to a smaller effective shift in supply costs than incurring a shipping delay. Data are not currently sufficient, however, to estimate which exporters may choose to change shipping mode as a response to the rule. As a result, we are unable to estimate the effect of this factor on the costs of the rule.
- The potential loss in consumer surplus will be offset to some degree by increases in demand for domestically produced substitute goods. When prices for imported goods rise, some consumers will switch from buying goods produced outside the United States to domestically produced substitute goods. Conversely, certain domestic producers who rely on foreign imports may reduce their production,

[199] As discussed in Chapter 2, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filings. However, because of data limitations, we cannot estimate the changes in cost attributable specifically to CBP's restraint in enforcing the rule during the initial 12 months or the flexibilities that the rule provides. We therefore estimate the incremental costs of the interim final rule assuming that importers will be fully compliant upon the *effective* date of the rule (i.e., ISF Importers or their designated agents will transmit all of their required Importer Security Filing data elements to CBP no later than 24 hours prior to lading at a foreign port), which likely overstates the welfare losses.

resulting in additional losses not captured by our approach. The net effect of these secondary effects on overall welfare losses is unknown.

- We make several aggregation assumptions necessary to generate our supply and demand curves in each relevant market. First, the 4-digit HTS categories of the Hummels' parameters are assumed to be valid for the different 8-digit HTS categories in the PIERS data. This assumption is likely to be valid, since the 4-digit HTS categories aggregate the categories beneath them. Likewise, the inverse demand and supply elasticities are calculated at the three-digit HTS level. These elasticities are assumed to be applicable to the sub-categories beneath them. To the extent that these aggregations are not valid, error may be introduced into the estimates. However, there is no *a priori* expectation of bias upward or downward for any such errors.
- The prices that are calculated from the PIERS data are average prices where the known total value of the trade category is divided by the known number of TEUs for that category. As such, these are not prices observed in the market. These prices will accurately reflect marginal prices if the producers of imports are operating at the minimum of their average cost functions (where average cost is equal to marginal cost). Otherwise, the average cost estimates may under-estimate actual marginal costs. The assumption that the calculated average price is equal to the category price is necessary in order to produce this analysis; no other price data are available. However, to the extent that marginal prices at the equilibria are consistently greater than average costs, then the estimated impacts of delay may also have a downward bias.
- The welfare impacts of time cost delays are also assumed to increase linearly with the number of days of delay. While this assumption may not be true, it is consistent with examples calculations provided in Hummels (2001) and Hummels *et al.* (2007). There is no *a priori* expectation of bias upward or downward for any such errors.

APPENDIX C | UNCERTAINTY ANALYSIS

INTRODUCTION

As described at the end of each chapter in this report, our analysis is subject to uncertainty due to data limitations and numerous assumptions made to estimate the costs and benefits of the rule.[200] The purpose of this appendix is to provide a quantitative analysis of the key sources of uncertainty identified in our analysis as required by the U.S. Office of Management and Budget's (OMB) *Circular A-4*.[201] As described in Chapter 1, *Circular A-4* provides guidance on conducting regulatory analysis, which includes specific guidance on the treatment and analysis of uncertainty when estimating the costs and benefits of regulatory alternatives.

The analysis presented in this appendix is limited to analyzing the uncertainties associated with estimating the total costs and welfare losses described in Chapter 4 of this report. The uncertainties associated with estimating the government implementation costs are not analyzed—these costs are obtained directly from Customs and Border Protection (CBP), and we therefore do not know and cannot analyze their limitations. In addition, we are unable to quantify the uncertainties associated with the types, probabilities, and consequences of terrorist attacks that this rule is intended to prevent.

In this appendix we first summarize the applicable Circular A-4 guidelines for uncertainty analysis. Next, we repeat the key sources of uncertainty identified in Chapters 3 through 5 and describe which of these factors we will address in our quantitative uncertainty analysis. We then develop appropriate ranges of values and associated distributions for the selected uncertain variables. Finally, we describe and present the results of our quantitative analysis of these sources of uncertainty, using a computer-based Monte Carlo simulation model.

OMB *CIRCULAR A-4* GUIDELINES

[200] As discussed in Chapter 2, the interim final rule provides for a 12-month "Structured Review and Flexible Enforcement Period" during which CBP will show restraint in enforcing the rule, taking into account difficulties that importers may face in complying with the rule, so long as importers are making satisfactory progress toward compliance and are making a good faith effort to comply with the rule to the extent of their current ability. In addition, the rule provides flexibility with respect to certain elements of the Importer Security Filing. However, because of data limitations, we cannot estimate the changes in cost attributable specifically to CBP's restraint in enforcing the rule during the initial 12 months or the flexibilities that the rule provides. We therefore estimate the incremental costs of the interim final rule assuming that importers will be fully compliant upon the *effective* date of the rule (i.e., ISF Importers or their designated agents will transmit all of their required Importer Security Filing data elements to CBP no later than 24 hours prior to lading at a foreign port), which likely overstates costs.

[201] U.S. Office of Management and Budget, *Circular A-4*, September 17, 2003.

OMB *Circular A-4* provides guidelines on the analysis of uncertainty when estimating the costs and benefits of regulatory alternatives. *Circular A-4* specifically requires a formal quantitative analysis of uncertainty for rules with annual economic effects exceeding $1 billion.[202] Because the costs estimated in this report result in annualized impacts exceeding this $1 billion threshold, we are undertaking a formal quantitative analysis in this appendix. In instances where formal quantitative analysis is required, *Circular A-4* suggests application of a "formal probabilistic analysis of the relevant uncertainties," possibly involving the use of simulation models (e.g., Monte Carlo simulations) to derive a probability distribution of benefits and costs. The probability distribution should include estimates of expected value (e.g., mean and median), ranges, variances, specified low-end and high-end percentile estimates, and other characteristics of the distribution. In addition, *Circular A-4* provides the following guidance with respect to analyzing uncertainty:

(1) Begin analysis of uncertainty at the earliest possible stage in developing the analysis.

(2) Focus on resolving or studying the uncertainties that have the largest potential effect on decision making.

As described at the end of each chapter in this report, we already identify the key uncertainties during each step of the analysis and address some of them by testing the sensitivity of our estimates to changes in certain variables (e.g., the high and low cost scenarios in Chapter 4). As described later in this appendix, we focus on those uncertainties that are likely to have the largest potential impact on the estimate of total costs and welfare losses.

SUMMARY OF KEY SOURCES OF UNCERTAINTY

The key sources of uncertainty in estimating the total costs and welfare losses associated with this rule are discussed below.

ESTIMATE AND CHARACTERIZATION OF THE NUMBER OF IMPORTERS, CARRIERS, SHIPMENTS, AND VESSEL TRIPS IN THE BASELINE YEAR (2005) (CHAPTER 3)

In Chapter 3, we analyze data extracted from the Vessel Automated Manifest System (Vessel AMS) and the Port Import Export Reporting Service (PIERS) databases in order to determine the baseline number and characteristics of entities (importers and carriers), shipments, and vessel trips affected by this rule. The key source of uncertainty is reporting error in the database. In addition, a number of importers have been redacted from the PIERS database. Finally, a series of simplifying assumptions are necessary to develop a useful, more complete set of numbers that would allow us to estimate total costs and welfare losses for each year of the analysis period (2009 – 2018).

- **Reporting error in original database.** The key uncertainty in our analysis is reporting error in the PIERS database and the Vessel AMS database on which it is based. This includes misspelled importer and vessel names, missing bill of lading

[202] U.S. Office of Management and Budget, *Circular A-4*, September 17, 2003, p. 41.

(BOL) numbers, missing wholesale values, and unrealistically high and low wholesale values.

- **Redacted importer names.** We do not know the number or size of the importers with names redacted by CBP in the PIERS data (labeled "ORDER" in the data sample set).
- **Simplifying assumptions.** In summarizing the PIERS and Vessel AMS data, we assume all importers with the same name are the same entity and the carrier issuing the most BOLs for shipments on a vessel is the vessel operator. In addition, we categorize shipments based on the Harmonized Tariff Schedule code and the type of vessel carrying the shipment. Finally, because our PIERS data sample set contains data for only part of the year (96 days), we use various assumptions and factors to approximate the total number of affected importers and shipments for the entire baseline year (2005).

ESTIMATE OF THE INCREMENTAL COSTS AND ECONOMIC IMPACT OF THE INTERIM FINAL RULE (CHAPTER 4)

Our estimates of the incremental costs in Chapter 4 are subject to uncertainty due to various assumptions about the estimated Importer Security Filing costs, the projected growth in importers and shipments during the 10-year analysis period, the potential for and magnitude of supply chain delays, and whether the carriers elect to transmit more than just the four required CSMs for U.S.-bound containers. In addition, we rely on CBP's preliminary estimates of government implementation costs.

- **Importer Security Filing costs.** We assume an initial cost of $25,000 per importer, based on an estimate provided in comments to the proposed rule.[203] We assume that the most infrequent importers (i.e., those that import only one shipment per year) would choose not to incur the estimated initial costs and would instead seek alternative sources for their goods or cease importing altogether.

  We assume that the recurring Importer Security Filing transaction costs are primarily dependent on transaction volume. We also assume that the estimated security filing costs, both initial and recurring, adequately account for all the costs that will be incurred by the various parties within the supply chain to modify, implement, and operate new information systems to collect, coordinate, and transmit the required security filing data elements to CBP. We also assume that the cost information provided by the supply chain parties we interviewed is representative of the entire supply chain. Finally, we do not account for CBP's adoption of a "Structured Review and Flexible Enforcement Period" during which CBP will work with the trade following the effective date of the interim

[203] This comment can be reviewed in its entirety at www.regulations.gov. Comment number USCBP-2007-0077-0046. Note that while this comment was submitted by the Chair of the Departmental Advisory Committee on the Commercial Operations of U.S. Customs and Border Protection and Related Homeland Security Functions (COAC), the author submitted it as an individual and not on behalf of COAC.

final rule to assist them in achieving compliance with minimal disruption or the flexibilities regarding certain elements of the Importer Security Filing.

- **Projected growth in importers and shipments.** We assume no year-to-year growth in the number of affected importers, given the lack of data to make such projections. We do assume that containerized and non-containerized shipments will grow at an annual rate of 5.4 percent and 1.4 percent, respectively (from the U.S. Army Corps of Engineers (USACOE) study).
- **Welfare loss from potential delays in the supply chain.** For the high cost scenario, we assume a supply chain delay of 2 or 3 days for the first year of the analysis period (2009) and 1 day for the subsequent 9 years of the analysis period (2010 – 2018). We do not account for CBP's adoption of a "Structured Review and Flexible Enforcement Period" during which CBP will work with the trade following the effective date of the interim final rule to assist them in achieving compliance with minimal disruption or the flexibilities regarding certain elements of the Importer Security Filing. The economic parameters (developed by Dr. David Hummels of Purdue University) by which we estimate welfare losses are based on a sample of traded goods that generally have the highest values amongst goods shipped in containers and are highly time sensitive relative to the universe of imports transported by vessel. We assume that potential supply chain delays primarily affect containerized cargo. Finally, to estimate the projected growth in shipment value, we assume that the value per shipment remains constant throughout the 10-year analysis period and apply the projected annual increase in the number of shipments estimate of 5.4 percent.
- **Container Status Messages.** We assume that small carriers do not already collect and maintain CSM data and, therefore, would not be required to comply with the CSM requirements. We assume that large carriers already collect and maintain CSM data and therefore would be required to comply with the CSM requirements. We estimate large carrier costs for complying with the CSM requirements using information provided by member carriers of the World Shipping Council, assuming that generally most large carriers will elect to transmit their global CSMs as the more cost-effective option.
- **Government implementation costs.** Estimates of government implementation costs were obtained from CBP; government costs may be lower or higher than those estimated in this report.

ESTIMATE OF THE BENEFITS OF THE INTERIM FINAL RULE (CHAPTER 5)

In Chapter 5, we describe the potential benefits of the rule through a break-even analysis, comparing the costs of avoided terrorist attacks to the cost of implementing the rule. Due to the low frequency with which terrorist attacks occur in U.S. territory, significant uncertainty exists regarding the selection of consequence scenarios and the economic valuation of these consequences, the simultaneous threat of multiple types of attacks, the analysis' focus on the interim final rule's ability to reduce the probability of attacks rather

than the consequences of those attacks, the baseline probability that such an attack might occur, and the unquantified ancillary benefits of the interim final rule.

- **Consequence scenarios.** We select the consequence scenarios applied in the break-even analysis based on available literature describing container-related terrorist threats and economic evaluations of the impact of related events. These scenarios may not capture the full range of attack modes or targets affected by the regulation.
- **Valuation of consequences.** We rely on the cost estimates provided in the available literature for our consequence scenarios. Adjustments to the available cost estimates could result in increases or decreases in the incremental probabilities estimated in our break-even analysis.
- **Simultaneous threat of multiple attacks.** The break-even analysis compares the consequences of a single attack to the annualized costs of the interim final rule, which only identifies the break-even probability reduction in the risk of one type of attack. In reality, the rule likely affects the risk of multiple types of attacks simultaneously.
- **Focus on probability rather than consequences.** As discussed in Chapter 5, this regulation has the potential to affect both the probability that particular types of attacks will be attempted and successful, as well as the consequences of attacks. For example, if the rule prevents nuclear material from entering the United States via ocean shipments, terrorists may be forced to use weapons with less destructive power. The effect of this focus on probability to the exclusion of changes in consequences is unknown.
- **Baseline probability unknown.** This approach does not provide the decision maker with any information about the baseline probability that these types of attacks will occur. As a result, the decision maker is expected to use his or her judgment to determine whether the break-even risk reductions are feasible.
- **Unquantified ancillary benefits.** Our interviews with potentially affected entities and supply chain experts suggest that the supply chain clarity provided by implementation of the interim final rule will likely have ancillary benefits to importers, particularly those who currently have little insight into the process. For example, importers will be able to more effectively allocate security resources by identifying points along the supply chain where their cargo is most susceptible to theft. The data may also assist in tracing contraband cargo, such as counterfeit versions of well-known designer goods, manufactured overseas and sold illegally in the United States. At this time, we are unable to quantify or monetize ancillary benefits associated with the interim final rule.

POTENTIAL IMPACT OF KEY SOURCES OF UNCERTAINTY

As recommended in *Circular A-4*, we focus our analysis on those sources of uncertainty that are likely to have the largest potential impact on the total cost and welfare loss estimate. During earlier stages of our regulatory analysis, we developed two scenarios to

examine how our initial results varied with plausible changes in assumptions, choices of input data, and alternative analytical approaches. Specifically, we developed low and high cost scenarios to analyze the impacts of various estimates of the initial, one-time and recurring costs for submitting the required data elements as well as the potential for supply chain delay as a result of the new requirements. As shown in Exhibit 4-21, the total present value costs (calculated with a 3 percent discount rate) of the rule (Alternative 1, the chosen alternative) over a 10-year period range from $7.6 billion to $56 billion, depending on these assumptions. The major assumption driving the difference in values between the two scenarios is whether or not we assume there will be significant delays in the supply chain as a result of the new security filing requirements.

The comparative results of the two cost scenarios therefore suggest that the uncertainties associated with the following variables have the most significant impact on the total cost and welfare loss estimate, and are therefore retained for further quantitative analysis:

- Initial, one-time unit costs for Importer Security Filings;
- The number or percentage of containers experiencing delay; and
- The length of potential delay in the supply chain.

RANGES OF VALUES AND PROBABILITY DISTRIBUTIONS ANALYSIS

For each of the variables listed above, we develop a range of values and associated probability distribution for our uncertainty analysis model. We rely on information gathered in our interviews with the trade, public comments on the proposed rule, and professional judgment to develop bounds and limits that reasonably capture and characterize the expected full range of values.

To develop the associated probability distributions, we rely on basic statistical principles and guidance available on-line for the uncertainty simulation model. We assume uniform or discrete uniform distributions for variables where we could develop a reasonable range of values and determine that all possible values are equally likely to occur. We assume triangular distributions for variables where we could develop a reasonable range of values with a most-likely value. We did not have enough data to justify using other distributions such as normal or lognormal distributions.

Exhibit C-1 summarizes the range of values and associated probability distributions developed for each of the uncertain variables.

EXHIBIT C-1 RANGES OF VALUES AND PROBABILITY DISTRIBUTIONS USED IN UNCERTAINTY ANALYSIS

VARIABLE	VALUES USED IN CHAPTER 4	RANGE OF VALUES	PROBABILITY DISTRIBUTION	RATIONALE
Initial, one-time costs per importer	$0 per importer that imports one shipment per year $25,000 per importer that imports more than one shipment per year	$0 per importer that imports one shipment per year $25,000 to $100,000 per importer that imports more than one shipment per year	Triangular, with most-likely value of $25,000	Available data do not allow for development of the extent to which the most infrequent importers (i.e., those that import only one shipment per year) would choose to incur these initial costs and continue importing; seek alternative sources for their goods or cease importing; and the amount of their applicable initial or cessation costs. The range of initial, one-time costs used for the more frequent importers are based on estimates provided to COAC by two software providers to modify existing information systems ($50,000) or acquire new information systems ($100,000) to manage the data needed to supply the security filing data elements prior to 24 hours before lading. COAC used 50 percent of the lower estimate of $50,000 ($25,000) as a conservative and realistic estimate, in consideration of companies that are already more than ready to provide the required data in advance.
Percent of consolidated container shipments experiencing delay	100% of consolidated container shipments are delayed in each year	50% to 100% of consolidated container shipments are delayed in the first year; 25% to 75% delayed thereafter.	Uniform	It is likely that not all consolidated container shipments would be delayed as a result of this rule. However, available data do not allow for development of a more precise range of values.
Percent of full container shipments experiencing delay	100% of unconsolidated (full) container shipments are delayed in each year	25% to 100% of full container shipments are delayed in the first year; 0% to 50% delayed thereafter.	Uniform	It is likely that not all full container shipments would be delayed as a result of this rule. However, available data do not allow for development of a more precise range of values.

EXHIBIT C-1 RANGES OF VALUES AND PROBABILITY DISTRIBUTIONS USED IN UNCERTAINTY ANALYSIS (CONTINUED)

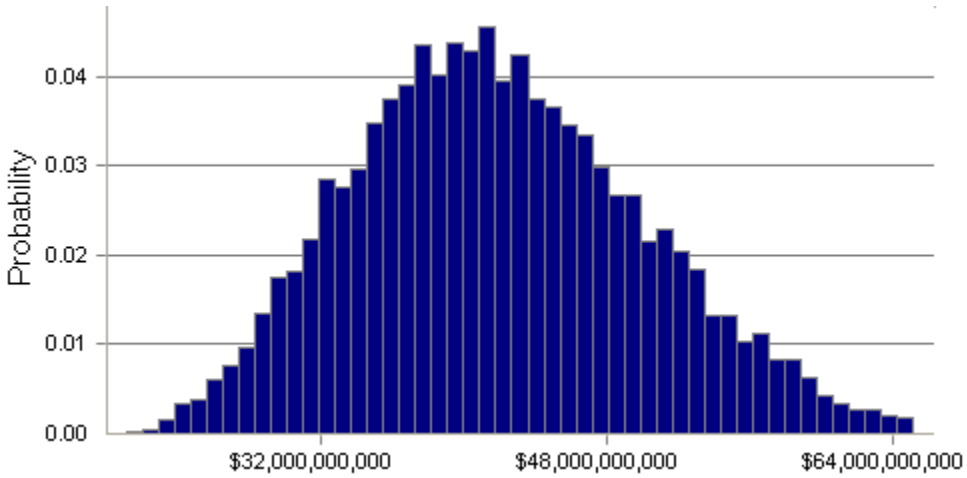
VARIABLE	VALUES USED IN CHAPTER 4	RANGE OF VALUES	PROBABILITY DISTRIBUTION	RATIONALE
Average length of delay for consolidated container shipments experiencing delay	Consolidated container shipments are delayed on average 3 days in the first year and 1 day in subsequent years.	Consolidated container shipments experience delays of 1 to 7 days in the first year and 12 hours to 2 days thereafter.	Uniform	This range of values is based on information gathered in our interviews with the trade and public comments to the proposed rule.
Average length of delay for full container shipments experiencing delay	Full container shipments are delayed on average 2 days in the first year and 1 day in subsequent years.	Full container shipments experience delays of 1 to 7 days in the first year and 12 hours to 1 day thereafter.	Uniform	This range of values is based on information gathered in our interviews with the trade and public comments to the proposed rule.

RESULTS AND DISCUSSION

The ranges of values and associated probability distributions developed for each of the uncertain variables, as listed in Exhibit C-1, are used as inputs for a computer-based Monte Carlo simulation model. We used a software program called Crystal Ball®, which is a graphically-oriented forecasting and risk analysis program that attaches to Microsoft Excel®.[204] This program runs Monte Carlo trials that consider all possible values within these designated ranges, with the assumed probability distribution influencing the value selected in each trial. For this uncertainty analysis, a total of 10,000 trials are run—each trial is independent and does not affect the outcome of other trials.

As shown in Exhibit C-2, the outcomes for all 10,000 trials result in a probability distribution of the total costs and welfare losses estimated for the high cost scenario under Alternative 1 (the chosen alternative).[205] Additionally, key characteristics of this resulting probability distribution are provided in Exhibit C-3, including estimates of the mean and median, ranges, variances, and 5th and 95th percentile estimates.

EXHIBIT C-2 PROBABILITY DISTRIBUTION OF PRESENT VALUE COSTS, ALTERNATIVE 1 (CHOSEN ALTERNATIVE), HIGH COST SCENARIO, 2009 - 2018, 3 PERCENT DISCOUNT RATE



Source: Crystal Ball® and IEC analysis.

[204] Crystal Ball® Version 7.2.2, Decisioneering, Inc., Denver, Colorado.

[205] We choose to conduct our uncertainty analysis on the high cost scenario because this scenario assumes delays in the supply chain and the variables affecting the associated delay costs can be tested. We treat the low and high cost scenarios developed in our analysis as two separate and distinct scenarios and make no attempt to analyze their uncertainties collectively in the same model (e.g., assign probabilities to the likelihood of each scenario occurring).

EXHIBIT C-3 SUMMARY OF KEY CHARACTERISTICS OF PROBABILITY DISTRIBUTION OF PRESENT VALUE COSTS, ALTERNATIVE 1 (CHOSEN ALTERNATIVE), HIGH COST SCENARIO, 2009 - 2018 (BILLION $, 2008), 3 PERCENT DISCOUNT RATE

STATISTIC	VALUE
ESTIMATE OF COST AND WELFARE LOSSES, 3% DISCOUNT RATE (BILLION DOLLARS)	
Trials	10000
Mean	$42.0
Median	$41.5
Standard Deviation	$8.2
Variance	$6.8x10^{19}
Minimum	$21.2
Maximum	$73.4
5th Percentile	$29.5
95th Percentile	$56.5
Estimated Cost from Chapter 4 (Exhibit 4-21)	$56.0

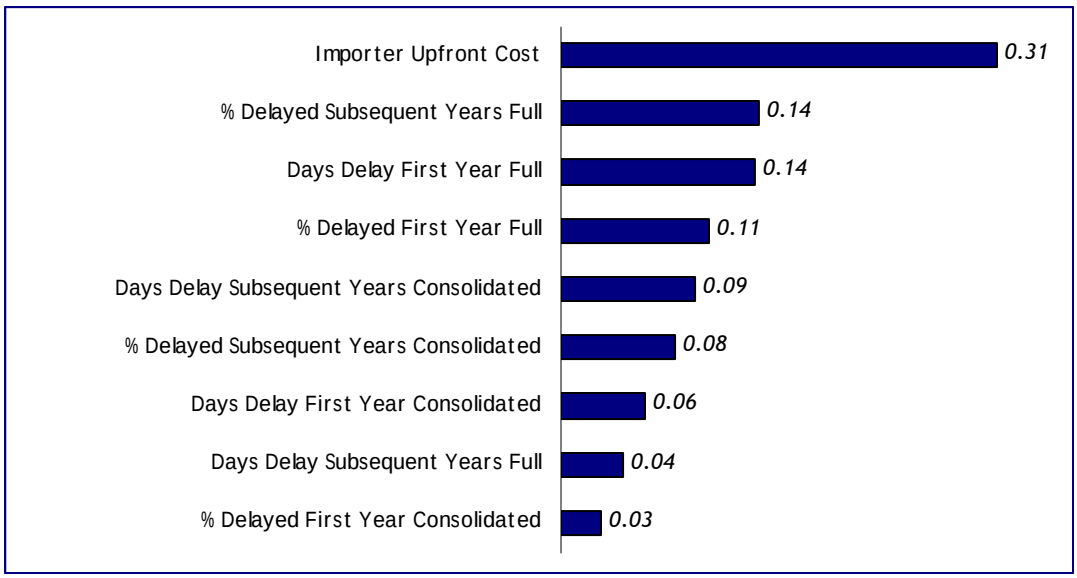
Note: Estimated losses from Chapter 4 represent the high cost scenario for Alternative 1 (chosen alternative).
Source: Crystal Ball® and IEC analysis.

As shown in Exhibits C-2 and C-3, the expected value (mean) of the cost distribution is $42.0 billion at a discount rate of 3 percent. In Chapter 4, we estimate total costs and welfare losses of $56 billion for the high cost scenario under Alternative 1 (chosen alternative), at a discount rate of 3 percent. The expected value is, therefore, lower than the total cost estimated in Chapter 4 after incorporating the full ranges of values for key variables in the uncertainty analysis. These results may reflect the use of ranges and distributions developed for each of the uncertain variables that are generally biased lower than the values used in the Chapter 4 analysis.

Nevertheless, the probabilistic analysis does provide a range of possible outcomes for total costs. The estimated total cost ranges from $21.2 billion to $73.4 billion. This range indicates that the total costs could be as much as 62 percent lower or 31 percent higher than estimated in the Chapter 4 analysis. The higher end of the range reflects worst-case estimates, which assume the outer bounds of the ranges of values that would result in the highest cost (e.g., highest initial, one-time cost to importers, highest percentage of containers experiencing delay, and longest possible average delay). However, as shown in Exhibit C-2, the likelihood of such a worst-case scenario is relatively low. In addition, as shown in Exhibit C-3, the 95th percentile cost ($56.5 billion) is approximately 23 percent lower than the maximum. The 95th percentile cost represents the value at which 95 percent of the cost outcomes are expected to be lower. Finally, as shown in Exhibit C-2, the cost outcome is more likely to be close to the expected (mean) value than far away.

To assess which variables significantly influence the results, the simulation model provides sensitivity charts. Exhibit C-4 shows the sensitivity chart which ranks the uncertain variables list in Exhibit C-1 according to their importance to the overall results.

EXHIBIT C-4 SENSITIVITY CHART



Source: Crystal Ball® and IEC analysis.

As shown in Exhibit C-4, the uncertainty associated with the initial, one-time cost for importers affects the results the most. Once any delay in the supply chain is assumed, the various assumptions we made regarding the number and type of containers delayed and the length of that delay individually impart a small but significant influence on the results of our analysis.[206]

In the case where any delay in the supply chain is assumed (e.g., our high cost scenario analyzed in this uncertainty analysis), the initial, one-time cost for importers, therefore, holds substantial influence in the final results. As a result, further analysis and resolution of this variable alone would result in significantly more precise and certain results. However, the available data do not allow for development of a more precise value for this variable.

Circular A-4 also suggests paying attention to correlated inputs when conducting Monte Carlo analysis.[207] If the assumed probability distributions of the various uncertain variables are correlated, the resulting distribution of the result (i.e., the total costs) can be overstated. Upon further review of the potential interdependencies among the variables, we do not find any significant correlations, as the variables (and the estimation of their values) are largely independent of each other.

[206] As evidenced by the substantial difference in the cost results between the low and high cost scenarios presented in Chapter 4, assuming any delay in the supply chain has a pronounced impact on the total costs estimated for this rule.

[207] U.S. Office of Management and Budget, *Circular A-4, Regulatory Analysis*, September 17, 2003, pp. 41-42.

In summary, the expected value (mean) of the loss distribution calculated from this uncertainty analysis is lower than the total high scenario cost estimated in Chapter 4 for Alternative 1, the chosen alternative ($56 billion). However, total costs can be as much as 62 percent lower or 31 percent higher than estimated in the Chapter 4 analysis. The likelihood of reaching the higher end of the range is low, and 95 percent of the cost outcomes are expected to be lower than the 95th percentile cost of $56.5 billion. The sensitivity analysis indicates that the uncertainty associated with estimating the initial, one-time cost for importers affects the results the most once any delay in the supply chain is assumed. As a result, further work to refine the loss estimate should focus on the development of a more precise value for this variable.

APPENDIX D | DETAILED CHAPTER 4 TABLES

EXHIBIT D-1: ESTIMATE OF SECURITY FILING COSTS, IMPORTER DATA ELEMENTS

EXHIBIT D-1A: ESTIMATE OF INITIAL, ONE-TIME COSTS FOR 2005 BASELINE YEAR (UNDISCOUNTED DOLLARS)

IMPORTER FREQUENCY	NO. OF IMPORTERS (LOW)	NO. OF IMPORTERS (HIGH)	LOW UNIT COST	LOW COST SCENARIO TOTAL	HIGH UNIT COST	HIGH COST SCENARIO TOTAL
A. IMPORTERS IMPORTING CARGO OTHER THAN EXCLUSIVELY BULK CARGO						
Once per year	0	393,443	$ -	$ -	$ -	$ -
Twice yearly to less than monthly	141,393	267,245	25,000	3,534,825,000	25,000	6,681,125,000
Monthly to less than weekly	35,387	68,164	25,000	884,675,000	25,000	1,704,100,000
Weekly to less than daily	17,727	18,771	25,000	443,175,000	25,000	469,275,000
Daily or greater	2,548	1,597	25,000	63,700,000	25,000	39,925,000
Anonymous	NA	NA	25,000	NA	25,000	NA
Total	**197,055**	**749,220**		**$4,926,375,000**		**$8,894,425,000**
B. IMPORTERS IMPORTING EXCLUSIVELY BULK CARGO						
Once per year	0	1,654	$ -	$ -	$ -	$ -
Twice yearly to less than monthly	659	1,430	25,000	16,475,000	25,000	35,750,000
Monthly to less than weekly	176	274	25,000	4,400,000	25,000	6,850,000
Weekly to less than daily	48	11	25,000	1,200,000	25,000	275,000
Daily or greater	3	0	25,000	75,000	25,000	-
Anonymous	NA	NA	25,000	NA	25,000	NA
Total	**886**	**3,369**		**$22,150,000**		**$42,875,000**

EXHIBIT D-1B: ESTIMATEOF SECURITY FILING INITIAL, ONE-TIME COSTS FOR 2009-2018, ALTERNATIVES 1 & 3, BULK CARGO EXEMPT (UNDISCOUNTED DOLLARS)

YEAR	NO. OF IMPORTERS (LOW)	NO. OF IMPORTERS (HIGH)	LOW COST SCENARIO	HIGH COST SCENARIO
2005	197,055	355,777	$ -	$ -
2006	197,055	355,777	-	-
2007	197,055	355,777	-	-
2008	197,055	355,777	-	-
2009	197,055	355,777	1,642,125,000	2,964,808,333
2010	197,055	355,777	1,642,125,000	2,964,808,333
2011	197,055	355,777	1,642,125,000	2,964,808,333
2012	197,055	355,777	-	-
2013	197,055	355,777	-	-
2014	197,055	355,777	-	-
2015	197,055	355,777	-	-
2016	197,055	355,777	-	-
2017	197,055	355,777	-	-
2018	197,055	355,777	-	-
Total (2009-2018)			**$4,926,375,000**	**$8,894,425,000**

Note: Assumes number of importers does not grow and initial, one-time costs are amortized over a period of 3 years. Assumes that those entities importing only one shipment per year do not incur initial, one-time costs and are therefore not included in the total number of importers.

EXHIBIT D-1C: ESTIMATE OF SECURITY FILING INITIAL, ONE-TIME COSTS FOR 2009-2018, ALTERNATIVE 2, BULK CARGO NOT EXEMPT (UNDISCOUNTED DOLLARS)

YEAR	NO. OF IMPORTERS (LOW)	NO. OF IMPORTERS (HIGH)	LOW COST SCENARIO	HIGH COST SCENARIO
2005	197,941	357,492	$ -	$ -
2006	197,941	357,492	-	-
2007	197,941	357,492	-	-
2008	197,941	357,492	-	-
2009	197,941	357,492	1,649,508,333	2,979,100,000
2010	197,941	357,492	1,649,508,333	2,979,100,000
2011	197,941	357,492	1,649,508,333	2,979,100,000
2012	197,941	357,492	-	-
2013	197,941	357,492	-	-
2014	197,941	357,492	-	-
2015	197,941	357,492	-	-
2016	197,941	357,492	-	-
2017	197,941	357,492	-	-
2018	197,941	357,492	-	-
Total (2009-2018)			**$4,948,525,000**	**$8,937,300,000**

Note: Assumes number of importers does not grow and initial, one-time costs are amortized over a period of 3 years. Assumes that those entities importing only one shipment per year do not incur initial, one-time costs and are therefore not included in the total number of importers.

EXHIBIT D-1D: ESTIMATE OF SECURITY FILING TRANSACTION COSTS FOR 2005 BASELINE YEAR, BY CARGO TYPE (UNDISCOUNTED DOLLARS)

IMPORTER FREQUENCY	2005 TOTAL BOLS (LOW)	2005 TOTAL BOLS (HIGH)	LOW UNIT COST	LOW COST SCENARIO TOTAL	HIGH COST FACTOR	HIGH UNIT COST	HIGH COST SCENARIO TOTAL
A. CONTAINERIZED							
Once per year	0	455,699	$50.00	$ -	1.5	$75.00	$34,177,425
Twice yearly to less than monthly	697,488	1,383,609	40.00	27,899,520	1.5	60.00	83,016,540
Monthly to less than weekly	1,225,039	1,643,561	30.00	36,751,170	1.5	45.00	73,960,245
Weekly to less than daily	2,185,749	1,808,278	20.00	43,714,980	1.5	30.00	54,248,340
Daily or greater	2,362,444	1,179,573	10.00	23,624,440	1.5	15.00	17,693,595
Anonymous	1,300,818	1,300,818	15.00	19,512,270	1.5	22.50	29,268,405
Total	**7,771,538**	**7,771,538**		**$151,502,380**			**$292,364,550**
B. BULK							
Once per year	0	2,791	$50.00	$ -	1.5	$75.00	$209,325
Twice yearly to less than monthly	4,859	12,593	40.00	194,360	1.5	60.00	755,580
Monthly to less than weekly	11,939	20,026	30.00	358,170	1.5	45.00	901,170
Weekly to less than daily	25,504	29,379	20.00	510,080	1.5	30.00	881,370
Daily or greater	35,549	13,064	10.00	355,490	1.5	15.00	195,960
Anonymous	11,152	11,152	15.00	167,280	1.5	22.50	250,920
Total	**89,003**	**89,005**		**$1,585,380**			**$3,194,325**

IMPORTER FREQUENCY	2005 TOTAL BOLS (LOW)	2005 TOTAL BOLS (HIGH)	LOW UNIT COST	LOW COST SCENARIO TOTAL	HIGH COST FACTOR	HIGH UNIT COST	HIGH COST SCENARIO TOTAL
C. BREAK-BULK							
Once per year	0	7,870	$50.00	$ -	1.5	$75.00	$590,250
Twice yearly to less than monthly	11,376	18,155	40.00	455,040	1.5	60.00	1,089,300
Monthly to less than weekly	15,699	25,409	30.00	470,970	1.5	45.00	1,143,405
Weekly to less than daily	42,412	56,142	20.00	848,240	1.5	30.00	1,684,260
Daily or greater	59,974	21,885	10.00	599,740	1.5	15.00	328,275
Anonymous	9,627	9,627	15.00	144,405	1.5	22.50	216,608
Total	**139,088**	**139,088**		**$2,518,395**			**$5,052,098**
D. RO-RO							
Once per year	0	25,196	$50.00	$ -	1.5	$75.00	$1,889,700
Twice yearly to less than monthly	28,672	12,908	40.00	1,146,880	1.5	60.00	774,480
Monthly to less than weekly	10,437	12,779	30.00	313,110	1.5	45.00	575,055
Weekly to less than daily	17,273	18,216	20.00	345,460	1.5	30.00	546,480
Daily or greater	33,842	21,124	10.00	338,420	1.5	15.00	316,860
Anonymous	9,494	9,494	15.00	142,410	1.5	22.50	213,615
Total	**99,718**	**99,717**		**$2,286,280**			**$4,316,190**
D. FROB							
Containerized FROB	1,149,685	1,149,685	$40.00	$45,987,400	1.5	$60.00	$68,981,100
Non-Containerized FROB	15,438	15,438	40.00	617,520	1.5	60.00	926,280
Total	**1,165,123**	**1,165,123**		**$46,604,920**			**$69,907,380**

EXHIBIT D-1E: ESTIMATE OF SECURITY FILING TRANSACTION COSTS FOR 2009 - 2018, ALTERNATIVES 1 AND 3, BULK CARGO EXEMPT (UNDISCOUNTED DOLLARS)

YEAR	NO. OF SHIPMENTS	LOW COST SCENARIO	HIGH COST SCENARIO
CONTAINERIZED CARGO (CONTAINERIZED CARGO AND CONTAINERIZED FROB)			
2005	8,921,223	$197,489,780	$361,345,650
2006	9,402,969	208,154,228	380,858,315
2007	9,910,729	219,394,556	401,424,664
2008	10,445,909	231,241,862	423,101,596
2009	11,009,988	243,728,923	445,949,082
2010	11,604,527	256,890,285	470,030,333
2011	12,231,172	270,762,360	495,411,971
2012	12,891,655	285,383,528	522,164,217
2013	13,587,804	300,794,238	550,361,085
2014	14,321,546	317,037,127	580,080,583
2015	15,094,909	334,157,132	611,404,935
2016	15,910,034	352,201,617	644,420,801
2017	16,769,176	371,220,504	679,219,524
2018	17,674,712	391,266,412	715,897,379
Total (2009-2018)	**141,095,523**	**$3,123,442,127**	**$5,714,939,910**
NON-CONTAINERIZED CARGO (BULK, BREAK-BULK, RO-RO, AND NON-CONTAINERIZED FROB)			
2005	254,243	$5,422,195	$10,294,568
2006	257,802	5,498,106	10,438,691
2007	261,412	5,575,079	10,584,833
2008	265,071	5,653,130	10,733,021
2009	268,782	5,732,274	10,883,283
2010	272,545	5,812,526	11,035,649
2011	276,361	5,893,901	11,190,148
2012	280,230	5,976,416	11,346,810
2013	284,153	6,060,086	11,505,666
2014	288,131	6,144,927	11,666,745
2015	292,165	6,230,956	11,830,079
2016	296,256	6,318,189	11,995,700
2017	300,403	6,406,644	12,163,640
2018	304,609	6,496,337	12,333,931
Total (2009-2018)	**2,863,636**	**$61,072,257**	**$115,951,652**

YEAR	NO. OF SHIPMENTS	LOW COST SCENARIO	HIGH COST SCENARIO
ALL CARGO (CONTAINERIZED AND NON-CONTAINERIZED CARGO)			
2005	9,175,466	$202,911,975	$371,640,218
2006	9,660,771	213,652,334	391,297,007
2007	10,172,141	224,969,636	412,009,497
2008	10,710,980	236,894,993	433,834,617
2009	11,278,770	249,461,197	456,832,365
2010	11,877,073	262,702,811	481,065,982
2011	12,507,533	276,656,262	506,602,119
2012	13,171,885	291,359,944	533,511,027
2013	13,871,958	306,854,324	561,866,750
2014	14,609,677	323,182,054	591,747,328
2015	15,387,074	340,388,088	623,235,014
2016	16,206,290	358,519,806	656,416,502
2017	17,069,579	377,627,148	691,383,165
2018	17,979,320	397,762,749	728,231,310
Total (2009-2018)	**143,959,159**	**$3,184,514,383**	**$5,830,891,561**

Notes: Assumes container shipments and non-containerized shipments increase at a rate of 5.4 percent per year and 1.4 percent per year, respectively. Estimates also assume that shipment growth is distributed among importers according to 2005 baseline condition.

EXHIBIT D-1F: ESTIMATE OF SECURITY FILING TRANSACTION COSTS FOR 2008 - 2017, ALTERNATIVE 2, BULK CARGO NOT EXEMPT (UNDISCOUNTED DOLLARS)

YEAR	NO. OF SHIPMENTS	LOW COST SCENARIO	HIGH COST SCENARIO
CONTAINERIZED CARGO (CONTAINERIZED CARGO AND CONTAINERIZED FROB)			
2005	8,921,223	$197,489,780	$361,345,650
2006	9,402,969	208,154,228	380,858,315
2007	9,910,729	219,394,556	401,424,664
2008	10,445,909	231,241,862	423,101,596
2009	11,009,988	243,728,923	445,949,082
2010	11,604,527	256,890,285	470,030,333
2011	12,231,172	270,762,360	495,411,971
2012	12,891,655	285,383,528	522,164,217
2013	13,587,804	300,794,238	550,361,085
2014	14,321,546	317,037,127	580,080,583
2015	15,094,909	334,157,132	611,404,935
2016	15,910,034	352,201,617	644,420,801
2017	16,769,176	371,220,504	679,219,524
2018	17,674,712	391,266,412	715,897,379
Total (2009-2018)	**141,095,523**	**$3,123,442,127**	**$5,714,939,910**
NON-CONTAINERIZED CARGO (BREAK-BULK, RO-RO, AND NON-CONTAINERIZED FROB)			
2005	343,248	$7,007,575	$13,488,893
2006	348,053	7,105,681	13,677,737
2007	352,926	7,205,161	13,869,225
2008	357,867	7,306,033	14,063,394
2009	362,877	7,408,317	14,260,282
2010	367,958	7,512,034	14,459,926
2011	373,109	7,617,202	14,662,365
2012	378,333	7,723,843	14,867,638
2013	383,629	7,831,977	15,075,785
2014	389,000	7,941,625	15,286,846
2015	394,446	8,052,807	15,500,862
2016	399,968	8,165,547	15,717,874
2017	405,568	8,279,864	15,937,924
2018	411,246	8,395,782	16,161,055
Total (2009-2018)	**3,866,134**	**$78,928,998**	**$151,930,556**

YEAR	NO. OF SHIPMENTS	LOW COST SCENARIO	HIGH COST SCENARIO
ALL CARGO (CONTAINERIZED AND NON-CONTAINERIZED CARGO)			
2005	9,264,471	$204,497,355	$374,834,543
2006	9,751,023	215,259,909	394,536,052
2007	10,263,656	226,599,717	415,293,889
2008	10,803,776	238,547,895	437,164,990
2009	11,372,865	251,137,240	460,209,364
2010	11,972,485	264,402,319	484,490,259
2011	12,604,281	278,379,562	510,074,335
2012	13,269,987	293,107,371	537,031,855
2013	13,971,433	308,626,215	565,436,870
2014	14,710,546	324,978,752	595,367,429
2015	15,489,355	342,209,939	626,905,797
2016	16,310,003	360,367,164	660,138,675
2017	17,174,744	379,500,369	695,157,449
2018	18,085,957	399,662,194	732,058,434
Total (2009-2018)	**144,961,656**	**$3,202,371,124**	**$5,866,870,466**

Notes: Assumes container shipments and non-containerized shipments increase at a rate of 5.4 percent per year and 1.4 percent per year, respectively. Estimates also assume that shipment growth is distributed among importers according to 2005 baseline condition.

EXHIBIT D-2 CALCULATION OF SUPPLY CHAIN WELFARE LOSS FOR 2009-2018, ALTERNATIVES 1, 2, AND 3 (UNDISCOUNTED COSTS)

YEAR	ESTIMATED WELFARE LOSS, PER DAY OF DELAY	DAYS OF DELAY	PERCENTAGE OF CONTAINERS DELAYED	TOTAL WELFARE LOSS, PER YEAR
CONSOLIDATED CONTAINERS				
2008	$859,428,037	0.0	0%	$ -
2009	905,837,151	3.0	100%	2,717,511,453
2010	954,752,357	1.0	100%	954,752,357
2011	1,006,308,984	1.0	100%	1,006,308,984
2012	1,060,649,670	1.0	100%	1,060,649,670
2013	1,117,924,752	1.0	100%	1,117,924,752
2014	1,178,292,688	1.0	100%	1,178,292,688
2015	1,241,920,494	1.0	100%	1,241,920,494
2016	1,308,984,200	1.0	100%	1,308,984,200
2017	1,379,669,347	1.0	100%	1,379,669,347
2018	1,454,171,492	1.0	100%	1,454,171,492
Total (2009-2018)				**$13,420,185,437**
FULL CONTAINERS				
2008	$2,398,013,290	0.0	0%	$ -
2009	2,527,506,008	2.0	100%	5,055,012,015
2010	2,663,991,332	1.0	100%	2,663,991,332
2011	2,807,846,864	1.0	100%	2,807,846,864
2012	2,959,470,595	1.0	100%	2,959,470,595
2013	3,119,282,007	1.0	100%	3,119,282,007
2014	3,287,723,235	1.0	100%	3,287,723,235
2015	3,465,260,290	1.0	100%	3,465,260,290
2016	3,652,384,345	1.0	100%	3,652,384,345
2017	3,849,613,100	1.0	100%	3,849,613,100
2018	4,057,492,208	1.0	100%	4,057,492,208
Total (2009-2018)				**$34,918,075,991**

YEAR	TOTAL WELFARE LOSSES	
	LOW COST SCENARIO	HIGH COST SCENARIO
2008	$ -	$ -
2009	-	7,772,523,468
2010	-	3,618,743,689
2011	-	3,814,155,848
2012	-	4,020,120,264
2013	-	4,237,206,759
2014	-	4,466,015,923
2015	-	4,707,180,783
2016	-	4,961,368,546
2017	-	5,229,282,447
2018	-	5,511,663,699
Total (2009-2018)	**$ -**	**$48,338,261,428**

Note: Assumes the estimated welfare losses increase at the projected shipment growth rate of 5.4 percent per year.

EXHIBIT D-3 ESTIMATE OF COSTS FOR ADDITIONAL CARRIER REQUIREMENTS (SMALL CARRIERS)
VESSEL STOW PLAN (SMALL CONTAINER CARRIERS AND CONTAINER VESSEL TRIPS), UNDISCOUNTED DOLLARS

YEAR	NO. OF SMALL NON-BULK CARRIERS	LOW INITIAL COST (PER CARRIER)	HIGH INITIAL COST (PER CARRIER)	LOW INITIAL TOTAL COST	HIGH INITIAL TOTAL COST	NO. OF SMALL NON-BULK VESSEL TRIPS (1)	LOW RECURRING COST (PER VESSEL TRIP)	HIGH RECURRING COST (PER VESSEL TRIP)	LOW RECURRING TOTAL COST	HIGH RECURRING TOTAL COST	LOW COST SCENARIO VESSEL STOW PLAN TOTAL	HIGH COST SCENARIO VESSEL STOW PLAN TOTAL
2005						4,603						
2006						4,757						
2007						4,917						
2008						5,081						
2009	0	$ -	$ -	$ -	$ -	5,251	$50	$50	$262,575	$262,575	$262,575	$262,575
2010	0	-	-	-	-	5,427	50	50	271,371	271,371	271,371	271,371
2011	0	-	-	-	-	5,609	50	50	280,462	280,462	280,462	280,462
2012	0	-	-	-	-	5,797	50	50	289,857	289,857	289,857	289,857
2013	0	-	-	-	-	5,991	50	50	299,568	299,568	299,568	299,568
2014	0	-	-	-	-	6,192	50	50	309,603	309,603	309,603	309,603
2015	0	-	-	-	-	6,399	50	50	319,975	319,975	319,975	319,975
2016	0	-	-	-	-	6,614	50	50	330,694	330,694	330,694	330,694
2017	0	-	-	-	-	6,835	50	50	341,772	341,772	341,772	341,772
2018	0	-	-	-	-	7,064	50	50	353,222	353,222	353,222	353,222
Total (2009 - 2018)				**$ -**	**$ -**	**61,182**			**$3,059,098**	**$3,059,098**	**$3,059,098**	**$3,059,098**

Notes: (1) Assumes the number of vessel trips to the United States increases at a rate of 3.35 percent per year.

EXHIBIT D-4 ESTIMATE OF COSTS FOR ADDITIONAL CARRIER REQUIREMENTS (LARGE CARRIERS)
VESSEL STOW PLAN (LARGE CONTAINER CARRIERS AND CONTAINER VESSEL TRIPS), UNDISCOUNTED DOLLARS

YEAR	NO. OF LARGE NON-BULK CARRIERS (1)	LOW INITIAL COST (PER CARRIER)	HIGH INITIAL COST (PER CARRIER)	LOW INITIAL TOTAL COST (2)	HIGH INITIAL TOTAL COST (2)	NO. OF LARGE NON-BULK VESSEL TRIPS (3)	LOW RECURRING COST (PER VESSEL TRIP)	HIGH RECURRING COST (PER VESSEL TRIP)	LOW RECURRING TOTAL COST	HIGH RECURRING TOTAL COST	LOW COST SCENARIO VESSEL STOW PLAN TOTAL	HIGH COST SCENARIO VESSEL STOW PLAN TOTAL
2005	74					17,488						
2006	74					18,074						
2007	74					18,679						
2008	74					19,305						
2009	74	$ -	$50,000	$ -	$1,233,333	19,952	$ -	$100	$ -	$1,995,180	$ -	$3,228,513
2010	74	-	50,000	-	1,233,333	20,620	-	100	-	2,062,018	-	3,295,352
2011	74	-	50,000	-	1,233,333	21,311	-	100	-	2,131,096	-	3,364,429
2012	74	-	-	-	-	22,025	-	100	-	2,202,488	-	2,202,488
2013	74	-	-	-	-	22,763	-	100	-	2,276,271	-	2,276,271
2014	74	-	-	-	-	23,525	-	100	-	2,352,526	-	2,352,526
2015	74	-	-	-	-	24,313	-	100	-	2,431,336	-	2,431,336
2016	74	-	-	-	-	25,128	-	100	-	2,512,786	-	2,512,786
2017	74	-	-	-	-	25,970	-	100	-	2,596,964	-	2,596,964
2018	74	-	-	-	-	26,840	-	100	-	2,683,962	-	2,683,962
Total (2009-2018)				**$ -**	**$3,700,000**	**232,446**			**$ -**	**$23,244,627**	**$ -**	**$26,944,627**

Notes: (1) Assumes the number of carriers does not increase over time.
(2) Assumes initial costs are amortized over 3 years.
(3) Assumes the number of vessel trips to the United States increases at a rate of 3.35 percent per year.

CONTAINER STATUS MESSAGES (LARGE CONTAINER CARRIERS), UNDISCOUNTED DOLLARS

YEAR	NO. OF LARGE CONTAINER CARRIERS (1)	LOW INITIAL COST (PER CARRIER)	HIGH INITIAL COST (PER CARRIER)	LOW INITIAL TOTAL COST (2)	HIGH INITIAL TOTAL COST (2)	LOW RECURRING COST (PER CARRIER/YEAR)	HIGH RECURRING COST (PER CARRIER/YEAR)	LOW RECURRING TOTAL COST	HIGH RECURRING TOTAL COST	LOW COST SCENARIO CSM TOTAL	HIGH COST SCENARIO CSM TOTAL
2005	74										
2006	74										
2007	74										
2008	74										
2009	74	$4,000	$250,000	$98,667	$6,166,667	$ -	$55,000	$ -	$4,070,000	$98,667	$10,236,667
2010	74	4,000	250,000	98,667	6,166,667	-	55,000	-	4,070,000	98,667	10,236,667
2011	74	4,000	250,000	98,667	6,166,667	-	55,000	-	4,070,000	98,667	10,236,667
2012	74	-	-	-	-	-	55,000	-	4,070,000	-	4,070,000
2013	74	-	-	-	-	-	55,000	-	4,070,000	-	4,070,000
2014	74	-	-	-	-	-	55,000	-	4,070,000	-	4,070,000
2015	74	-	-	-	-	-	55,000	-	4,070,000	-	4,070,000
2016	74	-	-	-	-	-	55,000	-	4,070,000	-	4,070,000
2017	74	-	-	-	-	-	55,000	-	4,070,000	-	4,070,000
2018	74	-	-	-	-	-	55,000	-	4,070,000	-	4,070,000
Total (2009-2018)				**$296,000**	**$18,500,000**			**$ -**	**$40,700,000**	**$296,000**	**$59,200,000**

Notes: (1) Assumes the number of carriers does not increase over time.
(2) Assumes initial costs are amortized over 3 years.

EXHIBIT D-5 PRESENT VALUE CALCULATIONS, ALTERNATIVE 1: IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO EXEMPT

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1B, D-1E, D-2)						
2005						
2006						
2007						
2008						
2009	$1,642,125,000	$249,461,197	$ -	$262,575	$98,667	$1,891,947,439
2010	1,642,125,000	262,702,811	-	271,371	98,667	1,905,197,849
2011	1,642,125,000	276,656,262	-	280,462	98,667	1,919,160,390
2012	-	291,359,944	-	289,857	-	291,649,801
2013	-	306,854,324	-	299,568	-	307,153,892
2014	-	323,182,054	-	309,603	-	323,491,657
2015	-	340,388,088	-	319,975	-	340,708,063
2016	-	358,519,806	-	330,694	-	358,850,500
2017	-	377,627,148	-	341,772	-	377,968,921
2018	-	397,762,749	-	353,222	-	398,115,970
Total (2009-2018)	**$4,926,375,000**	**$3,184,514,383**	**$ -**	**$3,059,098**	**$296,000**	**$8,114,244,481**
LOW COST SCENARIO – PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$1,642,125,000	$249,461,197	$ -	$262,575	$98,667	$1,891,947,439
2010	1,594,296,117	255,051,273	-	263,467	95,793	1,849,706,649
2011	1,547,860,307	260,775,060	-	264,362	93,003	1,808,992,733
2012	-	266,635,622	-	265,261	-	266,900,883
2013	-	272,636,092	-	266,162	-	272,902,254
2014	-	278,779,679	-	267,066	-	279,046,745
2015	-	285,069,665	-	267,974	-	285,337,639
2016	-	291,509,411	-	268,884	-	291,778,296
2017	-	298,102,358	-	269,798	-	298,372,156
2018	-	304,852,026	-	270,715	-	305,122,741
Total (2009-2018)	**$4,784,281,424**	**$2,762,872,384**	**$ -**	**$2,666,264**	**$287,462**	**$7,550,107,535**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO – PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$1,642,125,000	$249,461,197	$ -	$262,575	$98,667	$1,891,947,439
2010	1,534,696,262	245,516,646	-	253,618	92,212	1,780,558,737
2011	1,434,295,572	241,642,293	-	244,966	86,179	1,676,269,011
2012	-	237,836,503	-	236,610	-	238,073,113
2013	-	234,097,695	-	228,539	-	234,326,233
2014	-	230,424,338	-	220,743	-	230,645,081
2015	-	226,814,955	-	213,213	-	227,028,168
2016	-	223,268,117	-	205,940	-	223,474,057
2017	-	219,782,439	-	198,915	-	219,981,353
2018	-	216,356,581	-	192,129	-	216,548,710
Total (2009-2018)	**$4,611,116,833**	**$2,325,200,764**	**$ -**	**$2,257,246**	**$277,058**	**$6,938,851,901**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1B, D-1E, D-2, D-3, D-4)						
2005						
2006						
2007						
2008						
2009	$2,964,808,333	$456,832,365	$7,772,523,468	$3,491,088	$10,236,667	$11,207,891,922
2010	2,964,808,333	481,065,982	3,618,743,689	3,566,723	10,236,667	7,078,421,394
2011	2,964,808,333	506,602,119	3,814,155,848	3,644,891	10,236,667	7,299,447,858
2012	-	533,511,027	4,020,120,264	2,492,345	4,070,000	4,560,193,637
2013	-	561,866,750	4,237,206,759	2,575,839	4,070,000	4,805,719,347
2014	-	591,747,328	4,466,015,923	2,662,129	4,070,000	5,064,495,381
2015	-	623,235,014	4,707,180,783	2,751,311	4,070,000	5,337,237,108
2016	-	656,416,502	4,961,368,546	2,843,480	4,070,000	5,624,698,527
2017	-	691,383,165	5,229,282,447	2,938,736	4,070,000	5,927,674,348
2018	-	728,231,310	5,511,663,699	3,037,184	4,070,000	6,247,002,193
Total (2009-2018)	**$8,894,425,000**	**$5,830,891,561**	**$48,338,261,428**	**$30,003,725**	**$59,200,000**	**$63,152,781,715**
HIGH COST SCENARIO - PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$2,964,808,333	$456,832,365	$7,772,523,468	$3,491,088	$10,236,667	$11,207,891,922
2010	2,878,454,693	467,054,351	3,513,343,388	3,462,838	9,938,511	6,872,253,780
2011	2,794,616,206	477,521,085	3,595,207,700	3,435,660	9,649,040	6,880,429,690
2012	-	488,238,167	3,678,979,529	2,280,849	3,724,627	4,173,223,172
2013	-	499,211,330	3,764,703,324	2,288,599	3,616,142	4,269,819,396
2014	-	510,446,443	3,852,424,567	2,296,376	3,510,818	4,368,678,204
2015	-	521,949,512	3,942,189,799	2,304,179	3,408,561	4,469,852,052
2016	-	533,726,685	4,034,046,649	2,312,009	3,309,282	4,573,394,626
2017	-	545,784,255	4,128,043,853	2,319,865	3,212,896	4,679,360,868
2018	-	558,128,661	4,224,231,282	2,327,748	3,119,316	4,787,807,008
Total (2009-2018)	**$8,637,879,232**	**$5,058,892,855**	**$42,505,693,559**	**$26,519,212**	**$53,725,860**	**$56,282,710,718**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$2,964,808,333	$456,832,365	$7,772,523,468	$3,491,088	$10,236,667	$11,207,891,922
2010	2,770,848,910	449,594,375	3,382,003,448	3,333,386	9,566,978	6,615,347,097
2011	2,589,578,420	442,485,910	3,331,431,434	3,183,589	8,941,101	6,375,620,455
2012	-	435,503,919	3,281,615,637	2,034,496	3,322,332	3,722,476,384
2013	-	428,645,454	3,232,544,749	1,965,095	3,104,984	3,666,260,281
2014	-	421,907,667	3,184,207,631	1,898,061	2,901,854	3,610,915,213
2015	-	415,287,805	3,136,593,311	1,833,314	2,712,013	3,556,426,444
2016	-	408,783,207	3,089,690,981	1,770,776	2,534,591	3,502,779,556
2017	-	402,391,297	3,043,489,995	1,710,371	2,368,777	3,449,960,439
2018	-	396,109,582	2,997,979,864	1,652,027	2,213,810	3,397,955,283
Total (2009-2018)	**$8,325,235,663**	**$4,257,541,581**	**$36,452,080,516**	**$22,872,204**	**$47,903,107**	**$49,105,633,072**

EXHIBIT D-6 PRESENT VALUE CALCULATIONS, ALTERNATIVE 2: IMPORTER SECURITY FILINGS AND ADDITIONAL CARRIER REQUIREMENTS REQUIRED, BULK CARGO NOT EXEMPT

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1C, D-1F, D-2, D-3, D-4)						
2005						
2006						
2007						
2008						
2009	$1,649,508,333	$251,137,240	$ -	$262,575	$98,667	$1,901,006,815
2010	1,649,508,333	264,402,319	-	271,371	98,667	1,914,280,690
2011	1,649,508,333	278,379,562	-	280,462	98,667	1,928,267,024
2012	-	293,107,371	-	289,857	-	293,397,228
2013	-	308,626,215	-	299,568	-	308,925,783
2014	-	324,978,752	-	309,603	-	325,288,355
2015	-	342,209,939	-	319,975	-	342,529,914
2016	-	360,367,164	-	330,694	-	360,697,858
2017	-	379,500,369	-	341,772	-	379,842,141
2018	-	399,662,194	-	353,222	-	400,015,416
Total (2009-2018)	**$4,948,525,000**	**$3,202,371,124**	**$ -**	**$3,059,098**	**$296,000**	**$8,154,251,223**
LOW COST SCENARIO – PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$1,649,508,333	$251,137,240	$ -	$262,575	$98,667	$1,901,006,815
2010	1,601,464,401	256,701,280	-	263,467	95,793	1,858,524,941
2011	1,554,819,807	262,399,437	-	264,362	93,003	1,817,576,609
2012	-	268,234,766	-	265,261	-	268,500,026
2013	-	274,210,395	-	266,162	-	274,476,557
2014	-	280,329,526	-	267,066	-	280,596,592
2015	-	286,595,437	-	267,974	-	286,863,410
2016	-	293,011,482	-	268,884	-	293,280,366
2017	-	299,581,095	-	269,798	-	299,850,894
2018	-	306,307,793	-	270,715	-	306,578,508
Total (2009-2018)	**$4,805,792,542**	**$2,778,508,450**	**$ -**	**$2,666,264**	**$287,462**	**$7,587,254,718**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO – PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$1,649,508,333	$251,137,240	$-	$262,575	$98,667	$1,901,006,815
2010	1,541,596,573	247,104,971	-	253,618	92,212	1,789,047,373
2011	1,440,744,461	243,147,491	-	244,966	86,179	1,684,223,098
2012	-	239,262,924	-	236,610	-	239,499,534
2013	-	235,449,462	-	228,539	-	235,678,000
2014	-	231,705,359	-	220,743	-	231,926,101
2015	-	228,028,932	-	213,213	-	228,242,145
2016	-	224,418,558	-	205,940	-	224,624,498
2017	-	220,872,670	-	198,915	-	221,071,584
2018	-	217,389,753	-	192,129	-	217,581,882
Total (2009-2018)	**$4,631,849,367**	**$2,338,517,360**	**$-**	**$2,257,246**	**$277,058**	**$6,972,901,031**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1C, D-1F, D-2, D-3, D-4)						
2005						
2006						
2007						
2008						
2009	$2,979,100,000	$460,209,364	$7,772,523,468	$3,491,088	$10,236,667	$11,225,560,587
2010	2,979,100,000	484,490,259	3,618,743,689	3,566,723	10,236,667	7,096,137,337
2011	2,979,100,000	510,074,335	3,814,155,848	3,644,891	10,236,667	7,317,211,742
2012	-	537,031,855	4,020,120,264	2,492,345	4,070,000	4,563,714,464
2013	-	565,436,870	4,237,206,759	2,575,839	4,070,000	4,809,289,467
2014	-	595,367,429	4,466,015,923	2,662,129	4,070,000	5,068,115,482
2015	-	626,905,797	4,707,180,783	2,751,311	4,070,000	5,340,907,891
2016	-	660,138,675	4,961,368,546	2,843,480	4,070,000	5,628,420,700
2017	-	695,157,449	5,229,282,447	2,938,736	4,070,000	5,931,448,632
2018	-	732,058,434	5,511,663,699	3,037,184	4,070,000	6,250,829,317
Total (2009-2018)	**$8,937,300,000**	**$5,866,870,466**	**$48,338,261,428**	**$30,003,725**	**$59,200,000**	**$63,231,635,619**
HIGH COST SCENARIO - PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$2,979,100,000	$460,209,364	$7,772,523,468	$3,491,088	$10,236,667	$11,225,560,587
2010	2,892,330,097	470,378,892	3,513,343,388	3,462,838	9,938,511	6,889,453,725
2011	2,808,087,473	480,793,982	3,595,207,700	3,435,660	9,649,040	6,897,173,854
2012	-	491,460,223	3,678,979,529	2,280,849	3,724,627	4,176,445,228
2013	-	502,383,335	3,764,703,324	2,288,599	3,616,142	4,272,991,401
2014	-	513,569,174	3,852,424,567	2,296,376	3,510,818	4,371,800,935
2015	-	525,023,735	3,942,189,799	2,304,179	3,408,561	4,472,926,275
2016	-	536,753,153	4,034,046,649	2,312,009	3,309,282	4,576,421,094
2017	-	548,763,709	4,128,043,853	2,319,865	3,212,896	4,682,340,323
2018	-	561,061,833	4,224,231,282	2,327,748	3,119,316	4,790,740,179
Total (2009-2018)	**$8,679,517,570**	**$5,090,397,400**	**$42,505,693,559**	**$26,519,212**	**$53,725,860**	**$56,355,853,601**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$2,979,100,000	$460,209,364	$7,772,523,468	$3,491,088	$10,236,667	$11,225,560,587
2010	2,784,205,607	452,794,634	3,382,003,448	3,333,386	9,566,978	6,631,904,053
2011	2,602,061,315	445,518,679	3,331,431,434	3,183,589	8,941,101	6,391,136,118
2012	-	438,377,963	3,281,615,637	2,034,496	3,322,332	3,725,350,428
2013	-	431,369,081	3,232,544,749	1,965,095	3,104,984	3,668,983,908
2014	-	424,488,749	3,184,207,631	1,898,061	2,901,854	3,613,496,295
2015	-	417,733,803	3,136,593,311	1,833,314	2,712,013	3,558,872,441
2016	-	411,101,190	3,089,690,981	1,770,776	2,534,591	3,505,097,538
2017	-	404,587,964	3,043,489,995	1,710,371	2,368,777	3,452,157,107
2018	-	398,191,284	2,997,979,864	1,652,027	2,213,810	3,400,036,985
Total (2009-2018)	**$8,365,366,923**	**$4,284,372,709**	**$36,452,080,516**	**$22,872,204**	**$47,903,107**	**$49,172,595,460**

EXHIBIT D-7 PRESENT VALUE CALCULATIONS, ALTERNATIVE 3: IMPORTER SECURITY FILINGS REQUIRED, BULK CARGO EXEMPT

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1B, D-1E, D-2)						
2005						
2006						
2007						
2008						
2009	$1,642,125,000	$249,461,197	$ -	$ -	$ -	$1,891,586,197
2010	1,642,125,000	262,702,811	-	-	-	1,904,827,811
2011	1,642,125,000	276,656,262	-	-	-	1,918,781,262
2012	-	291,359,944	-	-	-	291,359,944
2013	-	306,854,324	-	-	-	306,854,324
2014	-	323,182,054	-	-	-	323,182,054
2015	-	340,388,088	-	-	-	340,388,088
2016	-	358,519,806	-	-	-	358,519,806
2017	-	377,627,148	-	-	-	377,627,148
2018	-	397,762,749	-	-	-	397,762,749
Total (2009-2018)	**$4,926,375,000**	**$3,184,514,383**	**$ -**	**$ -**	**$ -**	**$8,110,889,383**
LOW COST SCENARIO – PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$1,642,125,000	$249,461,197	$ -	$ -	$ -	$1,891,586,197
2010	1,594,296,117	255,051,273	-	-	-	1,849,347,390
2011	1,547,860,307	260,775,060	-	-	-	1,808,635,367
2012	-	266,635,622	-	-	-	266,635,622
2013	-	272,636,092	-	-	-	272,636,092
2014	-	278,779,679	-	-	-	278,779,679
2015	-	285,069,665	-	-	-	285,069,665
2016	-	291,509,411	-	-	-	291,509,411
2017	-	298,102,358	-	-	-	298,102,358
2018	-	304,852,026	-	-	-	304,852,026
Total (2009-2018)	**$4,784,281,424**	**$2,762,872,384**	**$ -**	**$ -**	**$ -**	**$7,547,153,807**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO – PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$1,642,125,000	$249,461,197	$ -	$ -	$ -	$1,891,586,197
2010	1,534,696,262	245,516,646	-	-	-	1,780,212,908
2011	1,434,295,572	241,642,293	-	-	-	1,675,937,865
2012	-	237,836,503	-	-	-	237,836,503
2013	-	234,097,695	-	-	-	234,097,695
2014	-	230,424,338	-	-	-	230,424,338
2015	-	226,814,955	-	-	-	226,814,955
2016	-	223,268,117	-	-	-	223,268,117
2017	-	219,782,439	-	-	-	219,782,439
2018	-	216,356,581	-	-	-	216,356,581
Total (2009-2018)	**$4,611,116,833**	**$2,325,200,764**	**$ -**	**$ -**	**$ -**	**$6,936,317,598**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1B, D-1E, D-2)						
2005						
2006						
2007						
2008						
2009	$2,964,808,333	$456,832,365	$7,772,523,468	$ -	$ -	$11,194,164,167
2010	2,964,808,333	481,065,982	3,618,743,689	-	-	7,064,618,004
2011	2,964,808,333	506,602,119	3,814,155,848	-	-	7,285,566,300
2012	-	533,511,027	4,020,120,264	-	-	4,553,631,291
2013	-	561,866,750	4,237,206,759	-	-	4,799,073,509
2014	-	591,747,328	4,466,015,923	-	-	5,057,763,252
2015	-	623,235,014	4,707,180,783	-	-	5,330,415,797
2016	-	656,416,502	4,961,368,546	-	-	5,617,785,047
2017	-	691,383,165	5,229,282,447	-	-	5,920,665,612
2018	-	728,231,310	5,511,663,699	-	-	6,239,895,009
Total (2009-2018)	**$8,894,425,000**	**$5,830,891,561**	**$48,338,261,428**	**$ -**	**$ -**	**$63,063,577,989**
HIGH COST SCENARIO - PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$2,964,808,333	$456,832,365	$7,772,523,468	$ -	$ -	$11,194,164,167
2010	2,878,454,693	467,054,351	3,513,343,388	-	-	6,858,852,431
2011	2,794,616,206	477,521,085	3,595,207,700	-	-	6,867,344,991
2012	-	488,238,167	3,678,979,529	-	-	4,167,217,696
2013	-	499,211,330	3,764,703,324	-	-	4,263,914,655
2014	-	510,446,443	3,852,424,567	-	-	4,362,871,010
2015	-	521,949,512	3,942,189,799	-	-	4,464,139,312
2016	-	533,726,685	4,034,046,649	-	-	4,567,773,335
2017	-	545,784,255	4,128,043,853	-	-	4,673,828,107
2018	-	558,128,661	4,224,231,282	-	-	4,782,359,943
Total (2009-2018)	**$8,637,879,232**	**$5,058,892,855**	**$42,505,693,559**	**$ -**	**$ -**	**$56,202,465,646**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$2,964,808,333	$456,832,365	$7,772,523,468	$ -	$ -	$11,194,164,167
2010	2,770,848,910	449,594,375	3,382,003,448	-	-	6,602,446,733
2011	2,589,578,420	442,485,910	3,331,431,434	-	-	6,363,495,764
2012	-	435,503,919	3,281,615,637	-	-	3,717,119,555
2013	-	428,645,454	3,232,544,749	-	-	3,661,190,202
2014	-	421,907,667	3,184,207,631	-	-	3,606,115,297
2015	-	415,287,805	3,136,593,311	-	-	3,551,881,116
2016	-	408,783,207	3,089,690,981	-	-	3,498,474,188
2017	-	402,391,297	3,043,489,995	-	-	3,445,881,291
2018	-	396,109,582	2,997,979,864	-	-	3,394,089,446
Total (2009-2018)	**$8,325,235,663**	**$4,257,541,581**	**$36,452,080,516**	**$ -**	**$ -**	**$49,034,857,760**

EXHIBIT D-8 PRESENT VALUE CALCULATIONS, ALTERNATIVE 4: ADDITIONAL CARRIER REQUIREMENTS ONLY

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1B, D-1E, D-2)						
2005						
2006						
2007						
2008						
2009	$ -	$ -	$ -	$262,575	$98,667	$361,242
2010	-	-	-	271,371	98,667	370,038
2011	-	-	-	280,462	98,667	379,129
2012	-	-	-	289,857	-	289,857
2013	-	-	-	299,568	-	299,568
2014	-	-	-	309,603	-	309,603
2015	-	-	-	319,975	-	319,975
2016	-	-	-	330,694	-	330,694
2017	-	-	-	341,772	-	341,772
2018	-	-	-	353,222	-	353,222
Total (2009-2018)	**$ -**	**$ -**	**$ -**	**$3,059,098**	**$296,000**	**$3,355,100**
LOW COST SCENARIO – PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$ -	$ -	$ -	$262,575	$98,667	$361,242
2010	-	-	-	263,467	95,793	359,260
2011	-	-	-	264,362	93,003	357,365
2012	-	-	-	265,261	-	265,261
2013	-	-	-	266,162	-	266,162
2014	-	-	-	267,066	-	267,066
2015	-	-	-	267,974	-	267,974
2016	-	-	-	268,884	-	268,884
2017	-	-	-	269,798	-	269,798
2018	-	-	-	270,715	-	270,715
Total (2009-2018)	**$ -**	**$ -**	**$ -**	**$2,666,264**	**$287,462**	**$2,953,727**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
LOW COST SCENARIO – PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$ -	$ -	$ -	$262,575	$98,667	$361,242
2010	-	-	-	253,618	92,212	345,830
2011	-	-	-	244,966	86,179	331,145
2012	-	-	-	236,610	-	236,610
2013	-	-	-	228,539	-	228,539
2014	-	-	-	220,743	-	220,743
2015	-	-	-	213,213	-	213,213
2016	-	-	-	205,940	-	205,940
2017	-	-	-	198,915	-	198,915
2018	-	-	-	192,129	-	192,129
Total (2009-2018)	**$ -**	**$ -**	**$ -**	**$2,257,246**	**$277,058**	**$2,534,306**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - UNDISCOUNTED DOLLARS (FROM EXHIBITS D-1B, D-1E, D-2, D-3, D-4)						
2005						
2006						
2007						
2008						
2009	$ -	$ -	$ -	$3,491,088	$10,236,667	$13,727,755
2010	-	-	-	3,566,723	10,236,667	13,803,390
2011	-	-	-	3,644,891	10,236,667	13,881,558
2012	-	-	-	2,492,345	4,070,000	6,562,345
2013	-	-	-	2,575,839	4,070,000	6,645,839
2014	-	-	-	2,662,129	4,070,000	6,732,129
2015	-	-	-	2,751,311	4,070,000	6,821,311
2016	-	-	-	2,843,480	4,070,000	6,913,480
2017	-	-	-	2,938,736	4,070,000	7,008,736
2018	-	-	-	3,037,184	4,070,000	7,107,184
Total (2009-2018)	**$ -**	**$ -**	**$ -**	**$30,003,725**	**$59,200,000**	**$89,203,727**
HIGH COST SCENARIO - PRESENT VALUE AT 3 PERCENT						
2005						
2006						
2007						
2008						
2009	$ -	$ -	$ -	$3,491,088	$10,236,667	$13,727,755
2010	-	-	-	3,462,838	9,938,511	13,401,349
2011	-	-	-	3,435,660	9,649,040	13,084,700
2012	-	-	-	2,280,849	3,724,627	6,005,476
2013	-	-	-	2,288,599	3,616,142	5,904,741
2014	-	-	-	2,296,376	3,510,818	5,807,194
2015	-	-	-	2,304,179	3,408,561	5,712,740
2016	-	-	-	2,312,009	3,309,282	5,621,291
2017	-	-	-	2,319,865	3,212,896	5,532,761
2018	-	-	-	2,327,748	3,119,316	5,447,064
Total (2009-2018)	**$ -**	**$ -**	**$ -**	**$26,519,212**	**$53,725,860**	**$80,245,071**

YEAR	IMPORTER INITIAL	IMPORTER SECURITY FILINGS	SUPPLY CHAIN	VESSEL STOW PLAN (SMALL AND LARGE CARRIERS)	CSMS (SMALL AND LARGE CARRIERS)	TOTAL
HIGH COST SCENARIO - PRESENT VALUE AT 7 PERCENT						
2005						
2006						
2007						
2008						
2009	$ -	$ -	$ -	$3,491,088	$10,236,667	$13,727,755
2010	-	-	-	3,333,386	9,566,978	12,900,364
2011	-	-	-	3,183,589	8,941,101	12,124,690
2012	-	-	-	2,034,496	3,322,332	5,356,828
2013	-	-	-	1,965,095	3,104,984	5,070,079
2014	-	-	-	1,898,061	2,901,854	4,799,915
2015	-	-	-	1,833,314	2,712,013	4,545,327
2016	-	-	-	1,770,776	2,534,591	4,305,367
2017	-	-	-	1,710,371	2,368,777	4,079,148
2018	-	-	-	1,652,027	2,213,810	3,865,837
Total (2009-2018)	**$ -**	**$ -**	**$ -**	**$22,872,204**	**$47,903,107**	**$70,775,310**

EXHIBIT D-9 PRESENT VALUE CALCULATIONS, GOVERNMENT IMPLEMENTATION COSTS

YEAR	PV FACTOR 3%	PV FACTOR 7%	GOVERNMENT IMPLEMENTATION COSTS		
			UNDISCOUNTED	PV AT 3%	PV AT 7%
2009	1.0000	1.0000	$6,600,000	$6,600,000	$6,600,000
2010	0.9709	0.9346	1,720,000	1,669,903	1,607,477
2011	0.9426	0.8734	1,000,000	942,596	873,439
2012	0.9151	0.8163	1,000,000	915,142	816,298
2013	0.8885	0.7629	1,000,000	888,487	762,895
2014	0.8626	0.7130	1,000,000	862,609	712,986
2015	0.8375	0.6663	1,000,000	837,484	666,342
2016	0.8131	0.6227	1,000,000	813,092	622,750
2017	0.7894	0.5820	1,000,000	789,409	582,009
2018	0.7664	0.5439	1,000,000	766,417	543,934
TOTAL				**$15,085,138**	**$13,788,129**

APPENDIX E | DETAILED CHAPTER 6 TABLES

This appendix includes the detailed results of our sampling from Dun & Bradstreet.

We took a random sample of importers in each shipment type. Sampling continued until we had industry-specific information on 400 entities in the containerized sample and 75 entities in the bulk and break-bulk samples.

There were some instances in which numerous NAICS codes were reported for the same entity. In these cases, we took the first NAICS code as the primary business. We believe this is reasonable because the NAICS codes were not listed in a numerical, or otherwise rational, order.

EXHIBIT E-1 CONTAINERIZED SAMPLE INFORMATION

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
424900	20	Miscellaneous Nondurable Goods Merchant Wholesalers
999990	19	INDUSTRY UNKNOWN
423830	13	Industrial Machinery and Equipment Merchant Wholesalers
442110	11	Furniture Stores
488510	10	Freight Transportation Arrangement
423220	8	Home Furnishing Merchant Wholesalers
423120	7	Motor Vehicle Supplies and New Parts Merchant Wholesalers
424330	7	Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers
424320	7	Men's and Boys' Clothing and Furnishings Merchant Wholesalers
423710	7	Hardware Merchant Wholesalers
424490	7	Other Grocery and Related Products Merchant Wholesalers
423910	6	Sporting and Recreational Goods and Supplies Merchant Wholesalers
326199	5	All Other Plastics Product Manufacturing
424310	5	Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers
423990	5	Other Miscellaneous Durable Goods Merchant Wholesalers
423690	5	Other Electronic Parts and Equipment Merchant Wholesalers
561499	5	All Other Business Support Services
423450	4	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers
424460	4	Fish and Seafood Merchant Wholesalers
424480	4	Fresh Fruit and Vegetable Merchant Wholesalers
423440	4	Other Commercial Equipment Merchant Wholesalers
423430	4	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
442299	4	All Other Home Furnishings Stores
423210	4	Furniture Merchant Wholesalers
453220	4	Gift, Novelty and Souvenir Stores
315191	3	Outerwear Knitting Mills
423940	3	Jewelry, Watch, Precious Stone, and Precious Metal Merchant Wholesalers
423390	3	Other Construction Material Merchant Wholesalers
423320	3	Brick, Stone, and Related Construction Material Merchant Wholesalers
424340	3	Footwear Merchant Wholesalers
236115	3	New Single-Family Housing Construction (except Operative Builders)
332510	3	Hardware Manufacturing
441310	3	Automotive Parts and Accessories Stores
424130	3	Industrial and Personal Service Paper Merchant Wholesalers
325620	3	Toilet Preparation Manufacturing
333911	3	Pump and Pumping Equipment Manufacturing
424430	2	Dairy Product (except Dried or Canned) Merchant Wholesalers

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
335999	2	All Other Miscellaneous Electrical Equipment and Component Manufacturing
424930	2	Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers
332913	2	Plumbing Fixture Fitting and Trim Manufacturing
333120	2	Construction Machinery Manufacturing
423110	2	Automobile and Other Motor Vehicle Merchant Wholesalers
327390	2	Other Concrete Product Manufacturing
333999	2	All Other Miscellaneous General Purpose Machinery Manufacturing
813110	2	Religious Organizations
334119	2	Other Computer Peripheral Equipment Manufacturing
423310	2	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
334290	2	Other Communications Equipment Manufacturing
522293	2	International Trade Financing
722110	2	Full-Service Restaurants
423510	2	Metal Service Centers and Other Metal Merchant Wholesalers
423730	2	Warm Air Heating and Air-Conditioning Equipment and Supplies Merchant Wholesalers
423810	2	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers
339992	2	Musical Instrument Manufacturing
451110	2	Sporting Goods Stores
333611	2	Turbine and Turbine Generator Set Unit Manufacturing
453310	2	Used Merchandise Stores
325320	2	Pesticide and Other Agricultural Chemical Manufacturing
325411	2	Medicinal and Botanical Manufacturing
337212	2	
448120	2	Women's Clothing Stores
541310	2	Architectural Services
339920	2	Sporting and Athletic Goods Manufacturing
333293	1	Printing Machinery and Equipment Manufacturing
334112	1	Computer Storage Device Manufacturing
333513	1	Machine Tool (Metal Forming Types) Manufacturing
311712	1	Fresh and Frozen Seafood Processing
311711	1	Seafood Canning
334412	1	Bare Printed Circuit Board Manufacturing
332612	1	Spring (Light Gauge) Manufacturing
311320	1	Chocolate and Confectionery Manufacturing from Cacao Beans
333512	1	Machine Tool (Metal Cutting Types) Manufacturing
238340	1	Tile and Terrazzo Contractors
238330	1	Flooring Contractors
333415	1	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
333314	1	Optical Instrument and Lens Manufacturing
332911	1	Industrial Valve Manufacturing
332998	1	Enameled Iron and Metal Sanitary Ware Manufacturing
333132	1	Oil and Gas Field Machinery and Equipment Manufacturing
236118	1	Residential Remodelers
332618	1	Other Fabricated Wire Product Manufacturing
332813	1	Electroplating, Plating, Polishing, Anodizing and Coloring
333913	1	Measuring and Dispensing Pump Manufacturing
333298	1	All Other Industrial Machinery Manufacturing
333319	1	Other Commercial and Service Industry Machinery Manufacturing
334310	1	Audio and Video Equipment Manufacturing
325199	1	All Other Basic Organic Chemical Manufacturing
315192	1	Underwear and Nightwear Knitting Mills
326299	1	All Other Rubber Product Manufacturing
326211	1	Tire Manufacturing (except Retreading)
326122	1	Plastics Pipe and Pipe Fitting Manufacturing
325998	1	All Other Miscellaneous Chemical Product and Preparation Manufacturing
325991	1	Custom Compounding of Purchased Resins
325612	1	Polish and Other Sanitation Good Manufacturing
325222	1	Noncellulosic Organic Fiber Manufacturing
312229	1	Other Tobacco Product Manufacturing
325211	1	Plastics Material and Resin Manufacturing
327122	1	Ceramic Wall and Floor Tile Manufacturing
325131	1	Inorganic Dye and Pigment Manufacturing
324121	1	Asphalt Paving Mixture and Block Manufacturing
315239	1	Women's and Girls' Cut and Sew Other Outerwear Manufacturing
322299	1	All Other Converted Paper Product Manufacturing
322224	1	Uncoated Paper and Multiwall Bag Manufacturing
322222	1	Coated and Laminated Paper Manufacturing
322121	1	Paper (except Newsprint) Mills
321918	1	Other Millwork (including Flooring)
316213	1	Men's Footwear (except Athletic) Manufacturing
315225	1	Men's and Boys' Cut and Sew Work Clothing Manufacturing
331222	1	Steel Wire Drawing
332410	1	Power Boiler and Heat Exchanger Manufacturing
312112	1	Bottled Water Manufacturing
332322	1	Sheet Metal Work Manufacturing
332312	1	Fabricated Structural Metal Manufacturing

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
327991	1	Cut Stone and Stone Product Manufacturing
332211	1	Cutlery and Flatware (except Precious) Manufacturing
316110	1	Leather and Hide Tanning and Finishing
331491	1	Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing and Extruding
313210	1	Broadwoven Fabric Mills
327113	1	Porcelain Electrical Supply Manufacturing
314110	1	Carpet and Rug Mills
327121	1	Brick and Structural Clay Tile Manufacturing
331210	1	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel
314129	1	Other Household Textile Product Mills
327999	1	All Other Miscellaneous Nonmetallic Mineral Product Manufacturing
334413	1	Semiconductor and Related Device Manufacturing
314912	1	Canvas and Related Product Mills
327310	1	Cement Manufacturing
327215	1	Glass Product Manufacturing Made of Purchased Glass
314999	1	All Other Miscellaneous Textile Product Mills
311930	1	Flavoring Syrup and Concentrate Manufacturing
313249	1	Other Knit Fabric and Lace Mills
452990	1	All Other General Merchandise Stores
339932	1	Game, Toy, and Children's Vehicle Manufacturing
523120	1	Securities Brokerage
512110	1	Motion Picture and Video Production
493190	1	Other Warehousing and Storage
493110	1	General Warehousing and Storage
488999	1	All Other Support Activities for Transportation
484210	1	Used Household and Office Goods Moving
481219	1	Other Nonscheduled Air Transportation
531120	1	Lessors of Nonresidential Buildings (except Miniwarehouses)
453998	1	All Other Miscellaneous Store Retailers (except Tobacco Stores)
532299	1	All Other Consumer Goods Rental
451130	1	Sewing, Needlework and Piece Goods Stores
451120	1	Hobby, Toy and Game Stores
448190	1	Other Clothing Stores
448150	1	Clothing Accessories Stores
446191	1	Food (Health) Supplement Stores
444220	1	Nursery and Garden Centers

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
444130	1	Hardware Stores
443120	1	Computer and Software Stores
454390	1	Other Direct Selling Establishments
541990	1	All Other Professional, Scientific and Technical Services
928120	1	
812113	1	Nail Salons
811219	1	Other Electronic and Precision Equipment Repair and Maintenance
811118	1	Other Automotive Mechanical and Electrical Repair and Maintenance
712110	1	Museums
711410	1	Agents and Managers for Artists, Athletes, Entertainers and Other Public Figures
624410	1	Child Day Care Services
561990	1	All Other Support Services
525930	1	Real Estate Investment Trusts
561621	1	Security Systems Services (except Locksmiths)
441222	1	Boat Dealers
541910	1	Marketing Research and Public Opinion Polling
541810	1	Advertising Agencies
541618	1	Other Management Consulting Services
541613	1	Marketing Consulting Services
541611	1	Administrative Management and General Management Consulting Services
541430	1	Graphic Design Services
541330	1	Engineering Services
541211	1	Offices of Certified Public Accountants
561730	1	Landscaping Services
336399	1	All Other Motor Vehicle Parts Manufacturing
212313	1	Crushed and Broken Granite Mining and Quarrying
339931	1	Doll and Stuffed Toy Manufacturing
339911	1	Jewelry (except Costume) Manufacturing
339113	1	Surgical Appliance and Supplies Manufacturing
339112	1	Surgical and Medical Instrument Manufacturing
337920	1	Blind and Shade Manufacturing
337122	1	Nonupholstered Wood Household Furniture Manufacturing
337110	1	Wood Kitchen Cabinet and Counter Top Manufacturing
443112	1	Radio, Television and Other Electronics Stores
336412	1	Aircraft Engine and Engine Parts Manufacturing
339999	1	All Other Miscellaneous Manufacturing

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
336322	1	Other Motor Vehicle Electrical and Electronic Equipment Manufacturing
336312	1	Gasoline Engine and Engine Parts Manufacturing
336111	1	Automobile Manufacturing
335314	1	Relay and Industrial Control Manufacturing
335312	1	Motor and Generator Manufacturing
335221	1	Household Cooking Appliance Manufacturing
335129	1	Other Lighting Equipment Manufacturing
335121	1	Residential Electric Lighting Fixture Manufacturing
336991	1	Motorcycle, Bicycle and Parts Manufacturing
424210	1	Drugs and Druggists' Sundries Merchant Wholesalers
334515	1	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals
424920	1	Book, Periodical, and Newspaper Merchant Wholesalers
424910	1	Farm Supplies Merchant Wholesalers
424820	1	Wine and Distilled Alcoholic Beverage Merchant Wholesalers
424810	1	Beer and Ale Merchant Wholesalers
424690	1	Other Chemical and Allied Products Merchant Wholesalers
424610	1	Plastics Materials and Basic Forms and Shapes Merchant Wholesalers
424470	1	Meat and Meat Product Merchant Wholesalers
339941	1	Pen and Mechanical Pencil Manufacturing
424410	1	General Line Grocery Merchant Wholesalers
339993	1	Fastener, Button, Needle and Pin Manufacturing
424110	1	Printing and Writing Paper Merchant Wholesalers
423930	1	Recyclable Material Merchant Wholesalers
423920	1	Toy and Hobby Goods and Supplies Merchant Wholesalers
423850	1	Service Establishment Equipment and Supplies Merchant Wholesalers
423840	1	Industrial Supplies Merchant Wholesalers
423610	1	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
423140	1	Motor Vehicle Parts (Used) Merchant Wholesalers
423130	1	Tire and Tube Merchant Wholesalers
443111	1	Household Appliance Stores
424420	1	Packaged Frozen Food Merchant Wholesalers

EXHIBIT E-2 BULK SAMPLE INFORMATION

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
488510	7	Freight Transportation Arrangement
423510	6	Metal Service Centers and Other Metal Merchant Wholesalers
423310	5	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
327310	4	Cement Manufacturing
423320	4	Brick, Stone, and Related Construction Material Merchant Wholesalers
221210	3	Natural Gas Distribution
424690	3	Other Chemical and Allied Products Merchant Wholesalers
999990	2	INDUSTRY UNKNOWN
325188	2	All Other Basic Inorganic Chemical Manufacturing
311712	2	Fresh and Frozen Seafood Processing
424720	2	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)
327320	1	Ready-Mix Concrete Manufacturing
327410	1	Lime Manufacturing
327992	1	Ground or Treated Mineral and Earth Manufacturing
325520	1	Adhesive Manufacturing
325199	1	All Other Basic Organic Chemical Manufacturing
331111	1	Iron and Steel Mills
321114	1	Wood Preservation
337920	1	Blind and Shade Manufacturing
311711	1	Seafood Canning
311412	1	Frozen Specialty Food Manufacturing
311225	1	Fats and Oils Refining and Blending
221119	1	Other Electric Power Generation
213112	1	Support Activities for Oil and Gas Operations
213111	1	Drilling Oil and Gas Wells
212321	1	Construction Sand and Gravel Mining
324110	1	Petroleum Refineries
423840	1	Industrial Supplies Merchant Wholesalers
812331	1	Linen Supply
541611	1	Administrative Management and General Management Consulting Services
523140	1	Commodity Contracts Brokerage
523120	1	Securities Brokerage
488320	1	Marine Cargo Handling
488210	1	Support Activities for Rail Transportation
486110	1	Pipeline Transportation of Crude Oil
454113	1	Mail-Order Houses
336399	1	All Other Motor Vehicle Parts Manufacturing

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
423860	1	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers
332111	1	Iron and Steel Forging
423830	1	Industrial Machinery and Equipment Merchant Wholesalers
423710	1	Hardware Merchant Wholesalers
423610	1	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
423120	1	Motor Vehicle Supplies and New Parts Merchant Wholesalers
339999	1	All Other Miscellaneous Manufacturing
336510	1	Railroad Rolling Stock Manufacturing
212111	1	Bituminous Coal and Lignite Surface Mining
332313	1	Plate Work Manufacturing
444220	1	Nursery and Garden Centers

EXHIBIT E-3 BREAK-BULK SAMPLE INFORMATION

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
423510	8	Metal Service Centers and Other Metal Merchant Wholesalers
423310	6	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
336611	4	Ship Building and Repairing
999990	4	INDUSTRY UNKNOWN
424480	3	Fresh Fruit and Vegetable Merchant Wholesalers
488510	3	Freight Transportation Arrangement
423830	2	Industrial Machinery and Equipment Merchant Wholesalers
424410	2	General Line Grocery Merchant Wholesalers
424470	2	Meat and Meat Product Merchant Wholesalers
424490	2	Other Grocery and Related Products Merchant Wholesalers
424690	2	Other Chemical and Allied Products Merchant Wholesalers
511110	2	Newspaper Publishers
423450	1	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers
423440	1	Other Commercial Equipment Merchant Wholesalers
423430	1	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
921190	1	#N/A
423120	1	Motor Vehicle Supplies and New Parts Merchant Wholesalers
928120	1	#N/A
336399	1	All Other Motor Vehicle Parts Manufacturing
424420	1	Packaged Frozen Food Merchant Wholesalers
335312	1	Motor and Generator Manufacturing
423810	1	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers
333911	1	Pump and Pumping Equipment Manufacturing
333120	1	Construction Machinery Manufacturing
327910	1	Abrasive Product Manufacturing
322224	1	Uncoated Paper and Multiwall Bag Manufacturing
322222	1	Coated and Laminated Paper Manufacturing
321918	1	Other Millwork (including Flooring)
311421	1	Fruit and Vegetable Canning
213112	1	Support Activities for Oil and Gas Operations
336350	1	Motor Vehicle Transmission and Power Train Parts Manufacturing
424810	1	Beer and Ale Merchant Wholesalers
488490	1	Other Support Activities for Road Transportation
488320	1	Marine Cargo Handling
484230	1	Specialized Freight (except Used Goods) Trucking, Long-Distance
483211	1	Inland Water Freight Transportation
483111	1	Deep Sea Freight Transportation

NAICS CODE	COUNT	INDUSTRY DESCRIPTION
451110	1	Sporting Goods Stores
447190	1	Other Gasoline Stations
423490	1	Other Professional Equipment and Supplies Merchant Wholesalers
441110	1	New Car Dealers
921110	1	#N/A
515120	1	Television Broadcasting
522293	1	International Trade Financing
541613	1	Marketing Consulting Services
212221	1	Gold Ore Mining
713930	1	Marinas
423990	1	Other Miscellaneous Durable Goods Merchant Wholesalers
812990	1	All Other Personal Services
488991	1	Packing and Crating
441222	1	Boat Dealers