

**DEPARTMENT OF TRANSPORTATION****Coast Guard****33 CFR Part 157**

[CGD 91-045c]

RIN 2115-AF27

**Structural Measures to Reduce Oil Spills From Existing Tank Vessels Without Double Hulls**

AGENCY: Coast Guard, DOT.

ACTION: Final rule.

**SUMMARY:** This final rule represents the last phase in the Coast Guard's three-phased effort to establish economically and technologically feasible structural and operational measures to reduce the threat of oil spills from tank vessels without double hulls, as required by the Oil Pollution Act of 1990. No structural measures are contained in this final rule because the Coast Guard has determined that there are no interim structural measures that are both technologically and economically feasible for existing tank vessels without double hulls.

**DATES:** This final rule is effective February 10, 1997.

**ADDRESSES:** Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the Executive Secretary, Marine Safety Council (G-LRA/3406), U.S. Coast Guard Headquarters, 2100 Second Street SW., room 3406, Washington, DC 20593-0001, between 9:30 a.m. and 2 p.m., Monday through Friday, except Federal holidays. The telephone number is (202) 267-1477.

**FOR FURTHER INFORMATION CONTACT:** LCDR Suzanne Englebert, Project Manager, Project Development Division, at (202) 267-6490.

**SUPPLEMENTARY INFORMATION:****Regulatory History**

Section 4115(b) of the Oil Pollution Act of 1990 (OPA 90) directs the Coast Guard to develop structural or operational requirements for tank vessels of 5,000 gross tons (GT) or more without double hulls that will serve as regulations until the year 2015. After 2015, all tank vessels operating in U.S. waters will be required to have double hulls under section 4115(a) of OPA 90 (46 U.S.C. 3703a). Regulations issued under the authority of section 4115(b) must provide as substantial protection to the environment as is economically and technologically feasible. A detailed review of structural measure issues, as they pertain to the Congressional mandates of OPA 90, appears in the supplemental notice in proposed

rulemaking (SNPRM) entitled "Structural Measures to Reduce Oil Spills from Existing Tank Vessels without Double Hulls" published on December 28, 1995 (60 FR 67226).

This final rule represents the final phase of the Coast Guard's three-phased effort to reduce oil pollution from certain existing tank vessels. The first phase was completed on August 5, 1994, by issuing a final rule entitled "Emergency Lightering Equipment and Advanced Notice of Arrival Requirements for Existing Tank Vessels Without Double Hulls" (59 FR 40186), which requires the carriage of emergency lightering equipment and the inclusion of the vessel's International Maritime Organization number in the advance notice of arrival report. The second phase was completed on July 30, 1996, by issuing a separate final rule entitled "Operational Measures to Reduce Oil Spills from Existing Tank Vessels without Double Hulls" (61 FR 39769). That rule, which focused on reducing the risk of groundings, collisions, or fires, requires existing tank vessels without double hulls to comply with certain operational measures until the year 2015.

To complete the third phase, the Coast Guard evaluated several different structural measures to determine their economical and technological feasibility. Such measures included retrofitting double bottoms or sides, implementing hydrostatic balance loading (HBL) for all vessel configurations, and restricting certain existing tanks from carrying cargo or retrofitting spaces so that they are located protectively around tanks carrying oil as cargo. As a result of further economic cost-benefit analysis and the comments on the SNPRM, the Coast Guard is not requiring structural measures. The Coast Guard has determined that structural measures are not economically feasible and that the measures required under phase one and two of this rulemaking meet the Congressional mandate of OPA 90 section 4115(b).

**Discussion of Comments**

Background information on proposed structural measures for existing vessels without double hulls is provided in the preambles to the advanced notice of proposed rulemaking (56 FR 56284; November 1, 1991), the notice of proposed rulemaking (58 FR 54870; October 22, 1993), and the SNPRM (60 FR 67226; December 28, 1995). The Coast Guard received a total of 29 letters on the SNPRM. These letters addressed several issues and presented more than 180 comments. Twelve comments

supported operational measures and two comments supported emergency lightering measures as finalized. The remaining comments discussed issues related to reducing oil outflow after an accident occurs on an existing tank vessel and are addressed in the following sections. All comments received on this rulemaking are available for inspection in docket [CGD 91-045c] at the address listed under **ADDRESSES**. For the purposes of this preamble discussion, the term "single-hull" means an existing tank vessel without a double hull. Pre-MARPOL vessels are defined as vessels that are not required to meet the pollution prevention requirements of the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL 73). MARPOL 73/78 vessels are defined as vessels that meet the requirements of the MARPOL 73 convention and vessels that meet the MARPOL 73 convention as amended by the 1978 Protocol (MARPOL 78). The term "Regulation 13G" refers to Regulation 13G of Annex I of MARPOL 73 as amended by the 1978 Protocol.

**I. Applicability**

Twenty-three comments pertained to the application of structural measures. Nine comments made general remarks on the applicability of structural measures and the OPA 90 mandated phase-out schedule's relationship to the implementation of structural measures. The remaining comments suggested that the Coast Guard exempt various types of vessels from the application of structural measures.

Two comments shared the opinion that the current OPA 90 phase-out schedule effectively creates an orderly transition to a future double-hull fleet, thus making additional measures unnecessary. One of these comments specifically noted that tank barges, in particular, would accrue no benefit from structural measures due to impending OPA 90 phase-outs. A separate comment agreed that the Coast Guard should maintain OPA 90 phase-out dates, but did not request that vessels be excluded from the application of structural measures or that structural measures not be required.

Five comments recommended that the Coast Guard require structural measures for all existing tank vessels, including non-petroleum oil carriers and tank barges. The comments stated that non-petroleum carriers may periodically transport petroleum and that non-petroleum oil spills pose an equal or greater risk to the environment as petroleum oil spills. In addition, the comments claimed that standards

should be uniform throughout industry to encourage equal competition and an even distribution of costs.

Two comments suggested alternatives to the broad application of structural measures. One comment encouraged the use of company historical performance as a basis for requiring implementation of structural measures. For example, the comment claimed that companies with a history of minimal oil spillage should not be required to implement structural measures to the same degree as frequent offenders. The second comment recommended that the Coast Guard establish an enforceable performance standard, as opposed to a one-size-fits-all approach, for the implementation of specific measures to ensure a high degree of spill prevention.

During this rulemaking, the Coast Guard extensively researched the cost and benefit of requiring a multitude of measures on single-hull tankships and tank barges prior to their phase-out dates. No tank barge or tankship company commented that their sole cargo carriage consisted on non-petroleum products. Consequently, all tank vessels, including those with the ability to transport non-petroleum products for one charter and change to carrying petroleum products for the next, were considered for this rulemaking.

The anticipated cost to single-hull tank vessels until 2015, or their phase-out dates, was strictly taken into account for this final rule assessment. The OPA 90 phase-out dates and current differences between U.S. and international fleet pollution prevention requirements were also considered in the cost and benefit analysis. Because this rulemaking addresses out-flow prevention measures typically requiring architectural or loading changes, and not human performance factors that are usually the reason for a company's lower spill record, the Coast Guard did not consider equivalencies or exemptions based on individual company performance.

Several comments claimed vessels trading at deepwater ports or offshore lightering zones should be exempt from the application of structural measures because most already operate with protection adequate for trading in these low risk areas and would experience no benefit from the use of structural measures. Other comments requested exemptions for vessels carrying non-petroleum oil or product cargo because most are already equipped with double bottoms and pose an insignificant risk to the environment. Comments also recommended excluding all tank vessels equipped with double bottoms from the

implementation of structural measures since these already have the ability to reduce oil outflow due to grounding incidents. Comments suggested that spill response tank barges, which transport oil for a limited purpose only, be held to lower standards than structural measures for routine oil carriers. In addition, several comments requested that clean product tankers less than 30,000 deadweight tons (dwt) be exempt from structural measures because spillage from these vessels has historically proven to be less damaging and less difficult to contain than spills from other vessels. Finally, some comments claimed that vessels which meet the requirements of MARPOL 78, should be exempt from these requirements because they already meet the highest international standards.

Vessels that are solely engaged in oil spill response are already exempt from the structural measures required by 33 CFR 157.08. Vessels operating at deepwater ports, offshore lightering zones, and those vessels fitted with double bottoms were considered in this rulemaking because, although groundings are less frequent, collisions and structural failures remain potential hazards. Non-petroleum carrying vessels were included in this rulemaking because the Coast Guard has determined that bulk spills of animal fat, vegetable oil, and other non-petroleum oil can be damaging to the environment. The cost and benefit of applying structural measures to single-hull tank vessels were separately identified by deadweight tonnage categories in this final rule regulatory assessment to determine if tank vessels, such as those product carriers operating at 30,000 dwt or less, were disproportionately affected. MARPOL 73/78 vessels were also considered separately in the regulatory analysis for this final rule to ensure anticipated benefits from any structural measures accurately reflected their currently pollution prevention construction.

Several comments requested exemption of specific vessels from implementation of HBL because it is not technically feasible for their operation. Specific vessels included: Type 2 Bulk Chemical/Integrated Cargo parcel tankers, which encounter difficulties in implementing HBL when dealing with heterogeneous cargoes; and vessels engaged in multi-port voyages, due to problems resulting from the implementation of HBL multiple times during a single voyage.

The Coast Guard agrees that the difficulty of implementing HBL directly correlates with cargo variety and discharge schedules. The technical

feasibility analysis for the structural measures SNPRM assumed tank vessels were carrying homogeneous cargoes and had limited off-loads. Small tankships, such as parcel tankers and vessels making multiple port discharges, have valid concerns about the practical application of HBL to their operations, and would most likely incur voyage delays or higher cargo shutout rates than originally assumed in the SNPRM for HBL. The regulatory assessment for this final rule analyzed the effect that HBL, assuming a higher cargo shutout cost and expense of delayed operations for a product or parcel tankship, would have on the cost-benefit ratio.

## *2. Consistency With International Standards*

The Coast Guard received 12 comments expressing support for the development or adoption of regulations that are equivalent to international standards such as Regulation 13G and International Maritime Organization (IMO) standards. Arguments in favor of harmonization included concerns that country-specific legislation would be difficult for industry to implement, and would introduce technical risks and disproportionate costs. Another comment specifically noted that the combination of protectively located void spaces (PL/Spaces) and HBL analyzed in the SNPRM would be too expensive and complex to implement. Consequently, the comment recommended adoption of Regulation 13G because it permits use of HBL or PL/Spaces on an individual basis. Another comment stated that a requirement to fit PL/Spaces would be onerous to the international fleet because it affects a vessel's ability to trade, unlike HBL, even when not trading in U.S. waters.

Other comments encouraged the Coast Guard to work in cooperation with the IMO to ensure high standards of environmental performance for all newly-built tank vessels. One comment also encouraged the Coast Guard to consider enforcement issues when preparing a structural measures regulation, stressing the importance of maintaining competition on an equal level.

In contrast, only one comment disagreed that uniformity would be achieved by drafting measures commensurate with international standards. This comment reasoned that, theoretically, Regulation 13G and OPA 90 express somewhat opposing objectives, since Regulation 13G works to extend the operating life of single-hull vessels, while OPA 90 limits the operating life of single-hull vessels by setting a maximum retirement date.

Consequently, it was suggested that other options be considered, including an alternative PL/Space configuration that splits the protected area between the side and bottom of the vessel.

The Coast Guard's goal is to implement its statutory mandates in regulations that are consistent with international standards wherever doing so is lawful, appropriate, and practical. Based on comments from the SNPRM, the Coast Guard considered adoption of international regulations including Regulation 13G, as well as other requirements not presently required by IMO. However, based on the revised cost and benefit analysis of these structural measures for existing tank vessels, the Coast Guard has determined that no measures, international or otherwise, are economically feasible.

### 3. Congressional Intent

Four comments argued that Congress directed the Coast Guard to consider implementation of both structural and operational measures for existing tank vessels without double hulls, but did not require the adoption of both types of measures. Three of the four comments also stated that no structural measures are required to be implemented unless they are both economically and technologically feasible. Another comment stated that Congress mandated strict standards to protect our nation's waters, obligating the Coast Guard to develop measures that closely approximate the protective effect of double hulls on single-hull tank vessels.

The Coast Guard has done extensive research on the requirements of section 4115(b) of OPA 90, including an analysis of the Congressional guidance offered for its implementation. The three final rules promulgated under CGD 91-045 make up a comprehensive evaluation of section 4115(b) that implements those measures the Coast Guard deems are both economically and technologically feasible as required by law.

### 4. Alternative Measures and Economic Incentives

The Coast Guard received five comments that encouraged the adoption of alternative systems to reduce oil outflow. One comment recommended that intermediate oil tight decks (IOTD) be required or offered as an equivalent measure for compliance with structural measures. The comment challenged the Coast Guard's refusal to consider IOTD on the basis of its alleged failure to meet the benchmark equivalency for alternative compliance found in Regulation 13G. The comment argued

that the Coast Guard's interpretation of the Regulation 13G standards was misleading and incorrect as it pertained to IOTD. According to the comment, the estimated installation costs for IOTD, \$2 million per vessel, would be approximately identical to fitting PL/Spaces. However, the comment asserted that cargo shutout amounts would vary from 2 percent for an IOTD equipped tanker to 19 percent for a tankship fitted with PL/Spaces. The comment also contended that the IOTD concept should be considered equivalent to a double hull.

The basis of the Coast Guard's determination of appropriate alternative measures for single-hull tank vessels in this final rule remains as stated in the SNPRM: the alternative must be approved by IMO's Marine Environment Protection Committee (MEPC) as an alternative structural arrangement meeting the requirements of Regulation 13G. Although IMO has accepted the concept of IOTD as a method for complying with the HBL alternative to Regulation 13G, this acceptance was not the only factor considered for this rulemaking. This final rule's regulatory assessment found that PL/Spaces, a combination of PL/Spaces and HBL, and HBL alone are all economically infeasible for pre-MARPOL tank vessels. A separate analysis using the IOTD shutout estimate of 2 percent and the refit costs of fitting PL/Spaces over 30 percent of the cargo tank area revealed that even with the reduced cargo shutout of IOTD, the cost-benefit of such a measure is not economically feasible. Calculations from this analysis estimated that the cost-benefit of implementing IOTD for vessels operating on U.S. coastal voyages ranged from \$62,200 to \$211,000, and from \$32,200 to \$159,300 per barrel of unspilled oil on those vessels operating on international voyages. The Coast Guard estimates that these ranges are a conservative representation of the IOTD's cost-benefit because the cost of fitting IOTD for the entire cargo area would be substantially higher than the cost of fitting bulkheads or double bottoms over 30 percent of the cargo area. The determination of equivalency between IOTD and a double hull is outside the scope of this rulemaking.

Another comment suggested that the Coast Guard adopt the American Underpressure System. This comment claimed that this inert gas controlled system dynamically controls the underpressure in the tank ullage space and would prevent oil spills above the line of rupture. This comment reasoned that since the Coast Guard has endorsed HBL and PL/Spaces it should also

accept alternative concepts, such as the American Underpressure System, that are similarly effective and result in comparable levels of risk regardless of IMO approval. According to the comment, the American Underpressure System is comparable in performance to the double hull, is significantly more effective than either HBL or PL/Spaces, and introduces no unmanageable risks. The comment estimated that the cost of implementing the American Underpressure System would be between 1 and 1.5 percent of the construction cost required to build a new single-hull tanker, while the cost to install a double hull would be between 30 to 40 percent of the construction cost required to build a new single-hull tanker. In addition, the comment claimed that the out-of-service time to retrofit the American Underpressure System was 1 to 3 weeks, compared to the 6 to 12 months typically required to install a double hull. Considering the loss of cargo capacity that would result from the installation of the double hull, as well as the comparison between the refit cost and out-of-service time required for the implementation of both measures, this comment concluded that no quantitative support exists to exclude the American Underpressure System as a viable alternative measure.

While underpressure systems could be less costly than PL/Spaces or HBL, they were not included in the regulatory assessment for this final rule because they have not been approved by IMO as an alternative to comply with Regulation 13G. Underpressure systems were specifically examined and discussed by IMO. These systems were expressly rejected by IMO due to various safety concerns.

Two comments recommended that the Coast Guard require emergency transfer systems (ETS). Another comment suggested that the Coast Guard develop industry-wide economic incentives that encourage companies to employ spill-reduction measures such as effective combinations of PL/Spaces and HBL prior to the regulatory phase-in dates and to engage in further development of promising new measures such as Underpressure Systems and ETS.

While ETS could be less costly than PL/Spaces or HBL, they were not included in the regulatory assessment for this final rule because they have not been approved by IMO as an alternative to comply with Regulation 13G and there are indications that, in some instances, they may be unsafe. The Coast Guard is using IMO approval of Regulation 13G alternatives as a benchmark because it provides international consistency as well as

general operational and safety requirements. Alternative measures creating conditions such as exposure of the tankship to stress, creation of fire or explosion hazards, stability considerations, and loading requirements are not approved by IMO. The Coast Guard's 1995 report to Congress entitled, "The Feasibility of Using Segregated Ballast Tanks (SBT) for Emergency Transfer of Cargo and Storage of Recovered Oil," concludes that when a vessel casualty occurs, fundamental changes in the vessel's stability often result. These stability changes make it potentially unsafe and inadvisable to use SBT for the emergency transfer of cargo. The Coast Guard did not consider an economic incentive program because it is beyond the scope of this rulemaking and Section 4115(b) does not provide the authority for incentives.

#### 5. Phase-In Alternatives

The Coast Guard received 15 comments on phase-in alternatives. Four comments claimed they could meet the 3-year phase-in period in the SNPRM, but would rather have one of the following options: (1) A phase-in period commencing no earlier than the date of a tank vessel's first scheduled dry docking following issuance of the final rule; (2) a requirement for industry to begin compliance in 1997 at a vessel's next scheduled dry dock, but no later than the year 2000; (3) a phase-in period no earlier than 1999 to 2001 for PL/Spaces to avoid substantial economic hardships on U.S. coastwise crude trading resulting from reduced cargo-carrying capacity; or (4) a phase-in for PL/Spaces at the vessel's next scheduled or emergency dry docking period, or at the next Certificate of Inspection renewal following issuance of the final rule, if dry docking is not required. Another comment urged the Coast Guard to delay the implementation of structural measures until at least 2000, which is the time when pre-MARPOL tank vessels reaching 25 years of age are required to comply with international standards. This comment explained that if the implementation dates were delayed, it would be easier for industry to meet the requirements, and, in addition, the Coast Guard would not have to account for the cost of implementing structural measures on these vessels in its final rule regulatory assessment. Another comment did not express support for structural measures, but suggested a standardized implementation period for domestic and foreign fleets.

In contrast, five comments strongly urged the Coast Guard to implement

structural measures immediately. Two of these comments limited their request to the implementation of HBL only, while another recognized the potential for delays in implementing structural measures on the pre-MARPOL fleet. One comment claimed that companies presently operating double-hull tank vessels are already providing higher levels of environmental protection, and consequently, are suffering economic penalties because single-hull tank vessels are still operating. Another comment alleged that the Coast Guard has failed to provide substantial protection to the environment by neglecting to promulgate a rulemaking within the deadlines established by OPA 90 and has harmed the public.

The Coast Guard has taken action to implement interim measures for existing tank vessels by issuing regulations for emergency lightering equipment and advanced notice of arrival requirements (59 FR 40186; August 5, 1994), and operational measures (61 FR 39769; July 30, 1996). These efforts reduce the risk of oil discharges from existing single-hull tank vessels. In order to ensure the equal consideration of economic burden on each facet of the industry, this final rule did not consider a staggered implementation schedule across the single-hull fleet. The regulatory assessment for this final rule analyzes the costs and benefits of implementing HBL on MARPOL as well as pre-MARPOL vessels starting in 1997. The assessment also considers implementation of PL/Spaces with ballast on pre-MARPOL vessels starting in 1997, assuming completion by 2000. The Coast Guard notes the comment pertaining to the OPA 90 deadline.

#### 6. Increased Potential for Environmental Harm

The Coast Guard received a total of 17 comments suggesting that the implementation of structural measures would lead to a greater risk of oil outflow, resulting in an increased risk of environmental harm. Eight comments attributed the greater environmental risk to the reduction in cargo capacity. Reduced cargo capacity would lead to more vessels or voyages necessary to transport cargo, thus increasing tank vessel traffic. Increased tank vessel traffic would create a greater potential for accidents, in opposition to the objectives of OPA 90.

Six comments claimed that complications resulting from physical structural modifications would increase the risk of vessel damage and instability, eventually leading to a greater probability of structural failure. The three remaining comments suggested

that the implementation of structural measures would pose an increase in safety hazards for vessel personnel.

Estimated cargo shutout from measures similar to Regulation 13G revealed that the resultant increase in the tank vessel traffic would be about 12 percent. This represents an approximate 2 percent increase in the total U.S. port deep draft traffic volume. The Coast Guard assumes that this small increase in traffic volume would be offset by the accident reduction measures implemented through operational measures. The Coast Guard agrees that some measures studied would modify the distribution of hull girder stresses and shear forces. In some instances, vessel owners may have to conduct additional structural analyses to determine how these stresses change the vessel's structural integrity. In those cases where the stresses would not be within allowable tolerances, additional structural safeguards such as swash bulkheads may be required. In the cost analysis for this final rule, refitting expense was considered for all measures, including HBL on MARPOL tankships. The Coast Guard recognizes that material stresses on a vessel's hull can develop due to hot work, specifically from the marriage of large areas of new metal to existing plate or framing. In some cases, this type of material stress has contributed to structural failure. If however, proper shipyard procedures are followed and there is thorough oversight of vessel construction or refits by the Coast Guard inspectors or classification societies, material stresses can be prevented. Corrosion damage due to converting cargo tanks to ballast tanks is valid and the cost to coat tanks has been considered in the regulatory assessment for this final rule. The Coast Guard disagrees with the claim that structural measures would pose a safety hazard for vessel personnel. Oil outflow reduction measures are incorporated directly into the vessel's design or provide passive protection with little human interface.

#### 7. State Regulation

The Coast Guard received four comments regarding Federalism issues. Two comments urged the Coast Guard to unambiguously declare that regulations promulgated for structural measures preempt State laws to avoid confusion arising from many independent laws. In contrast, two remaining comments strongly recommended that the Coast Guard declare that Federal law does not preempt State law on structural measures. The Coast Guard believes the clear and manifest purpose of Congress

is to confer upon the Federal government, through the Coast Guard, the exclusive authority to set structural standards for vessels to protect the environment from harm. The Coast Guard has determined that no additional structural measures are required for single-hull tank vessels. Nevertheless, the Coast Guard believes that States are precluded from imposing structural measures on tank vessels operating in interstate or foreign commerce.

#### 8. Technical Feasibility of PL/Spaces and HBL

Seven comments addressed implications of required implementation of PL/Spaces. One comment suggested that the Coast Guard consider alternative PL/Space configurations such as splitting the protected area between the vessel's side and bottom as an option. Another between the vessel's side and bottom as an option. Another comment encouraged the Coast Guard to conduct further studies on potential PL/Space configurations prior to mandating MARPOL requirements for the sake of uniformity. In addition, another comment recommended that the Coast Guard designate the location of PL/Spaces to ensure all vessels have the same built-in protection. One comment specifically urged the Coast Guard not to require PL/Spaces as this modification would lead to a greater demand on the ship-building industry, resulting in the production of inferior vessels. In contrast, one comment asserted that PL/Spaces are technologically feasible and recommended that PL/Spaces be required on all single-hull vessels.

For most tank vessel designs, the most technologically feasible place to install PL/Spaces is in the tankship's midbody. However, due to unique design considerations and the need to vary a vessel's draft or cargo-carrying capacity, the Coast Guard researched and analyzed the cost and benefit of allowing the owner to designate the location of PL/Spaces on their vessels. The Coast Guard assumes that by mandating the location of PL/Spaces for all tank vessels, the installation costs and benefits realized would be similar to those realized in the event that vessel owners were able to choose the PL/Space locations. While the Coast Guard has determined that PL/Spaces are technologically feasible, fitting them on pre-MARPOL tankships is economically infeasible.

A total of 15 comments were received pertaining to HBL. Eight opposed HBL for reasons including the following: (1)

The implementation of HBL would place pre-MARPOL vessels at a competitive disadvantage with MARPOL vessels, because they are already required to contain PL/Spaces under Regulation 13G; (2) HBL would be practically impossible to use because, depending on the type of cargo carried, problems may arise due to variances in density, tank coating compatibility, heating and cooling requirements, and permissible last cargoes; (3) HBL would necessitate revisions to vessel manuals and equipment; and (4) HBL would represent a significant regulatory challenge requiring strong, effective operational enforcement through Coast Guard oversight of industry compliance. Additionally, two comments suggested that HBL would provide only minimal oil outflow protection during groundings. One of these comments specifically explained that based on the static model used by the Coast Guard to test HBL's effectiveness, HBL may indicate a theoretical reduction in oil outflow for some grounding scenarios. However, after an accident, HBL may have limited effectiveness due to highly dynamic situations, such as weather-related impacts, tide ranges, and changes in ship trim and heel. Another two comments contended that HBL is not a structural measure requiring physical modifications, but an operational measure requiring a skilled knowledge of certain operating procedures.

In contrast to the opposing comments, the Coast Guard received seven comments supporting implementation of HBL. One comment noted that compliance with HBL requirements could be easily verified by tank gauging report examinations and draft mark inspections. Another comment recommended implementation of HBL on all single-hull vessels. An additional two comments suggested employment of HBL in all vessel cargo tanks, as opposed to only those tanks that are probabilistically located. One comment based this recommendation on two assumptions: (1) HBL would be easy to implement immediately as structural refits would be unnecessary; and (2) HBL would effectively reduce oil outflow in grounding incidents.

The Coast Guard has determined that HBL, in general, is technically feasible for single-hull tankships. Multi-port voyages and complex cargo carriage operations make HBL more time-consuming and difficult to meet. Also, some vessels would have costs attributable to HBL that are beyond the cargo shutout costs assumed in the SNPRM regulatory assessment. The regulatory assessment for this final rule

accounts for some costs associated with HBL measures on smaller tankships since these vessels are most likely to have difficulty implementing HBL. The effectiveness estimates associated with HBL in reducing the outflow of oil in a grounding were not changed for this final rule assessment because the Coast Guard deems the estimates to be representative of static, as well as limited dynamic conditions. The Coast Guard recognizes that enforcement of HBL would require its direct oversight to ensure compliance by all single-hull vessel owners or operators and that tank gauging reports could be used as tools. Since no structural measures are economically feasible, the Coast Guard will be using its resources to ensure operational measures are met. The Coast Guard did not analyze the cost-benefit of requiring tank vessel owners or operators to use HBL in all cargo tanks. However, if the cost to benefit ratio of applying HBL to those cargo tanks that are located in areas of higher damage risk is prohibitive, then the cost to benefit ratio for applying HBL to all cargo tanks is also infeasible.

Four comments suggested that the Coast Guard require a combination of PL/Spaces and HBL. One comment suggested a combination of PL/Spaces covering 30 percent of the vessel's side or bottom with HBL for the remaining tanks to the extent necessary for compliance with Regulation 13G. Another comment recommended employment of PL/Spaces covering 100 percent of center tank bottoms, if HBL is used in wing tanks.

The Coast Guard has analyzed the cost and the resultant oil outflow benefits attributable to a combination of fitting PL/Spaces and applying HBL measures to pre-MARPOL tankships in accordance with Regulation 13G. The cost for this measure when compared to its benefits make this measure economically infeasible. If the combination of PL/Spaces and HBL is not cost-effective, then employing the more onerous requirement of 100 percent PL/Spaces would also be infeasible.

#### Amendments to 33 CFR 157

This final rule amends the subpart G, H, and I heading to reflect that no structural measures are required as interim measures for existing tank vessels without double hulls to meet the requirements of Section 4115(b) of the Oil Pollution Act of 1990. The measures required under subparts G, H, and I are all measures the Coast Guard has determined are economically and technologically feasible for enhancing

the oil pollution prevention efforts of existing single-hull tank vessels.

#### Assessment

This rule is a significant regulatory action under section 3(f) of Executive Order 12866 and has been reviewed by the Office of Management and Budget under that Order. It required an assessment of potential costs and benefits under section 6(a)(3) of that Order, and is significant under the regulatory policies and procedures of the Department of Transportation (44 FR 11040; February 26, 1979). An Assessment has been prepared and is available in the docket for inspection or copying where indicated under **ADDRESSES**. The Assessment is summarized in the following discussion.

This rulemaking applies to all existing vessels of 5,000 gross tons (GT) or more that do not have double hulls and that carry oil, animal fat, vegetable oil, and other non-petroleum oil in bulk as cargo. An estimated 995 existing tankships (51 U.S. tankships, 944 foreign tankships) that will be operating on U.S. navigable waters in 1997 were considered to be affected by this rulemaking.

This final rule assessment revises the benefits assumptions and calculations of the regulatory assessment conducted for the supplemental notice of proposed rulemaking (SNPRM). Cost estimates were appropriately reduced to account for implementation of Regulation 13G of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (Regulation 13G) within the international fleet. Costs were also revised where comments indicated that costs were underestimated or omitted in the SNPRM analysis. The vessel population not required to meet the pollution prevention requirements of the 1973 International Convention for the Prevention of Pollution from Ships (pre-MARPOL) was also reassessed and reduced based on port call data and certificate of financial responsibility applications. The cost and benefits for vessels meeting the requirements of the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL 73) and vessels meeting the MARPOL 73 convention as amended by the 1978 Protocol (MARPOL 78), were combined in this final assessment. MARPOL 73/78 refers to vessels meeting MARPOL 73 and vessels meeting MARPOL 78 requirements.

#### General Comments on the SNPRM Regulatory Assessment

The Coast Guard received 36 comments addressing general regulatory assessment issues. Most of the comment criticized the Coast Guard's use of oil spill data from accidents occurring prior to the promulgation of the Oil Pollution Act of 1990 (OPA 90), because using this data resulted in the underestimation of costs and overestimation of benefits. The majority of these comments were based on a general impression that little benefit would result from the implementation of proposed structural measures in relation to the extensive costs involved. One comment specifically noted that studies performed by the International Maritime Organization (IMO), the Coast Guard, and Herbert Engineering Corporation failed to indicate that these measures were cost-effective.

The Coast Guard has revised its regulatory assessment for this final rule. The major difference between its assessment for the SNPRM and this final rule is the recalculation of anticipated oil outflow benefits based on the accident data for single-hull tankships from 1990 through 1994. This five-year period indicates a reduction of single-hull tankship accidents and reflects many of the improvements industry has made to reduce oil spills since OPA 90.

Another comment contended that a cost-benefit analysis was not authorized by OPA 90. The comment asserted that OPA 90 requires the Coast Guard to adopt measures providing the maximum protection to the environment that are economically feasible, not the ones that are least costly. Two other comments argued that economic feasibility should not be determined solely by a limited cost-benefit analysis. One of these comments maintained that economic feasibility should be based on whether the costs are wholly disproportionate to the benefits on an industry-wide scale, with the fate of one isolated firm or facility immaterial to the outcome of the rule. The other comment contended that economic feasibility should be based on the industry's ability to pass on or absorb costs without threatening the competitive structure of the industry.

Several requirements to conduct a cost-benefit analysis exist in law. One law requiring such analysis, which is specifically applicable to this rulemaking, is the Small Business Regulatory Enforcement Fairness Act of 1996. For this final rule, an evaluation of cost and its relationship to the anticipated benefits was performed with respect to structural measures. The evaluation included a review of the

potential impact of such measures on small entities, as well as a comparison of the impact on domestic versus international fleet vessels. The disproportionate cost to U.S. tankship companies operating on coastal routes, considering the little anticipated benefit in oil outflow reduction, was key in the Coast Guard's determination of economic infeasibility for structural measures.

#### Industry Costs

This final rule reassessed the cost of implementing structural measures in order to estimate the cost-benefit of requiring pre-MARPOL tankships to meet the requirements of Regulation 13G earlier than the 25 year age limit it imposes. In addition, costs were also reassessed to reflect the range of cargo shutout amounts realized by vessels depending on the type of cargo carried, i.e., crude or product. Finally, to ensure that a thorough examination of the cost to benefit ratio was conducted, costs were broken down by deadweight tonnage.

#### Cost Comments on the SNPRM Regulatory Assessment

(a) *General:* The Coast Guard received over 40 comments regarding various cost issues. Only two of the comments believed that the proposed structural measures would be economically feasible. One of these comments specifically disagreed with the hydrostatic balance loading (HBL) cost estimates attributed to vessels complying with the Ports and Waterways Safety Act or otherwise equipped with segregated ballast tanks (SBT). The comment argued that HBL would not result in a loss of cargo capacity for either vessel type.

The majority of the comments claimed that structural measures would not be economically feasible due to the excessive cost resulting from the reduction in cargo capacity. Most comments predicted a cargo capacity reduction of between 8 and 25 percent, but a few indicated that cargo capacity would be reduced by as much as 30 to 50 percent. If measures were applied to all vessels, one comment contended that a level economic playing field could be achieved throughout the industry and the high costs of cargo shutout could be adequately offset by an indirect distribution of costs to the public. Other comments stated that the cost estimates for structural measures did not adequately address opportunity costs (such as lost transportation time), time charter rates, dry dock fees, depreciation losses, and transportation, delivery, crew, fuel, financing, and insurance

costs. In addition, four comments claimed that some vessels would be unable to continue operations to U.S. ports if structural measures were implemented. Five more comments stated that the proposed measures would not be economically feasible for their fleet because their vessels would be phased-out of service shortly after incurring the cost of any structural measures. One of these comments suggested that rather than depleting limited financial resources to implement structural measures, vessel owners and operators should use the finances to support their fleet's transition to double hulls, which will become effective in 2015.

Another comment claimed that HBL-related cargo shutout amounts for the pre-MARPOL fleet were overestimated by the Coast Guard, and would amount to only 8 percent or less, as opposed to the 19 percent estimated in the SNPRM regulatory assessment. Consequently, this comment believed that HBL would be economically feasible, and that structural measures would cause a relatively insignificant 1.5 percent increase in tonnage demand on the international, import-trading fleet. In contrast, four other comments strongly stated that when costs are reviewed with respect to freight rates and worldwide tonnage capacity, the implementation of structural measures would not be economically feasible. Two comments stated that the SNPRM cost analysis substantially underestimated costs by not recognizing the cost of replacing lost oil-carrying capacity, and by not accounting for an increase in charter rates (and oil prices) caused by the consequent loss of capacity in the world fleets. The comments further explained that while there is some slack cargo carriage capacity remaining in the world's very large crude carrier (VLCC) tankship fleet, it is disappearing rapidly as older ships continue to retire, and any requirement reducing cargo capacity would inevitably exert substantial upward pressure on charter rates and transportation costs worldwide. The comments also calculated that the world scale spot charter market rate would increase as much as four times the cost attributed by the SNPRM to a VLCC tankship owner implementing HBL. Another comment estimated that the significant increase in daily time charter rates (from 27 to 78 percent to recover the costs of implementing protectively-located spaces (PL/Spaces) to its pre-MARPOL fleet, and from 6 to 32 percent to recover the costs of fitting double sides to its MARPOL 73/78 fleet) on

their tankships of less than 30,000 dwt would severely impact their ability to recover their capital investment. Consequently, the comment stated this would reduce its current fleet of 42 tankships trading in U.S. waters to 6 tankships. The fourth comment calculated that the total tonnage available for the U.S. trades in the 25,000 to 30,000 dwt product carrier category would be reduced 45 percent because of increased charter rates and reduced cargo-carrying capacity. The comment went on to state that due to the costs associated with the implementation of structural measures, 8 clean product tankers currently providing 64 percent of the clean product to the U.S. Gulf and East Coast would be forced from U.S. trade.

The Coast Guard has revised the cost and benefit calculations for this final rule in consideration of the comments submitted to the docket. This final rule assessment is extensive and uses factors such as cargo loss, or lack thereof for vessel's fitted with SBT, opportunity costs, and a wide range of costs a company might incur from refitting a vessel. Financing, insurance costs, vessel depreciation, the replacement of lost tonnage (resulting in time charter rate increases), and a vessel's limited remaining life under the OPA 90 phase-out schedule were used, in general, to evaluate the cost-effectiveness of replacing single-hull vessels with double hull vessels earlier than their OPA 90 mandated dates. Concerns such as the loss of a substantial portion of a company's fleet due to structural measures, as well as the possibility of disproportionate indirect costs to consumers in geographic areas dependent on a single oil source were key in the Coast Guard's determination of economic infeasibility.

(b) *Pre-MARPOL Tank Vessels:* Two comments supplied specific data for their international pre-MARPOL vessels between 5,000 to 29,000 dwt. One of these comments estimated a cargo shutout of 25 to 27 percent and refit costs of \$225,000 per vessel to implement structural measures on these smaller product tankers. The second comment indicated that each of their parcel tankers would be subjected to a cargo shutout of 35 percent with an average refit cost of \$10.3 million. Another comment supplied only cargo shutout information for international pre-MARPOL product tankers of 5,000 to 50,000 dwt. This comment calculated a cargo shutout of 20 to 25 percent for PL/Spaces, with HBL increasing the shutout to 28 to 35 percent. One comment estimated that the implementation of HBL would result in

a cost of \$2 million per vessel for the pre-MARPOL fleet. Another comment contended that the cost to pre-MARPOL tankships operating as very large crude carriers (VLCC) was overestimated in the SNPRM regulatory assessment, and that the pre-MARPOL VLCC tanker model used in the SNPRM regulatory assessment was not representative of a typical tanker of that size. As a result, according to this comment, the Coast Guard's assumption that all VLCC pre-MARPOL tankships will have to refit PL/Spaces to meet the requirements of Regulation 13G is false. This comment indicated that five vessels researched would be able to meet the requirements of Regulation 13G by using the HBL criteria approved as an IMO alternative. In a similar vein, another comment disagreed with the Coast Guard's assumption that pre-MARPOL tankers reaching the age of 25 before 2002 would have to implement PL/Spaces to meet Regulation 13G. This comment explained that these tankers can implement HBL to meet the international requirement of 13G and continue to trade; thus, if PL/Spaces are mandated without allowing for the HBL alternative, the cost to fit such spaces on pre-MARPOL tankers reaching 25 years old before 2002 should be included in the regulatory analysis.

For this final rule, the Coast Guard reassessed the costs and benefits of implementing different structural measures on the international pre-MARPOL tankship fleet. Measures studied for this reassessment included the combination of PL/Spaces and HBL, the use of HBL only in order to meet the requirements of Regulation 13G, and the implementation of HBL requirements on the identical timeline required by Regulation 13G. The per vessel, per voyage cost for implementing HBL in the final assessment varied depending on deadweight tonnage and ranged from \$121,000 to \$2.4 million. The Coast Guard recognizes that the assessment for the SNPRM only reflected cargo shutout cost for crude carriers. In the assessment for the final rule, costs were broken down by deadweight tonnage. A separate analysis was done to estimate the effect higher cargo shutout amounts realized by small product tankers may have on the cost-effectiveness of each of the structural measures researched. The Coast Guard did not increase the refit cost assumed in the SNPRM for small tankships because it deems the original onetime refit cost estimate of \$328,000 to be reasonable.

(c) *MARPOL 73/78 Tank Vessels:* Three comments supplied information on U.S. coastal fleet, MARPOL 73/78 vessels. For product tankers in the 5,000

to 49,000 dwt category, one comment submitted cargo shutout amounts approximating 207,515 long tons (LT) per year (yr), and opportunity costs (which include structural refit costs needed to meet the HBL requirement) of \$1 to \$3 million per vessel. Another comment supplied shutout percentages for product vessels carrying heavy (bunker C), medium (diesel oil), and light (gasoline) cargoes, using three different variations of structural measures. According to their calculations, shutout using HBL only would equal 5.5 percent for heavy cargo, 19.5 percent for medium weight cargo, and 38 percent for light cargo. Clean ballast tanks (CBT) with HBL would impose cargo shutouts of 29 percent, 41.6 percent, and 50 percent, respectively. Ballasted empty wing tanks with HBL would result in shutouts amounting to 53.6 percent, 59.2 percent, and 64.5 percent, respectively.

A comment estimated that crude-carrying U.S. MARPOL 73/78 vessels ranging from 5,000 to 49,000 dwt would experience shutouts of 113,077 LT/yr, and refit costs of \$1 to \$3 million per vessel following the implementation of structural measures. For crude-carrying tankers of the 50,000 to 89,000 dwt category, shutouts were approximated at 326,195 LT/yr, with refit costs again ranging from \$1 to \$3 million per vessel. Crude-carrying vessels operating in the 90,000 to 199,000 dwt range were estimated to potentially experience shutout amounts of 724,655 LT/yr and refit costs of \$1 to \$3 million per vessel following implementation of structural measures. For those crude-carrying vessels comprising 200,000 dwt or greater, a comment indicated that shutout would amount to 861,785 LT/yr plus \$1 to \$3 million in refit costs per vessel.

Two comments supplied information relating to the international MARPOL 73/78 fleet. For product-carrying vessels of 30,000 to 49,000 dwt, a cargo shutout cost was calculated to be \$300,000 per year (or \$1.5 million for the remainder of the ship's life). For parcel tankers operating in the 5,000 to 29,000 dwt category, cargo shutout was estimated at 34 percent for the implementation of HBL, plus 10 percent for the implementation of PL/Spaces when required, while refit costs amounted to an average \$7.4 million per vessel. Calculations submitted for parcel tankers operating in the 30,000 to 49,000 dwt category, showed 34 percent

shutout using HBL, plus an additional 10 percent for PL/Spaces where required, with refit costs averaging \$11.9 million per vessel.

For this final rule, the Coast Guard reassessed the costs and benefits of implementing HBL on the MARPOL 73/78 tankship fleet. A range of cargo shutout amounts was used to demonstrate the variance between the cost of implementing HBL on crude-carrying and product-carrying vessels. Per vessel, per voyage cargo shutout estimates for implementing HBL in this final assessment also varied depending on a vessel's deadweight tonnage, and ranged from \$151,000 to \$2.4 million. The Coast Guard recognizes that the assessment for the SNPRM did not include a refit cost for MARPOL 73/78 vessels. Onetime refit costs to MARPOL 73/78 vessels for swash bulkheads or other associated structural changes were added to the cost estimates for this final assessment. This onetime refit cost was assumed for MARPOL 73/78 vessels between 5,000 and 50,000 dwt in order to account for the practical application of HBL to these smaller tankships, which would necessarily have to fit some proportion of PL/Spaces to account for the high shutout consequences of HBL. Refit costs were not included for larger MARPOL 73/78 vessels because it was assumed that these vessels have sufficient CBT or PL/Spaces to practically apply HBL, assuming the cargo shutout amounts estimated in this final rule's regulatory assessment.

(d) *Tank Barges*: One comment estimated that for tank barges, the installation of PL/Spaces would impose average costs of \$3 million per tank barge, while the implementation of HBL would reduce cargo capacity by 33 to 50 percent, and in some cases, 100 percent per barge. This comment went on to explain that such costs are not readily absorbed, and are even exacerbated by the limited service life remaining for some of these barges, the enormous capital expenditure necessitated by the OPA-mandated transition to double hulls, and the diminution in value of the existing barge fleet brought on by the OPA-mandated replacement schedule. Another comment surmised that it was not technologically feasible for barges to meet the requirements of PL/Spaces or HBL without eliminating cargo tanks or performing major modifications at a significant cost. This comment estimated that PL/Spaces would reduce cargo capacity by 25

percent on barges with three longitudinal bulkheads, while HBL would impose a cargo shutout of 50 percent for barges with one longitudinal bulkhead. In addition, the costs of installing longitudinal bulkheads were estimated at \$800,000 to \$1.2 million per barge, ballast systems and tank coatings at \$400,000 to \$500,000 per barge, and opportunity costs at \$600,000 to \$800,000 per barge.

The Coast Guard reviewed and reassessed the cost for U.S. tank barge owners to comply with PL/Spacing requirements using either added bulkheads or existing tanks, and HBL requirements. The costs analyzed for the PL/Space options were similar to those used in the SNPRM assessment, but the costs studied for HBL measures were estimated by using figures provided in the comments. The phase-out dates for these barges were also factored into this cost analysis, along with costs similar to those incurred by the pre-MARPOL fleet. Through this final rule, the Coast Guard verifies that because of the high cost of implementing structural measures on tank barges, such measures are not economically feasible.

#### Final Rule Cost Assessment

The cost assessment for this final rule, as presented in Table 1, provides an estimate of costs for each tank vessel category (pre-MARPOL or MARPOL 73/78) and deadweight tonnage range. In general, these costs were calculated using a methodology similar to that done for the SNPRM assessment. However, additional analyses were used to calculate the projected costs of several variations of measures researched for the SNPRM including: (1) Implementation of Regulation 13G on the pre-MARPOL fleet in 1997, 1998, or 1999; (2) implementation of Regulation 13G on the pre-MARPOL fleet using the same timeline mandated by that regulation; (3) implementation of the HBL alternative allowed under Regulation 13G on the pre-MARPOL fleet; and (4) implementation of HBL on tank barges. An estimated range of costs was also developed to represent the difference in cargo shutout amounts attributable to vessels carrying crude oils (low number) and vessels carrying lighter products (high number). As a summary, the present-value cost of implementing certain structural measures in 1997 is presented in Table 1.



**Table 1: Cost Due to Certain Structural Measures**

Estimated Present Value Cost in Millions for Single-Hull Fleet (1997 through 2015)\*

Cost Range Represents Variation in Cargo Shutout to Reflect Crude or Product Cargos

Deadweight Tonnage (x1,000)	<b>Pre-MARPOL</b>			
	P/L Spaces with Ballast		HBL to meet 13G(7)	
	<u>International</u>	<u>U.S. Coastal</u>	<u>International</u>	<u>U.S. Coastal</u>
5 - 29	\$262.7 - \$338.4	\$26.3 - \$34.1	\$50.5 - \$378.4	\$5.3 - \$39.4
30 - 49	\$125.1 - \$141.6	\$13.7 - \$15.7	\$22.1 - \$166.0	\$2.8 - \$20.7
50 - 89	\$63.2 - \$71.0	\$7.2 - \$8.2	\$10.2 - \$77.2	\$1.4 - \$10.8
90 - 199	-----	\$21.3 - \$23.1	-----	\$4.2 - \$10.5
90 - 144	\$91.6 - \$99.7	-----	\$16.3 - \$40.8	-----
145 - 199	\$6.7 - \$7.2	-----	\$1.6 - \$3.2	-----
200+	\$159.1 - \$171.6	\$11.5 - \$12.5	\$17.9 - \$35.7	\$2.1 - \$5.2
Total	\$708.4 - \$829.5	\$80.0 - \$93.6	\$118.6 - \$701.3	\$15.8 - \$86.6

Deadweight Tonnage (x1,000)	<b>MARPOL 73/78</b>	
	HBL to meet 13G(7)	
	<u>International</u>	<u>U.S. Coastal</u>
5 - 49	\$186.9 - \$314.6	\$22.5 - \$93.1
50 - 89	\$270.4 - \$339.9	\$10.6 - \$16.2
90 - 199	-----	\$30.4 - \$39.7
90 - 144	\$261.7 - \$319.8	-----
145 - 199	\$49.6 - \$60.6	-----
200+	\$116.3 - \$142.2	\$10.6 - \$13.0
Total	\$884.9 - \$1,177.1	\$74.1 - \$162.0

Deadweight Tonnage (x1,000)	<b>U.S. Tank Barges</b>		
	PL/Spaces <u>Refit</u>	PL/Spaces using <u>Cargo Tanks</u>	<u>HBL</u>
	5 - 29	\$148.4 - \$160.4	\$48.9 - \$216.6
30+	\$54.0 - \$66.6	\$58.8 - \$142.5	\$19.0 - \$126.5
Total	\$202.4 - \$227.0	\$107.7 - \$359.1	\$33.0 - \$267.0

\* In accordance with Office of Management and Budget guidance costs and benefits have been discounted by 7% back to 1990.

## Benefits

The benefit analysis for this final assessment, in general, uses a methodology similar to that used in the SNPRM for evaluating the incremental reduction in volume of oil spilled as a result of structural measures. Although effectiveness ratios for international pre-MARPOL vessels were reevaluated based on the implementation of Regulation 13G, other effectiveness ratios remained the same as those reported in the SNPRM assessment. However, the volume of oil spilled due to accidents was estimated based on revised historical oil spill data reflecting: (1) The accident history of single-hull tankships since the enactment of OPA 90; (2) the anticipated reduction in oil spills due to the effect of the operational measures final rule on the frequency and severity of future accidents; and (3) the elimination of operational discharge benefits from the calculation, since operational discharge is not allowed in U.S. navigable waters.

## Benefit Comments on the SNPRM Regulatory Assessment

Six comments included remarks regarding the potential environmental benefits that may result from the implementation of structural measures. Three comments urged the Coast Guard to provide equal or greater consideration to the environmental benefits derived from the use of structural measures. Yet another comment contended that the SNPRM regulatory assessment failed to properly assess the benefits of the measures considered, citing the Coast Guard's failure to state the value of avoiding spills in comparable terms such as cleanup costs, natural resource damages, restoration costs, and commercial and recreational losses. Another comment urged the Coast Guard to include the potential reduction of both environmental and economic damages from oil not spilled in its regulatory analysis.

Although the Coast Guard recognizes the value of assessing benefits in terms of the cost of third-party cleanup and damage to natural resources, the Coast Guard, for all OPA 90 rulemakings, has reviewed benefits from the perspective of the amount of oil not spilled, rather than a dollar value figure. Details on the extensive work that NOAA has done on this subject can be found in its final rule entitled, "Natural Resource Damage Assessments" published in the Federal Register on January 5, 1996 (61 FR 440). When calculating benefits using NOAA natural resource guidance, a wide range of benefits can be estimated depending

on the sensitivity of the habitat, restoration costs, compensable value, and damage assessment costs. However, the inclusion of these factors would not significantly increase the benefits resulting from the implementation of structural measures to make them cost-effective.

The remaining comments minimized the potential benefits that may arise from the use of structural measures, and essentially concluded that structural measures would contribute little to the reduction of oil spill volume in U.S. waters. One comment noted that the environmental benefits resulting from the implementation of PL/Spaces would likely be minimal because the most cost-effective location for such spaces, the vessel's mid-body, would not provide adequate protection to the fore and aft sections of the vessel, which are the areas most likely to sustain damage in collisions. Another comment contended that the Coast Guard overestimated operational discharge benefit amounts by wrongly assuming that foreign tankers are not operating to the same operational discharge criteria as U.S. tankers, explaining that discharge criteria established by the 1973 International Convention for the Prevention of Pollution from Ships was brought into force in the late 1970s and applies to over 90 percent of the world's tanker tonnage. Two comments argued that the Coast Guard overestimated benefits for pre-MARPOL vessels by using the MARPOL 73 maximum allowable discharge amounts and underestimated the operational discharge benefits from MARPOL 73/78 vessels, which were incorrectly assumed to have no discharges. One of these comments questioned the Coast Guard's incorporation of operational discharges into the regulatory assessment for the SNPRM in the first place, because all operational discharge is forbidden in U.S. waters. Therefore, the comment asserted that the quantities of unspilled oil occurring from operational discharge were significantly overestimated in the SNPRM regulatory assessment and should be removed from the benefit calculations. The other comment calculated that the quantity of oil not spilled from operational discharges from pre-MARPOL vessels when converting to SBT/CBT was overestimated by the Coast Guard by a factor of 10 to 20.

A total of nine comments challenged the Coast Guard's use of pre-OPA 90 oil spill data in the regulatory assessment for the SNPRM, primarily on the grounds that it did not reflect the significant gains achieved in oil spill reduction within recent years. In

addition, several comments recommended that the Coast Guard consider the following when reviewing post-OPA 90 data: oil released from accidents, instead of oil released from operational discharges; and, accident data involving groundings or structural failures. In contrast, other comments stated that the Coast Guard should specifically exclude the following data from the economic assessment for structural measures: spill data in international waters; lightering zone data; and barge and tanker spill data unrelated to groundings, collisions, and structural failures.

The Coast Guard has extensively reassessed the anticipated benefits for structural measures in this final rule. This reassessment was done because the Coast Guard recognized the substantial decrease in oil spill volume from the tank vessel industry since 1990. The Coast Guard agrees that oil spill amounts attributed to operational discharges should not be included as a benefit for structural measures. The Coast Guard deems this final rule benefit assessment a reasonable estimate of oil outflow reduction amounts achieved through the implementation of structural measures.

## Final Rule Benefit Assessment

Oil spill amounts attributed to single-hull tankships and tank barges during the 5-year period of 1990 through 1994 were taken from the regulatory assessment for the operational measures final rule if the spills were caused by groundings, collisions, or structural failures. Based on this accident data, an average annual oil spill amount from single-hull tankships was estimated at 11.52 barrels per vessel. The average annual oil spill amount from single-hull tank barges over 5,000 GT was estimated to be 72.4 barrels per barge. Using a combination of the phase-out schedule and the build dates of the affected vessel population, as calculated in the SNPRM assessment, an estimated present value of oil spilled due to groundings, collisions, or structural failures was calculated to be 52,369 barrels for single-hull tankships and 21,487 barrels for barges. Based on anticipated oil spill prevention resulting from the implementation of operational measures, this present value oil spill amount was reduced appropriately and estimated to be between 16,768 and 32,520 barrels spilled between 1997 and 2015 for tankships and between 18,055 and 19,865 barrels spilled for tank barges. The average of this present value oil spill amount was then proportioned out between the four tankship categories based on vessel population as follows: (1) International pre-MARPOL (11,735

barrels); (2) U.S. pre-MARPOL (558 barrels); (3) International MARPOL 73/78 (11,742 barrels); and (4) U.S. MARPOL 73/78 (608 barrels). For U.S. and international tank barges, the average present value of 18,960 barrels spilled was used in this analysis. As done in the SNPRM, the U.S. fleet consists of vessels that only operate in U.S. coastwise trade. If a U.S. flagged vessel also trades between international ports, it was accounted for in the international population.

To estimate benefits in terms of oil unspilled, each structural measure's ability to reduce oil outflow in a grounding, collision, or structural failure accident was calculated and translated into an effectiveness ratio similar to those developed for the

SNPRM assessment. This effectiveness ratio was then multiplied by the anticipated annual oil spill amount for each of the three accident types to calculate the anticipated benefits of the implementation of structural measures.

Because comments received on the SNPRM stated that the cost to benefit ratio was disproportionate for smaller tankship operations, anticipated oil spill benefits were further broken down by deadweight tonnage. Benefits were also calculated for pre-MARPOL fleets where HBL was instituted to meet the requirements of Regulation 13G. The Coast Guard recognizes that PL/Spaces must be ballasted down in order to provide oil outflow benefits, despite the fact that Regulation 13G does not articulate this requirements.

Consequently, for this final rule assessment, benefits for the measure combining PL/Spaces and HBL were calculated based on the assumption that the spaces were ballasted down. The benefits estimated for this final rule are significantly less than those estimates used in the SNPRM, because the recalculation of benefits did not include consideration of operational discharge benefits for pre-MARPOL vessels, and because the spill history used for all tankships reflects post-OPA 90 accident data. Table 2 is a summary of the present-value benefits estimated for this final rule with respect to vessel type and deadweight tonnage based on an implementation date of 1997.

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**Table 2: Benefits Due to Certain Structural Measures**

Average Present Value Barrels Unspilled (1997 through 2015)\*

Deadweight Tonnage (x1,000)	Pre-MARPOL			
	P/L Spaces with Ballast		HBL to meet 13G(7)	
	<u>International</u>	<u>U.S. Coastal</u>	<u>International</u>	<u>U.S. Coastal</u>
5 - 29	1,525.5	61.8	572.7	23.6
30 - 49	576.7	24.3	292	12.6
50 - 89	304.7	16.9	154.2	5.1
90 - 199	-----	26.0	-----	10.7
90 - 144	260.3	-----	115.6	-----
145 -199	8.1	-----	3.5	-----
200+	414.2	12.3	137.2	4.1
Total	3,089.5	141.3	1,275.2	56.1

Deadweight Tonnage (x1,000)	MARPOL 73/78	
	HBL to meet 13G(7)	
	<u>International</u>	<u>U.S. Coastal</u>
5 - 49	513.0	27.3
50 - 89	583.9	11.0
90 - 199	-----	36.9
90 - 144	391.7	-----
145 -199	57.5	-----
200+	159.3	7.3
Total	1,705.4	82.5

Deadweight Tonnage (x1,000)	U.S. Tank Barges		
	PL/Spaces <u>Refit</u>	PL/Spaces using <u>Cargo Tanks</u>	<u>HBL</u>
	5 - 29	3,925.0	3,925.0
30+	1,442.7	1,442.7	1,125.0
Total	5,367.70	5,367.70	2,598.40

\* In accordance with current Office of Management and Budget guidance program costs and benefits are discounted at 7% back to 1990.

### Cost-Benefit

Cost-benefit calculations were completed using the revised cost and benefit estimates calculated for each structural measure. Based on the cost-benefit analysis performed for this final rule, structural measures, in particular, pose the greatest economic challenge to the U.S. coastal fleets. Post OPA-90 benefits combined with the high cost to U.S. coastal vessels to refit PL/Spaces or to implement HBL requirements that meet Regulation 13G requirements make the cost-effectiveness of implementing structural measures on these vessels questionable. In addition, given the disproportionate cost impact of structural measures on that portion of the fleet operating as small product tankers crucial to certain ports, economically feasible structural measures for these vessels cannot be attained.

### Cost-Benefit Comments on the SNPRM Regulatory Assessment

The Coast Guard received six comments on the cost-effectiveness of implementing structural measures. One comment estimated that a refinement of the SNPM regulatory assessment using post-OPA 90 data, excluding operational discharges in whole or in part (since such discharges occur far from U.S. waters in amounts substantially less than assumed in the SNPRM regulatory assessment), and including the cost of fitting PL/Spaces to pre-MARPOL tankers (since many vessels can satisfy the requirements of Regulation 13G using light-loading only), would result in costs in excess of \$50,000 per barrel of oil not spilled, as opposed to actual spill costs of \$2,000 to \$10,000 per barrel spilled. Another company evaluated the true cost-benefit of implementing structural measures to their corporation in light of the company's historical non-spill performance. Based upon their calculations, a 3-year phase-in period would result in cargo shutout and onetime modification costs totaling \$17.7 million for their fleet of product and crude-carrying vessels, while the net present value cost per barrel of

spilled oil avoided would be \$1 million per barrel. Consequently, this comment estimated the potential cost to this particular corporation as being 28 to 84 times greater than that indicated in the SNPM regulatory assessment. Another comment provided extensive documentation and analysis on the cost-effectiveness of the proposed measures by using oil spill data from 1991 through 1994, estimating the operational discharge benefits based on actual vessel discharge records, and including an estimate of clean-up and retribution costs. Using National Oceanic and Atmospheric Administration (NOAA) damage assessment and restoration settlement data and oil spill data from spills recorded within U.S. waters in the Oil Spill Intelligence Report, this comment estimated that the average damage amount per barrel should be \$18,580, and explained that in order for a requirement to be cost-effective, its cost-benefit should be less than this amount. According to this comments analysis, no structural requirement is cost-effective.

The Coast Guard agrees with the comments and has calculated the benefits for this final rule using post-OPA 90 accident data and excluding the benefits gained from eliminating operational discharges. The recalculated benefits for this final rule do not include estimates in terms of the amount of money saved by eliminating oil spill clean-up costs. To remain consistent with all other OPA 90 assessments, the Coast Guard has considered benefits in terms of oil unspilled. Because the cost-benefit ratios presented in this final rule are much higher than \$2,000 or \$18,580 per barrel as referenced in the comments, the Coast Guard deems that even if clean-up cost savings were included in this cost-benefit analysis, the cost-benefit ratios would not fall below these thresholds.

Three more comments specifically discouraged the Coast Guard from implementing the least costly structural measure. Two of these comments noted that the Coast Guard proposed PL/Spaces in light of its low cost, despite findings that another alternative requiring HBL would prevent the

spillage of significantly more oil. Specifically, the comment estimated that the HBL alternative would present spillage of 164,000 barrels of oil which is nearly 8 times the 21,000 barrels of spillage prevented by PL/Spaces. One of the comments also conceded that the HBL alternative would cost approximately \$3 billion to implement from 1998 to 2015, which amounts to nearly 5 times the estimated cost of implementing PL/Spaces, \$579 million, but explained that as compared to the cost of cleanup under California law, \$18,900 per barrel, the feasibility of HBL in terms of avoided costs is economically favorable.

The Coast Guard has reassessed the cost to benefit ratio for various structural measures. The costs for this final assessment closely correlate the costs used in the SNPRM assessment; however, the benefits have been significantly reduced, and no longer correlate. If the cost to benefit ratio of \$18,900 per barrel of unspilled oil is compared to this final rule assessment, none of the measures can be deemed cost-effective. However, the Coast Guard determination of economic infeasibility is not based solely on the dollar per barrel unspilled ratio. While the numbers certainly support a determination of economic infeasibility, the impact on small entities and geographic areas dependent on a single oil source also weighted in favor of this decision.

### Final Rule Cost-Benefits

The Coast Guard has extensively researched both the cost and the resultant benefits of implementing structural measures on single-hull tank vessels. In accordance with current Office of Management and Budget guidance, program costs and benefits are discounted at 7 percent back to 1990. A summary of the cost-benefit ratios, which were computed by dividing the cost of each structural measure by its associated benefit, is presented in Table 3, and reflects a 1997 implementation date. These ratios are categorized by international and U.S. coastal fleets.

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**Table 3: Cost - Benefit Due to Certain Structural Measures**

Estimated Present Value Cost-Benefit in Dollars per Barrel Unspilled (in Thousands)

Single-Hull Fleet with an Implementation date of 1997\*

Deadweight Tonnage (x1,000)	Pre-MARPOL			
	P/L Spaces with Ballast		HBL to meet 13G(7)	
	International	U.S. Coastal	International	U.S. Coastal
5 - 29	\$172.2 - \$221.8	\$425.6 - \$551.8	\$88.2 - \$660.7	\$224.6 - \$1,669.5
30 - 49	\$216.9 - \$245.5	\$563.8 - \$646.1	\$75.7 - \$568.5	\$222.2 - \$1,642.9
50 - 89	\$207.4 - \$233.0	\$426.0 - \$485.2	\$66.1 - \$500.6	\$274.5 - \$2,117.6
90 - 199	-----	\$819.2 - \$888.5	-----	\$392.5 - \$981.3
90 - 144	\$351.9 - \$383.0	-----	\$141.0 - \$352.9	-----
145 - 199	\$827.2 - \$888.9	-----	\$457.1 - \$914.3	-----
200+	\$384.1 - \$414.3	\$935.0 - \$1,016.3	\$130.5 - \$260.2	\$512.2 - \$1,268.3
Averaged Total	\$248.9	\$614.3	\$321.5	\$912.7

Deadweight Tonnage (x1,000)	MARPOL 73/78	
	HBL to meet 13G(7)	
	International	U.S. Coastal
5 - 49	\$364.3 - \$613.3	\$824.2 - \$3410.3
50 - 89	\$463.1 - \$582.1	\$963.6 - \$1,472.7
90 - 199	-----	\$823.8 - \$1,075.9
90 - 144	\$668.1 - \$816.4	-----
145 - 199	\$862.6 - \$1,053.9	-----
200+	\$730.1 - \$892.7	\$1,452.1 - \$1,780.8
Averaged Total	\$604.6	\$1,430.9

Deadweight Tonnage (x1,000)	U.S. Tank Barges		
	PL/Spaces Refit	PL/Spaces using Cargo Tanks	HBL
	5 - 29	\$37.8 - \$40.9	\$12.5 - \$55.2
30+	\$37.4 - \$46.2	\$40.8 - \$98.8	\$16.9 - \$112.4
Averaged Total	\$40.0	\$43.5	\$57.70

\* In accordance with Office of Management and Budget guidance costs and benefits have been discounted by 7% back to 1990.

An analysis of the cost to benefit ratio for requiring implementation of Regulation 13G on pre-MARPOL tankships on the same timeline as required by Regulation 13G (25 years after the vessel's build date) was also completed for this final rule regulatory assessment. Because those pre-MARPOL vessels on international routes were assumed to comply with this requirement, no cost or benefit was assigned to these vessels for implementing this requirement. The cost for implementing Regulation 13G on pre-MARPOL tankships was estimated to be \$13.5 million and would be placed solely on those tankships operating on U.S. coastal routes until 2015. The benefit from this requirement was not specifically calculated. The Coast Guard estimated a benefit lower than the attained by the HBL requirement on U.S. coastal pre-MARPOL tankships because the implementation date would be later than 1997 (the date assumed for the HBL calculations). Therefore, the cost-benefit to the U.S. coastal fleet would be higher than \$240,642 per barrel of unspilled oil. Because the financial burden of this measure reduces the ability of U.S. ships to compete with foreign shipping interests and the cost-benefit ratio is extremely high, the Coast Guard deems this measure to be economically infeasible.

Similar cost-benefit calculations were also conducted for varying implementation years ranging from 1998 to 2001. These calculations show that the cost-benefit ratio becomes higher with each implementation year proposed due to the short benefit time-frame resulting from the aggressive vessel phase-out schedule created by OPA 90. The inability to recoup financial losses, as well as the effectiveness of operational measures for existing tank vessels for reducing oil spills, supports a determination that the costs of structural measures outweigh the benefits.

The total present value cost of structural measures over the 18-year period of this final rule would range from \$896 million to \$1.1 billion. Total present value of the benefits for structural measures over the 18-year period of this final rule would range from 5,718 to 10,386 barrels of unspilled oil. As a benchmark for this analysis, the Coast Guard used cost-benefit of \$24,000 per barrel of unspilled oil, which was the estimated cost-benefit of the double hull requirements mandated by OPA 90 in Section 4115(a) to which these interim requirements are linked. Because the cost-benefit estimates for the measures are well over \$24,000 per

barrel of unspilled oil, and the measures would impose substantial costs to the industry over the estimated 18-year period, no measures are required. Some regulatory text is contained in this final rule to clearly indicate that the Coast Guard considers the operational measures and lightering equipment requirements to be the only feasible interim requirements for existing tank vessels without double hulls, and that these requirements, as promulgated, satisfy section 4115(b) of OPA 90.

#### Small Entities

Under the Regulatory Flexibility Act (5 U.S.C. 601, *et seq.*), the Coast Guard must consider whether this rule will have a significant economic impact on a substantial number of small entities. "Small entities" may include: (1) Small businesses and not-for-profit organizations that are independently owned and operated and are not dominant in their fields; and (2) governmental jurisdictions with populations of less than 50,000. The Coast Guard has determined that this rule will not have a significant economic impact on a substantial number of small entities because no structural measures are being imposed in this rule. Therefore, the Coast Guard certifies under section 605(b) of the Regulatory Flexibility Act (5 U.S.C. 601, *et seq.*) that this rule will not have a significant economic impact on a substantial number of small entities.

#### Unfunded Mandate

Under the Unfunded Mandates Reform Act (Pub. L. 104-4), the Coast Guard must consider whether this rule will result in an annual expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$100 million (adjusted annually for inflation). The Act also requires (in Section 205) that the Coast Guard identify and consider a reasonable number of regulatory alternatives and, from those alternatives, select the least costly, most cost-effective, or least burdensome alternative that achieves the objective of the rule.

After extensive review of several alternatives, all with varying cost and effectiveness ratings, the Coast Guard has determined that no structural measures are cost-effective, and is therefore not requiring any in this rule. Consequently, this rule will not result in estimated costs of \$100 million or more to either State, local, or tribal governments in the aggregate, or to the private sector.

#### Collection of Information

This rule contains no collection-of-information requirements under the Paperwork Reduction Act (44 U.S.C. 3501, *et seq.*).

#### Federalism

The Coast Guard has analyzed this rule under the principles and criteria contained in Executive Order 12612 (October 26, 1987) and, because of the long-standing and judicially recognized need for uniform rules regulating the design and construction of vessels engaged in interstate and international commerce, has determined that this rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

#### Environment

The Coast Guard considered the environmental impact of this final rule and concluded that preparation of an Environmental Impact Statement was not necessary. As discussed in the Environmental Assessment, the final rule's Regulatory Assessment, and the Operational Measures final rule Regulatory Assessment provide sufficient evidence and analysis for determining that structural measures are not economically feasible; and therefore, should not be promulgated under Section 4115(b) of OPA 90. Because no structural measures are required, an Environmental Impact Statement is not required under the National Environmental Policy Act. An Environmental Assessment and a Finding of No Significant Impact are available in the docket for inspection or copying where indicated under ADDRESSES.

#### List of Subjects in 33 CFR Part 157

Cargo vessels, Oil pollution, Reporting and recordkeeping requirements.

For the reason set out in the preamble, the Coast Guard amends 33 CFR part 157 as follows:

#### **PART 157—RULES FOR THE PROTECTION OF THE MARINE ENVIRONMENT RELATING TO TANK VESSELS CARRYING OIL IN BULK**

1. The authority citation for part 157 continues to read as follows:

Authority: 33 U.S.C. 1903; 46 U.S.C. 3703, 3703a (note); 49 CFR 1.46. Subparts G, H, and I are also issued under section 4115(b), Pub. L. 101-380, 104 Stat. 520; Pub. L. 104-55, 109 Stat. 546.

2. The subpart heading of subpart G is revised to read as follows:

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**Subpart G—Interim Measures For  
Certain Tank Vessels Without Double  
Hulls Carrying Petroleum Oils**

3. The subpart heading of subpart H is revised to read as follows:

**Subpart H—Interim Measures For  
Certain Tank Vessels Without Double  
Hulls Carrying Animal Fat or Vegetable  
Oil**

4. The subpart heading of subpart I is revised to read as follows:

**Subpart I—Interim Measures For  
Certain Tank Vessels Without Double  
Hulls Carrying Other Non-Petroleum  
Oil**

Dated: January 3, 1997.

Robert E. Kramek,

*Admiral, U.S. Coast Guard Commandant.*

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