Analysis of the Vessel Numbering Requirements of the Abandoned Barge Act of 1992

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EXECUTIVE SUMMARY

The Abandoned Barge Act of 1992 (the Act) states "The Secretary shall require an undocumented barge more than 100 gross tons operating on the navigable waters of the United States to be numbered". This report supports the regulatory assessment of the implementation of a numbering system for undocumented barges of more than 100 gross tons, per the Act. The numbering system would provide a means for identifying the parties responsible and liable for the illegal abandonment of a barge and enhance the Government's recovery of costs associated with the removal of the barge. Currently, there is no formal process for linking an abandoned undocumented barge to a responsible party, and consequently, there is little chance of the government recovering costs incurred from the removal.

The work herein includes a population survey of affected barges, a cost/benefit analysis of implementing a numbering system, and a regulatory flexibility analysis to assess the impact of a numbering system on small business entities. Information was obtained from the U.S. Coast Guard, U.S. Army Corp of Engineers, U.S. Environmental Protection Agency, and the barge industry.

There are approximately 20,000 undocumented barges greater than 100 gross tons plying the nation's navigable waters. A majority of these barges are dry cargo barges (86%) with the remainder being construction barges (10%) and tank barges (4%). It is estimated that 89% of undocumented barges operate within the Mississippi River System and Gulf Intracoastal Waterway.

The cost and benefit analysis reveals that both the barge industry and the Government would incur the costs of implementing and administrating the system. The cost to industry includes administration costs, transportation costs, and the costs to affix the number to the barge. The cost to government includes the cost to develop and implement a database for the system and cost to administer the system. The potential benefits would accrue to the Government through cost avoidance for removal and cleanup associated with the abandoned barge and from reimbursement of Government incurred costs from the responsible barge owner. No direct benefits were identified for the barge industry. It was assumed that the Coast Guard would have sole responsibility for implementing and administrating the numbering system for abandoned barges.

Two alternative, conventional methods of numbering were posited: 1) welding the number to the barge and 2) painting the number on the barge. The assumption under Alternative 1, welding would necessitate towing 85% of the barges to an appropriate facility for welding, while work on the remaining 15% would be carried out in place. For Alternative 2, it was assumed that painted numbers would be affixed in place, and that no towing costs would be incurred. An estimated initial cost of $18,000 would be incurred by the Coast Guard to develop and install a database for managing information from the barge numbering system. The unit costs for the 30 year study period for both alternatives are summarized in Table ES-1.

Table ES-1
Unit Cost Summary

	Alternative 1 Welding	Alternative 2 Painting
Government Costs:		
Administration Cost/Barge	$62	$62
Industry Cost/Barge:		
Existing Barges -Tow Req.	$2,577	
Existing Barges – No Tow Req.	$444	$153
Future Barges	$282	$65
Total Cost/Barge:		
Existing Barges -Tow Req.	$2,639	
Existing Barges-No Tow Req.	$506	$215
Future Barges	$344	$127

Three scenarios are used to develop the range of potential benefits: Scenario 1- barges greater than 100 tons are no longer abandoned (best case); Scenario 2- illegally abandoned barges are abandoned with the number intact; and Scenario 3- illegally abandoned barges are abandoned with the number removed or obliterated (worst case). The estimated annual benefits for each scenario are summarized in Table ES-2.

Table ES-2
Annual Benefits

	Scenario 1	Scenario 2	Scenario 3
Removal Cost Recovery	$250,000	$90,000	$0
Clean Up Cost Recovery	$429,890	$154,760	$0
Investigation Savings	$1,500	$1,090	$0
Total Annual Savings	**$681,390**	**$245,850**	**$0**

The net present values (present value of benefits – present value of costs) were calculated over a 30 year period (1998 – 2028) using a discount rate of 7%. The total cost present value was calculated by multiplying the unit cost by the number of affected barges for each year from 1998 through 2028. The cost/benefit analysis revealed no net benefit with Alternative 1 (welded numbers) for all 3 scenarios. A net benefit was identified for Alternative 2 (painted numbers) for scenarios 1. There were no net benefits identified for scenario 2 or scenario 3. Table ES-3 summarizes the net present values for the 30 year period. The reader should note that the net values reflect the difference between benefit to the Government and the cost, primarily borne by industry.

Table ES-3
Net Present Values – 30 Year Period

	Alternative 1 – Welding			Alternative 2 – Painting		
Scenario	**PV Benefit**	**PV Cost**	**Net PV**	**PV Benefit**	**PV Cost**	**Net PV**
1	$8,416,967	$45,557,481	($37,140,514)	$8,416,967	$6,501,706	$1,915,261
2	$3,036,902	$45,557,481	($42,520,579)	$3,036,902	$6,501,706	($3,464,804)
3	$0	$45,557,481	($45,557,481)	$ 0	$6,501,706	($6,501,706)

The costs associated with welding the number to the barge were found to be significantly higher than the cost of painting. Considering that neither alternative will prevent deliberate removal of the identification number on illegally abandoned barges, painted numbers are recommended over the more expensive welded number, if the numbering requirement is to be implemented.

1.0 INTRODUCTION

The United States Coast Guard tasked the John A. Volpe National Transportation System Center (Volpe Center) to undertake a study to support the regulatory assessment of implementing a numbering system for undocumented barges of more than 100 gross tons per the Abandoned Barge Act of 1992 (the Act). The intent of establishing a numbering system for undocumented barges is to provide a process for identifying the parties responsible for the illegal abandonment of a barge. Once identified, the responsible party would be held liable to the government for costs associated with the removal of the barge. Currently, there is no formal process for linking an abandoned undocumented barge to a responsible party, and consequently, there is little chance of the government recovering costs incurred from the removal.

A significant secondary benefit of numbering the abandoned barges is to identify the parties liable for removal and proper disposal of any hazardous substances stored or deposited on board. The Act itself does not specifically address this issue. However, if the materials in question constituted oil or hazardous substances and the owner refused to undertake their removal, the Government could carry out the work and recover the cost of mitigating or preventing a threatened or actual discharge to navigable waters from the owner, as a responsible party under the Oil Pollution Act. (Although if the barge were an inland oil barge, the amount of damages would be limited.) Similarly, if the materials constituted hazardous substances within the meaning of the Clean Water Act, CERCLA would impose liability for all costs of removal or remedial actions and also for any resulting damage to natural resources on the owner of the barge. To avoid liability, it would be necessary for the owner of the barge to prove not only that the materials were deposited by a third-party but also that there was no willful negligence on the owner's part which contributed to the problem. For purposes of this report, it is assumed that the barge owner will be liable for all the costs associated with removal and clean-up of all hazardous waste deposited on the barge.

This report includes a population study of affected barges, a cost/benefit analysis of implementing a numbering system, and a regulatory flexibility analysis to assess the impact of a numbering system on small business entities.

2.0 LEGISLATIVE AND RULEMAKING BACKGROUND

The Abandoned Barge Act of 1992, 46 United States Code (USC) 4701, amended Title 46 USC, Section 12301, by adding paragraph (b) which states that " The Secretary shall require an undocumented barge more than 100 gross tons operating on the navigable waters of the United States to be numbered." Other provisions of the act establish civil penalties for abandonment of barges, provide for steps to be taken by the government to remove abandoned barges, and establish the liability of owners of abandoned barges for the costs of removal.

2.1 LEGISLATIVE HEARING

In preparation for this legislation, a hearing was held before the Subcommittee on Coast Guard and Navigation, of the House Committee on Merchant Marine and Fisheries on 10 June 1992 concerning "Draft Legislation to Prohibit Abandonment of Barges, and for other purposes" (Serial No. 102-83). During this hearing, statements were made by the following persons:

- John Anderson, Assoc. Director for Transportation Issues, GAO
- CDR William Chubb, USCG
- CAPT Robert C. North, USCG
- William Justice, Senior Evaluator, GAO
- Hon. Howard Coble (NC)
- Hon. Jack Fields (TX)
- Hon. Greg Laughlin (TX)
- Hon. Owen Pickett (VA)
- Hon. Billy Tauzin (LA)
- Cornell Martin, American Waterways Operators

The testimony of Mr. John Anderson, Associate Director for Transportation Issues, United States General Accounting Office (GAO) served as the introduction for the hearing as well as the basis of most discussion of the proposed legislation. The GAO had prepared a report on the pollution, vessel removal, and cost impacts of abandoned vessels[1].

The primary findings in the hearing report were:

1. Based upon a search conducted by the Coast Guard, nearly 1,300 vessels were abandoned in our nations waterways. This figure was the result of a survey sent out by GAO to 45 USCG Marine Safety Offices and Captain of the Port units, which requested they respond with the number of abandoned vessels within their respective zones.

[1] "COAST GUARD, Abandoned Vessels are Polluting the Waterways", GAO/T-RCED-92-54, Jun 10, 1992

2. From 1988 to 1992, 82 water pollution incidents occurred which originated from abandoned vessels, 37 of these incidents required cleanup operations. Over that same period of time the Coast Guard conducted oil recovery operations from 14 additional vessels that were not leaking in order to remove the potential for a future discharge/release of oil/hazardous materials. The combined costs for the operations in response to actual and potential spills was 4.4 million dollars, with 2.5 million dollars being spent for two separate removal operations from the same vessel, an abandoned barge located in Empire, LA.[2] The total number of reported water pollution incidents over that same period (from all sources) was 54,386.[3]

3. There are no Federal laws to prohibit owners from abandoning vessels. [4]

4. It is often difficult to find the owner of an abandoned vessel. In many cases where ownership was determined, the owners were incapable of removing the abandoned vessel for a variety of reasons (e.g., deceased, bankrupt, etc.).

5. Barges that use inland waterways are exempt from vessel documentation.[5]

6. Ownership and disposition of vessels are subject to mandatory Coast Guard and Army Corps reporting. As part of the required annual report to the Army, vessel owners are required to strike through those vessels no longer operated and indicate the disposition of the vessel.

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[2] GAO Testimony "COAST GUARD, Abandoned Vessels are Polluting the Waterways, GAO/T-RCED-92-54, Jun 10, 1992

[3] MSMS data query, 24 Jun 1998

[4] As is the case with many terms used in a legal context, "Abandonment" has different meanings depending upon the definition of the law in which it appears. For the purposes of Admiralty and waterway protection statutes, abandonment is a traditional right by which an owner relinquishes all interest and property rights to a vessel. Historically abandonment has been, and in the case of all other vessels other than barges addressed by this act, a legal and legitimate means of disposal under U.S. Law. Until 1992, no laws specifically prohibited vessel abandonment, yet laws existed (and remain) which prohibit the obstruction of navigable waters by vessels and the wrongful deposit of refuse into navigable waters (33 USC 407, 408, and 409). All of these statues are under the jurisdiction of the Army Corps of Engineers and are criminal in nature. Although it was limited to barges only, passage of the Abandoned Barge Act of 1992, also created the first civil prohibition to vessel abandonment.

[5] With a few minor exceptions (i.e., lifeboats, tenders, etc.) all vessels of United States (ships, ferries, pleasure vessels, etc) are either "documented" under 46 CFR Part 67, or "numbered" under the regulations contained in 33 CFR Part 173. The only major exception exists in the case of "A non-self-propelled vessel, qualified to engage in the coastwise trade is exempt from documentation when used in that trade: Within a harbor, in whole or in part on the rivers or inland lakes of the United States, or in whole or in part on the internal waters or canals of any state." The exemption for non-self-propelled vessels extends back to as early as 1793 as a result of the limited utility, and relatively short service life of such vessels. It is important to note that these historical exclusions predate the towing industry of today.

The following statements were from Captain Robert C. North:

1. Due to the large number of abandoned vessels other than barges, it was recommended that the proposed legislation "be looked at for application to a wider range of vessels other than barges."

2. The proposed legislation should be cognizant of and incorporate the existing funding provisions contained in the Clean Water Act and CERCLA.

3. The ability to recover costs depends upon enhanced systems of linking the vessel owners through either a state numbering system or perhaps Coast Guard documentation.

4. It is most important that the provisions of the legislation be consistent with the National Contingency Plan.

2.2 FEDERAL REGISTER

On 14 October 1994, the Coast Guard published a request for comments in the Federal Register (FR 52646), in order to gather input for consideration in the regulatory project to enable this statutory change. Originally the proposal included the possibility for state issued numbers. The majority of the docket comments responded to that issue in a negative manner and the concept of state issued numbers was set aside. A more detailed listing of docket comments, grouped by subject, is presented in Appendix A.

The following is a summary of docket comments grouped by subject.

1. Numbering Issues

- A variety of suggestions were received regarding how and where the number should be affixed to the barge. Suggestions ranged from welding numbers at least 6" in height to the transom, to marking the barge in one or two places with numbers no more than 3" in height.

2. Implementation Issues

- A majority of the comments regarding the issuance of numbers requested the undocumented barge number system be similar to existing documented vessel numbering systems.
- As expected, comments from industry suggested that the new numbering system be the least burdensome to operations as possible.
- The idea of having one national numbering system administrated by the Coast Guard was unanimously supported by those who supplied comments. Due to the transient nature of the barge industry, having one central agency administering the system made the most sense to all respondents.

- Industry should be allowed adequate time to comply with the numbering requirement so that numbering can be done concurrent with inspection and yard availability schedules
- It was suggested that the simplified method of determining tonnage should be used to determine the tonnage of barges (L x B x D x 0.84/100 = GT). This method would be the most cost effective in determining the tonnage.
- The barge identification number and registration should stay with the barge for the life of the vessel or until a status change. This will eliminate the need to renew registration every year.

3. Cost Issues

- The Towing Safety Advisory Committee estimates the costs for marking barges to be between $500 to $1,500 per hull
- Due to the involuntary nature of marking and registration, initial registration should be free.
- At the time of the comments were written (1992), scrap prices were such that abandoning of barges was not economical.

4. Validity of the Concept

- A number of respondents expressed concern regarding the benefit of the numbering system. There is no method currently available to permanently affix an identification number. Consequently, an owner can remove or obliterate the identification number prior to abandonment, rendering the numbering system useless.
- It was suggested that the Coast Guard and the barge industry could work together to continually survey the waterways and identify abandoned barges and the responsible parties. This would eliminate the need for numbering undocumented barges.
- A few of the comments asked for additional justification for implementing the numbering system. Typical questions included: how many pollution incidents were caused by abandoned undocumented barges?; what was the cost incurred from these incidents?; or quoting one respondent, "are we committing millions to chase nickels?"[6]

[6] Louisiana Shipbuilding and Repair Association

3.0 METHODOLOGY

3.1 OBJECTIVE

The Coast Guard has requested the Volpe Center perform a study to support a regulatory assessment. The purpose of a regulatory assessment is to estimate benefits and costs of a regulation and perform other required analyses, such as Regulatory Flexibility. The objective of this report is to provide data and information to the Coast Guard in order to support a regulatory assessment of a potential rulemaking implementing a numbering system for undocumented barges more than 100 gross tons.

3.2 DATA SOURCES

In order to support the regulatory assessment, the Volpe Center acquired data describing the number and type of vessels affected by the regulation, the impacted agencies and industries, and the costs and benefits to society of implementing the regulation. Data was obtained from a number of sources including the U.S. Coast Guard, U.S. Army Corp of Engineers (USACE), National Response Center (NRC), and the barge and towing industry. Telephone interviews were also conducted with various government agencies and industry representatives. Appendix B lists the agencies, organizations and companies contacted for this report

3.2.1 Coast Guard

3.2.1.1 Abandoned Vessel Statistics

As outlined in Commandant instruction 16465.43 of 5 April 1996, Coast Guard units are required to identify abandoned vessels during the course of ongoing operations. Annually the Captains of the Ports (COTP) submit a summary report of abandoned vessels within their geographic areas of responsibility, from which a national summary is prepared. The 1997 summary report documents that 2,697 abandoned vessels exist along the navigable waterways of the United States. Of this total, 1,010 are barges. Analysis of the summary and discussions with Coast Guard COTP personnel reveals differences in the manner in which the surveys were performed from port to port. Some classify vessels by their use and others classify by vessel design. For example, a de-engined ship used as a barge to carry containers between ports could be counted as either a ship or a barge depending upon where the survey was conducted. In one case, a deck barge with a house trailer mounted on board was considered to be a recreational vessel.

Out of the 1,010 barges contained on the summary report, 15 of these barges are listed as posing a pollution threat. It is not clear if the determination of what constitutes a pollution threat is driven by the framework of the National Contingency Plan as contained in 40 CFR 300 (such as the presence of oil or hazardous substance on board) or the criterion under which some of the local summaries appear to have been prepared (the capacity as a receptacle for possible future dumping).

Again, the criterion for determining a pollution threat was left to local interpretation. For example, at one location abandoned vessels were deemed to be anything that is visible and that could be identified as being a vessel or part thereof, regardless of condition. This definition includes the skeletal remains of 19th century steam ships and wooden barges whose frames are visible at low water but clearly pose no threat for use as depositories for oil and hazardous substances. In another port, anything that has an intact section of hull or portable tank on board that is capable of holding 1,000 gallons of oil or hazardous substance was counted as a pollution threat, regardless of the presence of oil or hazardous substances.

For the above reasons, the data in the Abandoned Vessel Summary are considered to be suspect and unreliable, and are not used herein.

3.2.1.2 National Pollution Funds Center

The U.S. Coast Guard's National Pollution Funds Center (NPFC) has fiduciary responsibility for the Oil Spill Liability Trust Fund (OSLTF) and the portion of Superfund used by the Coast Guard. The NPFC was queried in order to obtain actual spill frequency and cost data for spills from abandoned barges that resulted in federal cleanup costs. Data was also requested on the number of cases where Federal funds were expended in mitigation of spills originating from abandoned vessels, abandoned barges[7], and the success rates of the NPFC in recovering costs expended for pollution response operations, from responsible parties.

3.2.1.3 Marine Safety Management System

The U.S. Coast Guard Marine Safety Management System was consulted in order to establish the size of the actively documented barge fleet of over 100 gross tons.

3.2.2 U.S. Army Corps of Engineers

Pursuant to the Rivers and Harbors Appropriations Act of 1922, the U.S. Army Corps of Engineers (USACE) collects statistical data concerning all vessels which ply the navigable waters of the United States in the pursuit of commerce. The requirements for submitting navigation statistics are in Title 33 CFR 207.800. These regulations, generally, require the owner of a vessel to submit navigation statistics to the Army for "all movements of domestic waterborne commercial vessels... ... including but not limited to dry cargo and tanker moves, loaded and empty barge moves, towboat moves, with or without barges in tow, fishing vessels, movements of crew boats and supply boats to offshore locations, tugboat moves, and movements of newly constructed vessels from the shipyard to the point of delivery." Owners must also report vessels which remained

[7] The National Pollution Funds Center does not track or maintain data regarding "abandoned vessels" or "abandoned barges". NPFC does however recognize if a responsible party for a pollution incident is known or unknown.

idle during the reporting period[8]. USACE does not collect data on recreational vessels and vessels used exclusively for construction.

USACE publishes this data as "Waterborne Transportation Lines of the United States", and is available from the Waterborne Commerce Statistics Center, in New Orleans, LA. Data available includes physical description (type and dimensions), draft, service, cargo, ownership, area of operation, age, USCG number (Official Number or USCG assigned number), average age, and rates of new construction. 1995 and 1996 (latest year available) data are the basis of the analysis within this report.

3.2.3 National Response Center

The Emergency Response Notification System (ERNS) database contains data on initial reports to the National Response Center for spill reports within the Environmental Protection Agencies area of responsibility (inland Zone [9]). ERNS was queried for spill reports which originated from barges, where the discharger was unknown. Data from ERNS and NPFC were the basis for estimating the number and cost of hazardous substance releases originating from abandoned barges.

3.2.4 Barge Industry

3.2.4.1. Barge Fleet Profile of Inland River Barges for the Mississippi River System and Connecting Waterways[10]

This publication contains statistical data on the Mississippi River line haul fleet, which makes up the majority of the undocumented barge fleet. These data are used for the purpose of comparison to USACE data regarding fleet size and barge operating locations.

3.2.4.2 Industry Interviews

Telephone interviews were held with a variety of barge and towing companies, as well as, the American Waterways Operators and the National Shipyard Association. The interviews were conducted in order to identify the impacts to industry from the implementation of a numbering system.

3.3 COST-BENEFIT ANALYSIS

A cost-benefit analysis was performed in accordance with the Office of Management and Budget's "OMB Circular No. A-94: Guidelines and Discount Rates for Cost-Benefit Analysis of Federal Programs" and "Guidance for Regulatory Evaluations: A Handbook for DOT Benefit-Cost Analysis" produced by the U.S. Department of Transportation. The purpose of the cost-benefit analysis is to identify and compare the costs and benefits

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[8] 33 CFR 207.800 (b) (2) (i) (B)

[9] Per 40 CFR 300, National Contingency Plan.

[10] Lambert, Jack, Barge Fleet Profile of Inland River Barges for the Mississippi River System and Connecting Waterways, March 1998, Eleventh Annual Edition, Sparks Companies

associated with implementing a numbering system for undocumented barges more than 100 gross tons.

The costs of implementing a numbering system were identified and quantified through discussions with the Coast Guard, USACE, US Environmental Protection Agency (EPA) and industry representatives. The benefits were identified through discussions with the Coast Guard, EPA and industry and quantified using databases from the Coast Guard, USACE, and the National Response Center. A more detailed discussion of the methodology used for the cost-benefit analysis is presented in section 5.

3.4 REGULATORY FLEXIBILITY ANALYSIS

A regulatory flexibility analysis was performed to consider the affects of the numbering system on small entities. Data from the USACE's Waterborne Commerce Statistics Center, the "1998 Directorate of Corporate Affiliations"[11], "Standard and Poor's Register of Corporations, Directors, and Executives"[12], and the Internet were used to identify the affected small business entities.

This report considered companies employing less than 500 employees as being small business entities. The number and type of affected small entities, compliance requirements, and the alternatives considered to reduce the burden on small entities are identified and discussed in the analysis.

[11] "1998 Directory of Corporate Affiliations", Volumes 3 and 4, National Register Publishing, New Providence, NJ, 1998

[12] "Standard and Poor's Register of Corporations, Directors, and Executives", The McGraw-Hill Companies, New York, NY, 1998

4.0 AFFECTED BARGES

This section presents the results of the population review of undocumented barges conducted as part of the Coast Guard's Statement of Work. Information obtained from the population review includes: number of barges, service types/industries in which undocumented barges operate, maintenance intervals, construction rates, operating locations, and number of undocumented barges owned and operated by small entities (small entity information is presented in section 6.0). The resulting fleet description was found by comparison and analysis of Army Corp of Engineers, Coast Guard, and industry data sets.

4.1 DEFINITIONS

4.1.1 Barges

For the purposes of this study, barges were defined per the International Classification of Ships by Type (ICST) and the Vessel Type, Construction, and Characteristic (VTCC) codes used by the USACE. Both schemes classify vessels by construction characteristics of the marine structure without regard to particular vessel use or the type of cargo carried. Any vessel or barge reported as self-propelled is not included in the affected fleet. Barges listing propulsion horsepower were likewise excluded. Table 4.1 presents the types of vessels and their corresponding ICST and VTCC codes that were considered barges for this report.

Table 4.1
Barge Type and Codes

ICST Code	VTCC code	Description
141	70	Single Hull Tank Barge
142	71	Double Hull Tank Barge
143	72	Double Sided Tank Barge
144	73	Double Bottom Tank Barge
149	74	Other Tank Barge
341	40	Open Hopper Barge
341	47	Open Dry Cargo Barge
342	41	Covered Hopper Barge
342	48	Covered Dry Cargo Barge
343	43	Deck Barge
344	52	Lash/Seabee Barge
349	42	Carfloat
349	44	Pontoon Barge
349	49	RO-RO Barge
349	50	Lash/Seabee
349	90	Convertible Barge
349	99	Other

4.1.2 Other Barges

Construction Barge

Construction barges are used exclusively for construction and are exempt from Army Corps reporting requirements. Therefore these barges are not included in the USACE database, however since these barges will not be exempt from the requirement to register as undocumented barges, an estimated fleet population was included as part of this study. These barges are generally deck barges and spud barges that carry or position construction material (piling, stone, etc.) or equipment (cranes, dredge pipe. etc).

Spar Barge

Refers to a barge that has passed its useful economic life as a means of marine transport and is used as a mooring platform for other vessels to tie up to. Due to the accountability problems that are inherent with this category of use, and the fact that barges in this category should fall under the jurisdiction of the Army Corps of Engineers' wetlands protection jurisdiction, these barges were considered outside of the definition of operating and were excluded from this study.

4.1.3 Miscellaneous Definitions

Documented/Undocumented Vessel

The definition and requirements of a documented vessel are given in 46 CFR 67. A documented vessel is a vessel that is the subject of a valid Certificate of Documentation. A Certificate of Documentation is required for the operation of a vessel in certain trades, serves as evidence of vessel nationality, and permits a vessel to be subject to preferred mortgages.

All vessels greater than 5 net tons which engage in the fisheries on the navigable waters of the United States or in the Exclusive Economic Zone, Great Lakes trade, or coastwise trade must have a Certificate of Documentation. However, the relevant exception to the requirement is any non-self-propelled vessel (i.e., barge) that is qualified to engage in the coastwise trade and is engaged:

- Within a harbor;
- On the rivers and lakes (except the Great Lakes) of the United States; or
- On the internal waters or canals of any State.

A barge that is exempt from the requirement to be documented may be documented at the discretion of the owner. If a vessel does not have a Certificate of Documentation it is considered an undocumented vessel.

Numbered/Unnumbered Vessel

A numbered vessel is a vessel that is assigned an identification number from either the Coast Guard or a state agency. Documented vessels, undocumented vessels equipped with propulsion equipment, and undocumented barges greater than 100 gross tons (per Abandoned Barge Act of 1992) are required to be numbered. The Coast Guard issues numbers to documented vessels, which remains with the vessel for its entire service life, and state agencies issue numbers to undocumented vessel equipped with propulsion equipment. The numbering system to be implemented for undocumented barges has not been determined at the time of this report.

Inspected/Uninspected Barge

Barges that carry certain cargo or are engaged in oceangoing service (with the exception of Puget Sound) are required to be inspected by the Coast Guard. Barges are required to be inspected when carrying:

- Flammable and combustible liquids in bulk
- Passengers
- Dangerous cargo defined by 46 CFR 98 and 49 CFR 171 – 179

Inspected barges receive a certificate of inspection, however they are not issued an official vessel identification number. The Coast Guard issues a certificate number that is used as an internal administration number for record keeping. Inspected barges do not have the certificate number marked on the vessel and the number does not remain with the barge for the life of the barge. Barges not requiring inspection are considered uninspected barges.

Gross Tonnage

The definition of gross tonnage is given in 46 CFR 69.9. The gross tonnage is the approximate volume of a vessel. There are three methods of calculating the gross tonnage:

- Convention Measurement System: the total volume of all enclosed spaces modified by a coefficient.
- Standard and Dual Measurement Systems: the total volume of all enclosed spaces less certain exempt spaces
- Simplified Measurement System: the product of the vessel's length, depth, and breadth modified by a coefficient.

4.2 BARGE FLEET

The number of undocumented barges more than 100 gross tons was estimated based on data obtained from USACE's Waterborne Commerce Statistics Center and Coast Guard's Marine Safety Management System (MSMS). The USACE data was used to estimate the

total number of barges more than 100 gross tons. The MSMS database was used to identify the number of barges more than 100 gross tons that are currently documented. The difference in the number of barges between the USACE data and the MSMS data was used as the basis for the number of undocumented barges affected by the numbering requirement.

4.2.1. Data Issues and Methodology

The USACE data was queried for vessels with VTCC codes corresponding to barges (see section 4.1 for list of VTCC codes used) and with net tonnage greater than 100 tons. The USACE database did not include a field for gross tonnage therefore the net tonnage was used as an estimate of gross tonnage.[13] This query resulted in 32,257 barges more than 100 gross tons.

The Coast Guard provided data from MSMS of all currently documented barges more than 100 gross tons. The total number of documented barges, per MSMS, was 15,676. In order to identify the number of undocumented barges, the vessel identification numbers were compared between the Coast Guard data of documented barges and the USACE data. The results of the comparison revealed 13,763 documented barges in both databases, 1,913 barges exclusively on the Coast Guard documented database (i.e., documented barges that should be in the USACE database but are not), and 18,494 barges exclusively on the USACE database. These 18,494 barges are considered existing undocumented barges more than 100 gross tons. To reach the final estimated number of undocumented barges, the 18,494 barges were reduced by 537 to account for the number of lash/seebee barges that were included as undocumented. Lash/seebee barges operate oversees and therefore are required to be documented. The 537 undocumented barges are most likely barges that have lapse documentation due to being out of operation. When these barges are brought back into operation they will be required to be documented. Therefore, the estimated total number of undocumented barges more than 100 gross tons is 17,957 (18,494-537).

4.2.2 Database Discrepancies

Several discrepancies were observed between the USACE and the MSMS databases: 1) there were 1,913 documented barges found in the MSMS database that were not included in the USACE database, 2) Coast Guard document numbers listed for many barges in the USACE database were not valid numbers, and 3) the USACE database may underestimate the total barge fleet. Details are found in the following paragraphs:

Comparison of the USACE data with data from MSMS revealed 1,913 documented vessels were not included in the USACE database. There could be a number of reasons for the discrepancy, such as the documented barge being under construction, taken out of

[13] The USACE database determines net tonnage as the difference between gross tonnage and the volume used for accommodation of the vessel master, officers, crew, navigation and propelling equipment expressed in units of 100 cubic feet per ton. Since the affected barges will have minimum space dedicated to these purposes it was assumed the net tonnage would be similar to the gross tonnage.

operation, or failure of the owner to report the barge to the USACE. This report considered the 1,913 documented barges as additional existing barges and added them to the USACE database total.

As a result of the database comparison, it became apparent that the documentation numbers listed for many of the barges in the USACE database were no longer active (approximately 14,000). One reason for the inactive numbers may be attributed to expired documentation numbers being reported to USACE. In many instances, barges are originally documented in order to obtain financing for construction. As documentation is not required for a large number of barges, owners will sometimes allow the documentation to lapse. As a result, the barge owner may have been issued a document number in the past, let the registration expire, and continued to report the number to USACE.

Although required to do so, owners do not uniformly report available, non-operating vessels to USACE. During the course of this study, carriers that were listed as having fleets of 100 or more barges were contacted. When questioned as to the actual size of the entire available fleet of hulls owned, many companies responded with a number that was 50% to 100% higher than what was reflected in the USACE database. In the interests of uniformity of data and to avoid the possibility of double counting, the higher estimates are not used as part of our analysis. Therefore, the total number of undocumented vessels used in this report should be considered a conservative estimate, since un-reported barges may come back into service.

4.2.3 Tree Top Fleet Description

As stated in section 4.1, construction barges are not exempt from the numbering requirement and were not included in the USACE data. Discussions with various industry representatives, including the American Waterways Operators, resulted in an estimated 2,000 construction barges. Table 4.2 summarizes the affected barge fleet.

Table 4.2
Affected Barges

Description	Number of Barges
Barges more than 100 gross tons (USACE data)	32,257
Documented barges not in USACE database (MSMS)	1,913
Construction barges (estimated)	2,000
Total Estimated Barges More than 100 Gross Tons	**36,170**
Adjustment for Lash/Seebee barges	(537)
Documented barges more than 100 gross tons (MSMS)	(15,676)
Total Undocumented Barges More than 100 Gross Tons	**19,957**

4.3 BARGE FLEET BY SERVICE TYPE

The "Waterborne Transportation Lines of the United States" was used to obtain the service types of both the total barge fleet and the undocumented barge fleet. As stated in section 4.2.1.1, a number of documented barges (1,913) provided by MSMS were not included in the USACE database. The MSMS database did not provide a breakdown of the service type for the 1,913 documented barges and therefore these barges were not included in the service type breakdown. Table 4.3 presents the number of barges for each service type. A detailed breakdown of service type, operating locations, and type of cargo, grouped by individual barge operators, is provided in Appendix C.

Table 4.3
Barge Population by Service Type

ICST	VTCC	Description	Total Barges	Un-Doc. Barges
141	70	Single Hull Tank Barge	757	178
142	71	Double Hull Tank Barge	2,378	493
143	72	Double Sided Tank Barge	148	34
144	73	Double Bottom Tank Barge	35	3
149	74	Other Tank Barge	588	152
341	40	Open Hopper Barge	8,415	5,717
341	47	Open Dry Cargo Barge	1,116	730
342	41	Covered Hopper Barge	9,387	5,429
342	48	Covered Dry Cargo Barge	3,120	1,808
343	43	Deck Barge	4,384	3,332
344	52	Lash/Seebee Barge	1,780	0
349	42	Other - Railroad Car Barge	29	19
349	44	Other - Pontoon Barge	2	2
349	49	Other – RO-RO Barge	20	2
349	50	Other - Container Barge	33	4
349	90	Other - Convertible Barge	26	22
349	99	Other	39	32
		Construction	2,000	2,000
Total			34,257	19,957

Table 4.4 presents the number of undocumented barges grouped by major service type: tank, dry cargo, and construction. Tank barges typically carry liquid cargo such as petroleum, petroleum products, and liquid chemicals. Dry cargo barges typically carry grain, coal, sand, steel and other solid bulk commodities. Construction barges are generally deck barges and spud barges that carry or position construction material (piling, stone, etc.) or equipment (cranes, dredge pipe. etc.).

Table 4.4
Undocumented Barges by Major Service Type

Barge Type	Number of Undoc. Barges	Percentage of Total Undoc. Barges
Tank	860	4%
Dry Cargo	17,097	86%
Construction	2,000	10%
Total	19,957	100%

4.4 FLEET BY AGE

The average age of barges by service type are presented in Table 4.5. Unless noted parenthetically, all barges listed below are of steel construction.

Table 4.5
Average Barge Age by Service Type

ICST	VTCC	Service Type	Fleet Size	Avg. Age	Oldest	Newest
141	70	Single Hull Tank Barge	178	20	1926	1996
142	71	Double Hull Tank Barge	493	21	1945	1997
143	72	Double Sided Tank Barge	34	14	1949	1995
144	73	Double Bottom Tank Barge	3	21	1950	1996
149	74	Other Tank Barge	152	28	1933	1997
341	40	Open Hopper Barge	5,709	17	1911	1997
341	40	" "(wood)	1	19		1979
341	40	" "(unknown)	7	35	1945	1982
341	47	Open Dry Cargo Barge	730	25	1922	1997
342	41	Covered Hopper Barge	5,363	18	1930	1997
342	41	" "(fiberglass)	63	19	1977	1980
342	41	" "(unknown)	3	20	1978	1978
342	48	Covered Dry Cargo Barge	1,805	18	1937	1997
342	48	" "(fiberglass)	3	18	1978	1981
343	43	Deck Barge	3,326	26	1906	1997
343	43	" " (wood)	5	68	1913	1943
343	43	" "(unknown)	1	55		1943
349	42	Other - Railroad car Barge	19	37	1940	1996
349	44	Other - Pontoon Barge	2	32	1965	1967
349	49	Other – Ro-Ro Barge	2	19	1970	1994
349	50	Other - Container Barge	4	19	1945	1995
349	90	Other - Convertible Barge	22	29	1926	1991
349	99	Other	32	30	1928	1984
		Construction	2,000	Unknown	Unknown	
		Total	**19,957**			

4.5 NEW BARGE CONSTRUCTION RATES

Table 4.6 presents the historic annual construction of new barges (both documented and undocumented) in the United States by barge type. As can be seen from Table 4.6, the construction rates varied from year to year with no apparent trend in the annual construction rate.

Table 4.6
Annual New Barge Construction [14]

Vessel type	1989	1990	1991	1992	1993	1994	1995	1996
Dry Covered	47	204	97	184	232	218	345	397
Dry Open	279	202	274	243	213	114	100	682
Lash/Seabee	0	21	32	2	0	0	0	0
Deck	250	268	85	207	169	67	60	156
Other Dry	47	29	4	1	1	6	1	0
Tank	17	51	89	84	44	54	91	135
Total (tank and dry)	**640**	**775**	**581**	**721**	**659**	**459**	**597**	**1370**

(Average 725 per year)

Data of the construction rates for new barges operating on the Mississippi River System and connecting waterways is presented in Table 4.7. These data are a subset of the data presented in Table 4.6 and show that a majority of new barges are constructed for use in the Mississippi River System and connecting waterways.

Table 4.7
Annual New Barge Construction – Mississippi River System [15]

Vessel type	1989	1990	1991	1992	1993	1994	1995	1996
Standard	37	37	0	22	12	0	0	0
Stumbo	0	0	0	0	15	0	0	0
Jumbo open	282	274	309	326	137	128	118	563
Jumbo covered	51	104	143	296	283	275	387	433
Jumbo tank	3	32	48	56	16	15	14	26
Other tank	10	14	29	25	29	24	70	60
Total	**383**	**461**	**529**	**725**	**492**	**442**	**589**	**1079**

(average 588 per year)

4.6 OPERATING LOCATIONS

The "Waterborne Transportation Lines of the United States" provides the number of barges (excluding construction barges) operating on the Atlantic, Gulf and Pacific Coasts, the Mississippi River System and the Gulf Intracoastal Waterway, and the Great Lakes System. Barges operating in the Great Lakes are required to be documented and

[14] Waterborne Transportation Lines of the United States, Vol. 1, U.S. Army Corps of Engineers, 1996

[15] Lambert, Jack, Barge Fleet Profile of Inland River Barges for the Mississippi River System and Connecting Waterways, March 1998, Eleventh Annual Edition, Sparks Companies

therefore no undocumented barges operate in that area. In order to estimate the number of undocumented barges operating in each area, the percentage of total barges operating in each area was applied to the number of undocumented barges. The number of all barges and undocumented barges greater than 100 gross tons, by operating locations, are presented in Table 4.8 and Table 4.9, respectively. Data is not available regarding the operational locations of construction barges. A detailed breakdown of service type, operating locations, and cargo type, grouped by individual barge operators, is provided in Appendix C.

Table 4.8
All Barges by Operating Location

Barge Type	Atlantic, Gulf and Pacific Coasts		Mississippi River System and Gulf Intracoastal Waterway		Subtotal	Great Lakes System	Total
	Number	%[16]	Number	%			
Tank	640	16	3,354	84	3,994	42	4,036
Dry Cargo	3,216	11	25,308	89	28,524	251	28,775
Total	3,856	12	28,662	88	32,518	293	32,811

Source: Waterborne Transportation Lines of the United States

Table 4.9
Undocumented Barges Greater Than 100 Gross Tons by Operating Location

Barge Type	Number of Undoc. Barges	Atlantic, Gulf and Pacific Coasts		Mississippi River System and Gulf Intracoastal Waterway	
		% [16]	Number of Undoc. Barges	%	Number of Undoc. Barges
Tank	860	16	138	84	722
Dry Cargo	17,097	11	1,881	89	15,216
Total	17,957	11	2,019	89	15,938

4.7 MAINTENANCE INTERVALS

Maintenance intervals vary widely across the barge fleet. The most frequent intervals coincide with the two-year Coast Guard inspection requirements for certain barges. Barges that require inspection include[17]: barges carrying flammable and combustible liquids in bulk, barges carrying passengers, barges carrying dangerous cargoes when required under 46 CFR 98, and 49 CFR 171-179, and barges in oceangoing service (with

[16] percentages were calculated as the number of barges, by type (tank or dry cargo), divided by the total number of barges operating outside the Great Lakes System. For example, 16% of tank barges in Atlantic area was calculated as 640/3,994.
[17] 46 CFR Subchapter "D" and "O"

the exception of Puget Sound). The number of inspected/undocumented barges (577) makes up a small fraction of the total undocumented barge fleet.

No standard maintenance schedule exists for uninspected barges. Maintenance periods are very closely tied to the service and operating areas in which the barges trade. For example, dry cargo barges operating primarily in fresh water such as the western rivers (which make up the majority of the affected barge population) do not experience significant hull deterioration due to rust and therefore rarely if ever undergo preventative maintenance periods in a shipyard. In the case of this type of vessel, the barge is inspected when it is passed from tow to tow and damage is reported. When convenient (or in the case of serious damage, necessary), repairs are made. In the case of leased barges, repairs may not be conducted until the end of the lease period. It is not uncommon for barges to be under lease for several years. While dry cargo barges operating in fresh water do receive necessary repairs, they can also go through their entire service lives without ever undergoing periodic maintenance.

5.0 COST/BENEFIT ANALYSIS

This analysis estimates the costs and benefits of implementing a national vessel numbering system for undocumented barges more than 100 gross tons. The analysis was developed using "Guidance for Regulatory Evaluations: A Handbook for DOT Benefit-Cost Analysis" produced by the U.S. Department of Transportation and "OMB Circular No. A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs".

The annual costs and benefits of implementing the numbering system were estimated over a thirty year duration. To calculate the present value of future costs and benefits, the annual cost and benefit streams were discounted using a rate of 7%, as specified in OMB Circular No. A-94, dated October 29, 1992.

The costs of implementing and administrating the numbering system will accrue to the barge industry and the government. The cost to industry includes added administrative costs, transportation costs, and the cost to affix the vessel identification number to the barge. The cost to the government includes costs for developing and installing a database for the numbering system and costs for administering the system. The potential benefits of implementing the numbering system will accrue to the Government through cost avoidance for removal and cleanup associated with the abandoned barge and from reimbursement of government incurred costs from the responsible party. Implementation of the numbering system would result in no direct benefits to industry.

5.1 AFFECTED AGENCIES

Two Federal agencies are affected by this rulemaking: the Coast Guard and the EPA. The Coast Guard has jurisdiction over vessel removal, while the Coast Guard and EPA have jurisdiction over cleanup of hazardous substance releases into the nation's waters.

5.1.1 Abandoned Barge Removal

The Coast Guard and USACE are the two governmental agencies responsible for responding to abandoned vessels. USACE is responsible for the removal of all vessels, including abandoned barges, that are obstructions to navigation. The Coast Guard is responsible for the removal of abandoned vessels that have released, or have the potential to release, hazardous substances into the environment.

USACE was contacted in order to obtain information regarding the impact of abandoned barges on USACE operations. The USACE reported that very seldom is a barge abandoned in a navigable waterway and therefore, USACE does not incur costs in removing them. Abandoned barges are almost always found along the banks of the waterway, away from the navigational channels. The barges that are obstructions to navigation are operational barges (not abandoned) and the responsible parties of the barges take responsibility for removing the barge. Therefore, USACE will not experience a benefit or cost from the barge numbering regulation, and for the purpose of

this report, is not considered an impacted agency.

5.1.2 Cleanup of Hazardous Substance Releases

The Coast Guard and EPA are the responsible Federal agencies for overseeing the cleanup of hazardous substance released into the nation's water. The National Contingency Plan gives jurisdiction over coastal areas to the Coast Guard and inland areas to EPA. The boundaries between coastal and inland waters are defined by regional agreement between the Coast Guard and EPA. Any affects this rulemaking will have on the quantity of hazardous substances being released from abandoned barges will impact both agencies; benefit calculations do not differentiate between the two agencies.

5.2 ASSUMPTIONS FOR COSTING OF NUMBERING SYSTEM

At the time of this analysis, a system for numbering undocumented barges more than 100 gross tons has not been established. In order to develop the costs of implementing a numbering system, it was necessary to make several assumptions regarding the type of numbering system that would be implemented by the Coast Guard. These assumptions are based on comments received from the Coast Guard request for comments (Federal Register, FR 52646), the hearing held before the Subcommittee on Coast Guard and Navigation, of the House Committee on Merchant Marine and Fisheries on 10 June 1992 concerning "Draft Legislation to Prohibit Abandonment of Barges, and for other purposes" (Serial No. 102-83), and from discussions with Coast Guard Headquarters and field units; they are:.

- There will be one national numbering system, administered by the Coast Guard, for undocumented barges over 100 gross tons.
- Tonnage will be based upon the Simplified Measurement System (0.84 x Length x breadth x depth/100)[18].
- The number issued to a hull will remain for the life of the barge. The accompanying certificate of number will be valid until the barge changes ownership, or is taken out of service, at which time it will be the owner's responsibility to surrender the certificate of number to the Coast Guard.
- Existing undocumented barges more than 100 gross tons will have two years from the effective date of the Final Rule to comply with its requirements.
- The responsibility of numbering the affected barges will rest with the owners of the barges.

5.3 ALTERNATIVES

Two alternatives for numbering the affected barges were identified, based on discussions with the Coast Guard and comments received from the Coast Guard request for comments (Federal Register, FR 52646). The first alternative is to affix the number to the barge by welding the number to the hull. The second alternative is to paint or decal

[18] 46 CFR Subchapter "G"

the number to the hull.

5.3.1 Alternative 1 – Welded Number

The vessel identification number is to be affixed similar to documented vessels[15]. The number is to be bead welded in two locations on the outer hull by qualified welders with the barge in a gas free state.

5.3.2 Alternative 2 – Paint or Decal Number

The vessel identification number is to be affixed in a manner similar to that required of state numbered vessels. The number is to be durably marked by paint or decal on the hull of the barge and will be repainted every 10 years. The numbering will be completed at the barges current location (i.e., the barge will not have to be towed to a ship repair facility).

Welding numbers into a hull offers a more durable marking than painting and will resist obliteration due to normal wear and tear. Nonetheless, it is important to point out that neither method will place a number onto the hull in such a manner that it can not be deliberately removed by one who is intent on illegally abandoning a barge, and concealing its ownership. Painted numbering is the least costly and time consuming option available, yet painted numbers can be easily painted over, defaced, or removed.

5.4 AFFECTED FLEET

As discussed in section 4.2, the estimated number of existing undocumented barges affected by the legislation is approximately 20,000. In order to estimate the number of affected barges in future years (i.e., barges to be constructed in the future that will require numbering), a 2% annual net increase in the number of barges was applied to the existing 20,000 barges. The 2% is based on the Maritime Administration's[19] forecasted growth rate of inland waterways traffic and discussions with industry representatives. The projected population of undocumented barges more than 100 gross tons is shown in table 5.1.

Table 5.1
Projected Population of Undocumented Barges More than 100 Gross Tons

Year	1998	2003	2008	2013	2018	2023	2028
Projected Affected Fleet	20,000	22,082	24,380	26,917	29,719	32,812	36,227

[19] "The 1997 Annual Report", Maritime Administration, May 1998.

5.5 UNIT COSTS

The costs associated with implementing a vessel numbering system for barges more than 100 gross tons consists of industry costs and government costs. The cost to industry includes added administrative costs and the cost to affix the vessel identification number to the barge. The cost to the government includes costs for developing and installing a database for the numbering system and costs for administrating the system.

5.5.1 Government Costs

The relevant assumptions for this cost calculation are: 1) the Coast Guard will be the responsible agency for issuing vessel identification numbers for all undocumented barges more than 100 gross tons; and 2) the Coast Guard will incur the cost of developing and installing a database system for storing the numbering system data and the administrative cost of issuing numbers. The database development and installation costs and the numbering system administrative costs incurred by the government will be the same for Alternative 1 and Alternative 2.

The database development and installation costs include software development and installation, as well as training for Coast Guard personnel. Based on Volpe Center past experience with database development, it is assumed this will be a three week effort performed by a database professional including 1 week of training for 3 Coast Guard personnel.

The administrative costs include: distribution of simplified measurement form and application for Coast Guard vessel number, receipt and processing of the measurement form and application, issuing the Certificate of Number, tracking barge ownership to assure the disposition of barges is recorded, and responding to information inquiries regarding the numbering of affected barges. The administrative costs estimate was based on information from discussions with the National Documentation Center.

Table 5.2
Government Costs

Developing and Installing Database (one-time costs)	**$18,000**	
(3 CG personnel x 40 x $38) + (dbase prof. 120 hrs x $110/hr)		
Administration Costs Numbering Barges		
	GS-07	**GS-12**
Hrly Rate*	$ 24.00	$ 38.00
Hrs./Barge	1	1
Labor Cost/Barge	$ 24.00	$ 38.00
Admin. Cost/Barge	**$ 62.00**	

*Hourly rates are based on "Hourly Standard Rates for Personnel" COMDTINST 7310.1E

5.5.2 Industry Costs

Industry would incur administrative costs and costs to affix the vessel identification number to the hull. It is assumed that owners of existing undocumented barges more than 100 gross tons will be required to apply for and affix a vessel identification number to all affected barges within 2 years, and that barges more than 100 gross tons that are to be constructed in the future (after December 1998) will have the required vessel number affixed during construction.

5.5.2.1 Alternative One: Welded Vessel Identification Number

The vessel identification number will be bead welded onto the hull in two places. It is assumed that the vessel number will be alphanumeric, consisting of 7 to 8 characters, and will take 4 man-hours to weld on to the hull, including setup time. The barge must be gas free prior to welding.

Information obtained from industry interviews revealed that a majority of barges (e.g., hopper, dry cargo, deck) do not undergo regularly scheduled maintenance. These barges generally operate in fresh water and do not suffer the same environmental attack as ocean going barges. These barges are only brought to maintenance facilities if they become damaged and need repair. Consequently, welding the vessel identification number to these barges requires that the barge be taken out of operation and transported to a facility, or simply to the river bank for welding for the sole purpose of affixing the vessel number. This results in additional costs due to down time (time away from operation) and towing expenses. This analysis assumes 85%, (17,000) of barges will require towing to a facility in order to be numbered. The 85% is based on the percentage of barges operating in fresh water (89%) and adjusted to account for barges that will have numbers welded at current site or during maintenance. Barges operating in fresh water rarely undergo routine maintenance (refer to section 4.7) and would most likely require towing for the sole purpose of welding the numbers to the barge. It is assumed the remaining 15% (3,000) of barges will be numbered during routine maintenance, Coast Guard inspections, or at their current on-site location.

Administrative Costs:

These are costs incurred for inventory of existing barges, request and completion of application forms, and scheduling of the numbering of the barge at an appropriate facility. These costs are detailed as follows.

Inventory: The existing fleet must be inventoried in order to identify the number and locations of undocumented barges that will be affected by the numbering requirement. This activity also includes the admeasurement of barges in order to identify barges over 100 gross tons. For this analysis it was assumed the owners would use the simplified method of determining gross tonnage (L x B x D x 0.84 / 100 = GT).

Application: Request for vessel numbering applications for each affected barge must be made to Coast Guard. Once the applications are received, an application for each affected barge must be completed and sent back to Coast Guard for issuance of the vessel identification.

Scheduling: Arrangements must be made to have the vessel identification number welded to each affected barge. Barges must be scheduled for down time in order to be available for welding of the vessel number. Arrangements must also be made to contract or schedule (if in-house) a welder to affix the number to each barge.

Cost to Affix Vessel Identification Number

These costs include towing the vessel to and from a welding facility, affixing the number, and down time of the barge.

Tow: The affected barges will need to be towed to and from the facility where the vessel identification number is to be welded. This cost will vary depending on the location of the barge, the distance of the barge from the welding facility, and the need go through any locks. The cost of towing is an average cost based on industry representitives and includes the cost to tow to and from the facility as well as the necessary insurance needed during tow. Future undocumented barges will have the number affixed during construction and towing will not be necessary.

Affixing Number: It was estimated that it will take 4 man hours of a welder to setup for and affix the vessel number to the barge. The hourly rate of $63 per hour is based on Means 1996 Heavy Construction Cost Data for a welder, adjusted for inflation and geographic location (Midwest).

Down Time: The 20,000 existing undocumented barges will be out of operation while the vessel identification number is being welded to the barge. The daily cost of downtime was based on a barge earning a monthly revenue of $3,500. It was assumed that a barge that required towing would be out of operation for 3 days and a barge not requiring towing would be out of operation for 1 day. The estimated downtime cost was based on information obtained from interviews with industry representitives.

The unit cost to industry for numbering of undocumented barges is presented in Table 5.3, Table 5.4, and Table 5.5.

Table 5.3
Unit Cost to Weld Number on Existing Barges (Tow Required)

	Qty/Barge	Rate	Total
Administrative			
Inventory/File Application (hours)	1.5	$ 30.00	$ 45
Schedule Numbering (hours)	1	$ 30.00	$ 30
Subtotal			**$ 75**
Affix Number			
Tow	1	$ 1,900.00	$ 1,900
Down Time (days)	3	$ 116.67	$ 350
Affix Number (hours)	4	$ 63.00	$ 252
Subtotal			**$ 2,502**
Total Cost Per Barge			**$ 2,577**

Table 5.4
Unit Cost to Weld Number on Existing Barges (Tow Not Required)

	Qty/Barge	Rate	Total
Administrative			
Inventory/File Application (hours)	1.5	$ 30.00	$ 45
Schedule Numbering (hours)	1	$ 30.00	$ 30
Subtotal			**$ 75**
Affix Number			
Tow	0	$ 1,900.00	$ 0
Down Time (days)	1	$ 116.67	$ 117
Affix Number (hours)	4	$ 63.00	$ 252
Subtotal			**$ 369**
Total Cost Per Barge			**$ 444**

Table 5.5
Unit Cost to Weld Number on Newbuildings

	Qty/Barge	Rate	Total
Administrative			
File Application (hours)	1	$ 30.00	$ 30
Schedule Numbering (hours)	0	$ 30.00	$ -
Subtotal			**$ 30**
Affix Number			
Tow	0	$ 1,900.00	$ -
Down Time (hours)	0	$ 20.19	$ -
Affix Number (hours)	4	$ 63.00	$ 252
Subtotal			**$ 252**
Total Cost Per Barge			**$ 282**

5.5.2.2 Alternative Two: Painted Vessel Identification Number

The vessel identification number will be affixed onto the hull in two places by either paint or decals. It is assumed that the vessel number will be alphanumeric, consisting of 7 to 8 characters and that existing undocumented barges will not need towing to a facility for numbering. The vessel identification number will be painted on the barge while it remains at its operation site. For future newbuildings, the vessel identification will be affixed during construction.

Administrative Costs

These are costs incurred for inventory of existing barges, request and completion of application forms, and scheduling the barge numbering. The administration costs of Alternative 2 are similar to that of Alternative 1, with the exception that there is no need to schedule towing.

Cost to Affix Vessel Identification Number

These costs include the cost to paint or decal the vessel identification number to the hull. It was estimated that for existing barges the downtime would be 0.5 day. This downtime would be for locating the barge, preparing the hull, painting or decaling the number, and allowing the paint or decal to dry. The daily cost of downtime is the same as for Alternative 1.

The unit cost to industry for numbering of undocumented barges is presented in Table 5.6 and Table 5.7

Table 5.6
Unit Cost to Paint or Decal Number on Existing Barges

	Qty/Barge	Rate	Total
Administrative			
Inventory/File Application (hours)	1.5	$ 30.00	$ 45
Schedule Numbering (hours)	0.5	$ 30.00	$ 15
Subtotal			**$ 60**
Affix Number			
Down Time (days)	0.5	$ 116.67	$ 58
Affix Number (hours)	1	$ 35.00	$ 35
Subtotal			**$ 93**
Total Cost Per Barge			**$ 153**

Table 5.7
Unit Cost to Paint or Decal Number on Future Barges

	Qty/Barge	Rate	Total
Administrative			
File Application (hours)	1.0	$ 30.00	$ 30
Schedule Numbering (hours)	0	$ 30.00	$ -
Subtotal			**$ 30**
Affix Number			
Down Time (days)	0	$ 116.67	$ -
Affix Number (hours)	1	$ 35.00	$ 35
Subtotal			**$ 35**
Total Cost Per Barge			**$ 65**

5.5.3 Summary of Unit Costs

Table 5.8 summarizes the unit costs for alternative 1 and alternative 2. The unit costs do not include the initial one-time cost ($18,000) to develop and implement the numbering system database.

Table 5.8
Unit Costs Summary

	Alternative 1 Welding	Alternative 2 Painting
Government Costs:		
Administration Cost/Barge	$62	$62
Industry Cost/Barge:		
Existing Barges (Tow Req./No Tow Req.)	$2,577/ $444	$153
Future Barges	$282	$65
Total Cost/Barge:		
Existing Barges (Tow Req./No Tow Req.)	$2,639/ $506	$215
Future Barges	$344	$127

5.6 TOTAL COSTS

The total costs associated with implementing a vessel numbering system are presented in Tables 5.9 and 5.10 for Alternative 1 and Alternative 2, respectively. The total costs were calculated by multiplying the unit costs by the number of affected barges for each year from 1998 through 2028. The tables show the present values for the 10 year (Year 2008), 20 year (Year 2018), and 30 year (Year 2028) periods. Appendix E provides a breakdown of the annual present values of Alternatives 1 and 2.

Table 5.9
Cost Summary for Alternative 1

Total Costs: Alternative 1 - Welded Numbers						
Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
No. of Existing Affected Barges-Tow Req.	8500	8500	0	0	0	0
No. of Existing Affected Barges-No Tow Req.	1500	1500	0	0	0	0
No. of Future Barges	400	408	416	424	433	442
Initial Database Cost	$ 18,000					
Cost/Barge Existing Affected Barges-Tow Req.	$ 2,639	$ 2,639	$ -	$ -	$ -	$ -
Cost/Barge Existing Affected Barges-No Tow Req.	$ 506	$ 506				
Cost/Barge Future Barges	$ 344	$ 344	$ 344	$ 344	$ 344	$ 344
Total Cost (1998 $)	$ 23,345,690	$ 23,330,442	$ 143,159	$ 146,022	$ 148,943	$ 151,922
Discounted Cost @ 7%	$ 22,569,130	$ 21,078,869	$ 120,881	$ 115,233	$ 109,848	$ 104,715
Present Value Costs thru 2008	**$ 44,470,837**					
Present Value Costs thru 2018	**$ 45,141,739**					
Present Value Costs thru 2028	**$ 45,557,481**					

Table 5.10
Cost Summary for Alternative 2

Total Costs: Alternative 2 - Painted Numbers						
Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
No. of Existing Affected Barges	10000	10000	0	0	0	0
No. of Future Barges	400	408	416	424	433	442
Initial Database Cost	$ 18,000					
Cost/Barge Existing Affected Barges	$ 215	$ 215	$ -	$ -	$ -	$ -
Cost/Barge Future Barges	$ 127	$ 127	$ 127	$ 127	$ 127	$ 127
Total Industry Cost (1998 $)	$ 2,222,133	$ 2,205,149	$ 52,852	$ 53,909	$ 54,988	$ 56,087
Discounted Cost @ 7%	$ 2,148,217	$ 1,992,335	$ 44,628	$ 42,542	$ 40,554	$ 38,659
Present Value Costs thru 2008	**$ 4,444,333**					
Present Value Costs thru 2018	**$ 5,728,694**					
Present Value Costs thru 2028	**$ 6,501,706**					

The number of vessels under Alternative 1 that requires towing was estimated at 85% of the affected barges (17,000 of the 20,000 existing undocumented barges). The remaining 15% will be numbered during routine maintenance, Coast Guard inspection or at its on-site location, therefore eliminating the need to be towed for the sole purpose of numbering.

5.7 BENEFITS

The potential benefits of a vessel numbering system for undocumented barges more than 100 gross tons will accrue to the government. No direct benefits to industry were identified. The potential benefit to the government will come from the government's cost avoidance of removal and cleanup costs associated with the barge and from reimbursement of government incurred costs from the responsible parties. The intent of the numbering system is to increase the responsible party's accountability for the barge, thereby deterring the illegal abandonment of the barge. Cost avoidance results from fewer undocumented barges being illegally abandoned, and therefore, fewer abandoned barges requiring government removal. Reimbursement of government incurred costs results from locating the responsible parties of an illegally abandoned barge and holding them liable for costs incurred from the removal.

The underlying intent and secondary benefit of the numbering system is that responsible parties can be held responsible for removal and disposal of any hazardous substances located on the abandoned barge and the clean up of any hazardous substances released from the barge into the environment. Without identifying the responsible party, the Coast Guard and EPA utilize funds from CERCLA and the Oil Spill Liability Trust Fund (OSLTF) for the cleanup, removal and disposal of the hazardous substance.

5.7.1 Annual Benefits

The calculation for avoidance of barge removal and hazardous waste cleanup costs are based on Coast Guard and EPA data since 1992. The annual benefits will depend on the actions of the responsible parties with regard to unlawful abandonment. Three scenarios based on possible actions of the responsible parties are identified, resulting in a range of possible values for the annual benefit.

5.7.1.1 Abandoned Barge Removal

The only case since 1992 where Coast Guard funds were used to remove abandoned barges under the authority of the Act is in the case of San Jacinto, Texas, where $1.5 million was expended to remove 5 barges in 1997. All 5 barges were not numbered and the responsible parties were not identified. Due to the lack of historical data, it is difficult to estimate what the rate of abandoned barge removal will be for future years. Therefore, an annual cost of $250,000 for barge removal is assumed for those cases where the responsible parties are not identified and held responsible for the removal. Table 5.11 presents the historical removals for the period FY 1992 (year Act was promulgated) through FY 1997.

Table 5.11
Coast Guard Abandoned Barge Removals

Fiscal Year	Number of Cases	Costs Incurred
FY92	0	$0
FY93	0	$0
FY94	0	$0
FY95	0	$0
FY96	0	$0
FY97	5	$1,500,000
TOTAL	**5**	**$1,500,000**
AVG. ANNUAL	**0.8**	**$250,000**

5.7.1.2 Hazardous Substance Cleanup and Removal

As stated in section 5.1, the Coast Guard and EPA are the two Federal agencies responsible for overseeing the cleanup of hazardous substance releases into the nation's waters. The NPFC provided data on the amount of OSLTF funds expended in response to spills from abandoned barges. Included in this data is the amount of CERCLA funds expended by the Coast Guard (Coast Guard requests for CERCLA funds are distributed through NPFC).

EPA was contacted in order to obtain data on the amount of CERCLA funds expended by EPA in response to releases from abandoned barges. EPA was not able to provide this data on a national basis, however EPA Headquarters deferred the request for data to EPA Region 6 where a majority of abandoned vessels are encountered. EPA Region 6 (consists of Arkansas, Louisiana, New Mexico, Oklahoma, and Texas) was contacted and their information was the basis for CERCLA funds used by EPA in response to abandoned barge cleanups.

Data were analyzed for the years 1992 through July, 1998 (includes 10 of the 12 months of FY98). NPFC provided data on the number of cases and costs incurred by fiscal year. The quantity of spilled material was not available. NPFC does not collect data regarding abandoned barges, therefore, data was queried for barges with unknown owners/operators. The number of cases and associated federal funds expended by fiscal year are provided in Table 5.12. A listing of the cases is provided in Appendix D.

Table 5.12
EPA and Coast Guard Abandoned Barge Cleanups

Fiscal Year	Number of Cases	Costs Incurred
FY92	2	$2,190,163
FY93	1	$467,789
FY94	0	$0
FY95	1	$4,844
FY96	1	$4,785
FY97	3	$270,000
FY98 (Thru July 1998)	0	0
TOTAL	**8**	**$2,937,581**
AVG. ANNUAL		**$429,890**

The average annual cost incurred by the Coast Guard and EPA for the period FY92 through July, 1998 was $429,890. Neither the National Pollution Funds Center nor the Marine Safety Offices contacted could provide information regarding documentation history on any of these cases. Although it is possible that these cases could have been documented barges with numbers removed, it is assumed that the entire cost resulted from undocumented abandoned barges. This assumption is based on: 1) the majority of barges are undocumented, 2) documented barges are less likely to be abandoned due to the likelihood of documented barges having outstanding mortgages and protection and indemnity insurance (i.e., less likely an owner of a documented barge will benefit financially from abandonment), and 3) this assumption maximizes the potential benefits of the numbering system.

The available data do not indicate whether the funds were spent for cleanup of hazardous waste on board the barge prior to abandonment (either as clingage, cargo, or illegally dumped on board while the barge was operating[20]) or that illegally dumped into the barge after abandonment. This analysis assumes that all cleanup costs ($2,937,581) are potential benefits.

Table 5.13 provides some perspective of the magnitude of the abandoned barge cleanup effort relative to total national expenditures, based on OSLTF data on the total number of oil spill and hazard substance incidents for FY93 through FY97. Incidents involving abandoned barges are a small percentage of oil and hazardous substance incidents.

[20] During the course of our investigation we spoke to several barge operators. During these interviews we were advised by barge owners that although it is not a common or condoned practice, it sometimes occurs that a barge is returned to an owner with bilge slops from a towboat pumped on board.

Table 5.13
Oil and Hazardous Substance Incidents Reported by NPFC

	Total Incidents		Abandoned Barge Incidents		
Fiscal Year	# of Cases	Cost	# of Cases	Cost	% of Total Annual Cost
1993	490	$14,000,000	1	$467,789	3.34%
1994	538	$30,200,000	0	$0	0.00%
1995	567	$39,500,000	1	$4,844	0.01%
1996	599	$48,600,000	1	$4,785	0.01%
1997	552	$49,600,000	3	$270,000	0.54%

5.7.1.3 Reduced Investigation Effort

The time to investigate and identify the responsible party of an abandoned barge is reduced with a barge identification number system in place. The Coast Guard would use the database to identify the abandoned vessel and responsible party, rather than the laborious process of making phone calls to various state and local agencies and interviewing local people.

Cost estimates for both types of investigations follow and are based on Coast Guard field personnel experience. The investigation of a vessel with an identification number would typically require Coast Guard staff consisting of labor category E1-E4 and labor category E6-E9. The Coast Guard staff typically required to investigate a vessel without an identification number consists of labor categories E6-E9, and O1/O2. The estimated annual benefit to the Coast Guard in reduced investigation costs is $1,090. The annual investigation costs are presented in Table 5.14.

5.7.2 Benefit Scenarios

The benefits of requiring undocumented barges to be numbered and registered will depend on the responsible party's method of disposal. There are three possible methods of barge disposal: 1) the barge is not abandoned and is properly disposed of, 2) the barge is illegally abandoned with the vessel number intact, and 3) the barge is illegally abandoned with the identification number removed or obliterated. Three scenarios are analyzed, one scenario for each of the possible disposal methods.

Scenario 1: The undocumented barge numbering requirement discourages responsible parties from illegally abandoning their barge. This scenario is the best case scenario.

Scenario 2: Undocumented barges are illegally abandoned with the vessel number intact. This scenario would allow the Coast Guard to track the responsible parties to the illegally abandoned barge.

Scenario 3: Undocumented barges are illegally abandoned with the vessel number removed or obliterated. This scenario defeats the purpose of a vessel numbering system and would result in no benefit. This is the worst case scenario.

Table 5.14
Annual Investigation Costs

Barges with Vessel Identification Number			
	E1-E4	**E6-E9**	**O1/O2**
Hrly Rate	$ 17.00	$ 24.00	$ 27.00
Hrs./Barge	2	2	
Labor Cost/Barge	$ 34.00	$ 48.00	$ -
Total Govt. Cost/Barge	**$ 82.00**		
Est. Barge Investigations/year	**5**		
Annual Cost	**$ 410**		
Barges without Vessel Identification Number			
	E1-E4	**E6-E9**	**O1/O2**
Hrly Rate	$ 17.00	$ 24.00	27.00
Hrs./Barge	0	8	4
Labor Cost/Barge	$ -	$ 92.00	$ 108.00
Total Govt. Cost/Barge	**$ 300.00**		
Est. Barge Investigations/year	**5**		
Annual Cost	**$ 1,500**		
Annual Benefit ($1,500-$410)	**$ 1,090**		

It is difficult to predict the percentage of barges that will fall into each of the three scenarios, for each of the two numbering schemes. Instead of trying to predict the distribution of barges that will fall within each scenario, the benefits for each scenario were calculated as if all the barges and associated costs fall within that scenario. The result is a range of potential benefits consisting of the maximum benefit (scenario 1), intermediate benefit (scenario 2), and minimum benefit (scenario 3). The likelihood of each scenario is discussed in section 5.8.3.

It is also assumed that the number of barges falling within each scenario is independent of whether the number is welded or painted to the hull. Discussions with the Coast Guard and comments from the docket reveal that there currently exists no permanent method of affixing an identification number to a vessel. Therefore, both welded numbers (alternative 1) and painted numbers (alternative 2) can be removed from a vessel. The difference between alternative 1 and alternative 2 is that the process to remove the welded number is more difficult than that for removing painted numbers.

5.7.2.1 Scenario 1 Benefit

This is the best case scenario. If barges more than 100 gross tons are no longer abandoned, the Coast Guard will benefit by not having to expend funds to remove these barges or clean up, remove and dispose of hazardous substances from the barge. The total potential benefit (cost avoidance) will consist of the annual removal costs ($250,000), the annual hazardous substance cleanup costs ($429,890), and Coast Guard time saved by not having to investigate and locate the responsible party of the abandoned barge. This scenario assumes that after the numbering system is established, the hazardous waste that would have been deposited into an abandoned barge is not deposited into one of the thousands of other legally abandoned vessels. Table 5.15 presents the estimated annual benefits for Scenario 1.

Table 5.15
Scenario 1 Annual Benefit

Annual Coast Guard Removal Costs	$ 250,000
Annual Coast Guard Hazardous Substance Cleanup	$ 429,890
Annual Investigation Savings	$ 1,500
Total Annual Benefit	**$ 681,390**

5.7.2.2 Scenario 2 Benefit

In this scenario, undocumented barges are abandoned with the vessel identification number intact. The Coast Guard would attempt to identify the responsible party and hold them liable for the removal of the barge and for any associated cleanup, removal and disposal of hazardous substances.

Based on estimates of cost recovery success for pollution mitigation operations from the NPFC, viable responsible parties are identified in 60% of all cases where federal funds are expended in pollution mitigation operations. Of those 60% of cases where viable responsible parties are identified, 60% of the funds expended are recovered by the government. This results in an average cost recovery of 36% of the total funds expended. Therefore, based on NPFC history, the government can expect to recover 36% of the cost incurred to remove and clean up illegally abandoned barges with their vessel identification number intact. Table 5.16 presents the estimated annual benefits for Scenario 2.

Table 5.16
Scenario 2 Annual Benefit

Annual Cost to Remove Barges	$250,000
Annual Cost of Barge Clean Up	$429,890
Subtotal	**$679,890**
Expected Cost Recovery (36%)	$244,760
Annual Investigation Savings	$1,090
Total Annual Benefit	**$245,850**

5.7.2.3 Scenario 3 Benefit

In this scenario the vessel identification numbers are removed or obliterated from the abandoned barges, and the numbering system is ineffective. Discussions with the Coast Guard and comments received in the docket reveal that the responsible party commonly removes or obliterates a vessel identification number prior to abandonment. Illegal abandonment would most likely mean removal or obliteration of the vessel identification number. If removal or obliteration of the number takes place in all cases, the annual benefit is clearly $0.

5.7.3 Annual Benefits Summary

Table 5.17 summarizes the annual benefit for each scenario. The present values of the benefits for the 10 year (Year 2008), 20 year (Year 2018), and 30 year (Year 2028) periods are presented in Table 5.18. Appendix E provides a breakdown of the annual benefits and present values for each scenario.

Table 5.17
Annual Benefit Summary

	Scenario 1	Scenario 2	Scenario 3
Removal Cost Recovery	$250,000	$90,000	$0
Clean Up Cost Recovery	$429,890	$154,760	$0
Investigation Savings	$1,500	$1,090	$0
Total Annual Savings	**$681,390**	**$245,850**	**$0**

5.8 TOTAL COSTS AND BENEFITS COMPARISON

Table 5.19 presents the total costs and benefits associated with establishing a vessel numbering system for undocumented barges more than 100 gross tons. The table shows the total net present values (present value benefits – present value costs) for each of the cost alternatives and benefit scenarios for the 10 year (Year 2008), 20 year (Year 2018), and 30 year (Year 2028) periods. Annual net present values for each alternative and

Table 5.18:
Benefit Summary

Total Benefits by Scenario						
Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Scenario 1						
Total Benefits (1998 $)*	$ 340,695	$ 681,390	$ 681,390	$ 681,390	$ 681,390	$ 681,390
Discounted Benefit @ 7%	$ 329,362	$ 615,630	$ 575,355	$ 537,715	$ 502,538	$ 469,661
Present Value Costs thru 2008	**$ 4,621,105**					
Present Value Costs thru 2018	**$ 7,137,672**					
Present Value Costs thru 2028	**$ 8,416,967**					
Scenario 2						
Total Benefits (1998 $)*	$ 122,925	$ 245,850	$ 245,850	$ 245,850	$ 245,850	$ 245,850
Discounted Benefit @ 7%	$ 118,836	$ 222,124	$ 207,592	$ 194,012	$ 181,319	$ 169,457
Present Value Costs thru 2008	**$ 1,667,328**					
Present Value Costs thru 2018	**$ 2,575,323**					
Present Value Costs thru 2028	**$ 3,036,902**					
Scenario 3						
Total Benefits (1998 $)	0	0	0	0	0	0
Discounted Benefit @ 7%	0	0	0	0	0	0
Present Value Costs thru 2008	**$ -**					
Present Value Costs thru 2018	**$ -**					
Present Value Costs thru 2028	**$ -**					

Table 5.19: Total Cost and Benefit Summary

	Year 2008			Year 2018			Year 2028		
	Present Value Cost	Present Value Benefit	Present Value Net	Present Value Cost	Present Value Benefit	Present Value Net	Present Value Cost	Present Value Benefit	Present Value Net
Scenario 1									
Welded Number	$ 44,470,837	$ 4,621,105	***$ (39,849,732)***	$ 45,141,739	$ 7,137,672	***$ (38,004,067)***	$ 45,557,481	$ 8,416,967	***$ (37,140,514)***
Painted Number	$ 4,444,333	$ 4,621,105	***$ 176,773***	$ 5,728,694	$ 7,137,672	***$ 1,408,978***	$ 6,501,706	$ 8,416,967	***$ 1,915,261***
Scenario 2									
Welded Number	$ 44,470,837	$ 1,667,328	***$ (42,803,509)***	$ 45,141,739	$ 2,575,323	***$ (42,566,416)***	$ 45,557,481	$ 3,036,902	***$ (42,520,579)***
Painted Number	$ 4,444,333	$ 1,667,328	***$ (2,777,005)***	$ 5,728,694	$ 2,575,323	***$ (3,153,371)***	$ 6,501,706	$ 3,036,902	***$ (3,464,804)***
Scenario 3									
Welded Number	$ 44,470,837	$0.00	***$ (44,470,837)***	$ 45,141,739	$0.00	***$ (45,141,739)***	$ 45,557,481	$0.00	***$ (45,557,481)***
Painted Number	$ 4,444,333	$0.00	***$ (4,444,333)***	$ 5,728,694	$0.00	***$ (5,728,694)***	$ 6,501,706	$0.00	***$ (6,501,706)***

scenario are provided in Appendix F.

5.8.1 Alternative 1 – Welded Numbers

As can be seen in Table 5.19, the estimated net present value associated with Alternative 1 (welding) is negative for all three scenarios and for all three analysis periods (2008, 2018, and 2028). A majority of the costs associated with welding the numbers is born by the industry during the first 2 years of compliance. This can be attributed to the high cost of administration, towing, and welding the numbers to the existing 20,000 undocumented barge fleet. This suggests that even for the best possible scenario (scenario 1), the estimated cost of Alternative 1 is greater than the estimated benefits. Consequently, there appears to be no net economic benefit in requiring welded identification numbers for all undocumented barges more than 100 gross tons.

5.8.2 Alternative 2 – Painted Numbers

Table 5.19 shows the estimated net present value of alternative 2 is positive for all three periods (2008, 2018, and 2028) for scenario 1 only. There is no net benefit to painted numbers with scenario 2 and scenario 3. Similar to alternative 1 (welded numbers), the cost associated with alternative 2 is highest in the first two years, at which time the existing 20,000 barges are required to be numbered. The estimated costs of this alternative will be greater than the estimated benefits for the first 9 years with scenario 1, after which the benefits will be greater than the costs (except for scenario 2 in year 2010 which shows a net cost of $158,037, due to cost to repaint initial 20,000 barges (see Appendix F)).

5.8.3 Likelihood of Abandonment Scenarios

5.8.3.1 Scenario 1

The likelihood of scenario 1, no barge owners illegally abandoning their barges, would be very small. Economic conditions will most likely be the major consideration of unethical owners when it comes to deciding whether to illegally abandoned their barge. Since both the welded and painted vessel identification numbers can be (and have been in the past) removed or obliterated from the barge, an unlawful owner would most likely remove the number prior to abandonment. Therefore, it appears the numbering of barges will have little affect in eliminating deliberate abandonment of barges. Scenario 1 was included in this analysis as a benchmark to identify the best case scenario (most possible benefit).

5.8.3.2 Scenario 2

As stated in section 5.6.3.1, an unethical owner would most likely remove or obliterate the barge number prior to illegally abandonment. In the case of intentional abandonment, the likelihood of abandonment with the numbers intact is also small. However, there have been cases where barges have been accidentally broken away and stranded (due to weather, etc.) and the owners have declared the barge a loss and abandoned it in order to

escape salvage fees. In these cases, the barge number will most likely be intact and the owner identified. Therefore, there is the likelihood of some, but not all, abandoned barges having the number intact after abandonment.

5.8.3.3 Scenario 3

This is the most likely scenario for barges that are intentionally abandoned. Since intentional abandonment is illegal, the owner would most likely remove or obliterate the vessel number before abandonment.

There are no data available on the number of undocumented barges abandoned intentionally as opposed to unintentionally and, therefore, it is not possible to estimate the relative likelihood of scenario 2 and scenario 3. The number of barges illegally abandoned will most likely be affected by scrap metal prices and the cost to properly dispose of barges. As the cost increases, the incentive for unethical owners to illegally abandon their barges will also increase. The same can be said for the illegal disposal of hazardous substances onto an abandoned barge. As the cost to dispose of hazardous substances increases, the incentive to illegally dump material into an abandoned barge (or any other abandoned vessel) will also increase. As a result, the actual net present value of numbering undocumented barges will most likely fluctuate between the net present value of scenario 2 and scenario 3.

6.0 REGULATORY FLEXIBILITY ASSESSMENT

Under the Regulatory Flexibility Act (5 U.S.C. 601 et. seq.), the Coast Guard must consider whether any potential rulemaking would have significant impact upon a substantial number of small entities. This section addresses the analysis requirements of the act.

6.1 REASON FOR AGENCY ACTION

The Abandoned Barge Act of 1992, sections 5301 to 5305 of Public Law 102-587, of 4 November 1992, added a new chapter 47 to Title 46 United States Code (46 USC 4701 to 4705), which makes it illegal to abandon a barge of greater than 100 gross tons and established non-funded procedures for removal of barges illegally abandoned. The Act further amended 46 USC 12301 to require the numbering of undocumented barges of greater than 100 gross tons operating on the navigable waters of the United States.

6.2 REGULATORY OBJECTIVES

The direct objective of numbering undocumented barges is to provide a means of identification for abandoned barges, in order to facilitate the government's recovery of costs expended removing abandoned barges. The underlying objective of this action is not addressed in the Act itself, yet is the primary justification for the Act discussed in all preliminary testimony, reports, and public notices, i.e., the recovery of costs expended in the removal of oil and hazardous wastes that might be on board or illegally deposited therein.

The Abandoned Barge Act clearly establishes liability for removal of an abandoned barge. The Act is silent with regard to additional liability such as hazardous waste removal costs for wastes that may have been deposited by another party following an owner's abandonment.

6.3 LEGAL BASIS FOR THE ACTION

Title 46 USC Chapter 123, (Numbering of Undocumented Vessels) was amended by the Abandoned Barge Act of 1992. Section 12301 was amended by adding section (b) as indicated in Italics, below:

Section 12301 – Numbering Vessels

(a) An undocumented vessel equipped with propulsion machinery of any kind shall have a number issued by the proper issuing authority in the State in which the vessel principally is operated.

(b) The Secretary shall require an undocumented barge more than 100 gross tons operating on the navigable waters of the United States to be numbered.

6.4 AFFECTED SMALL ENTITIES

Companies that own and operate barges vary widely in size and operation. Some companies own, operate and maintain large fleets of barges (as well as lease considerable numbers of barges from others). Others merely own and lease out barges. Still others own and operate small fleets in local or regional trades. For the purposes of this report companies employing less than 500 employees are considered as small business entities.

The USACE's "Waterborne Transportation Lines of the United States, Volume 2 - Vessel Company Summary" database was queried to identify owners of undocumented barges more than 100 gross tons. The query identified 660 owners with undocumented barge fleets ranging in number from 1 to 1,608. The results of the query also revealed that 15% of the barge operators own over 85% of the affected barges. A majority (74%) of the affected owners have undocumented barge fleets of less than 10. Table 6.1 presents the number of affected owners by fleet size. No data was available on the ownership of construction barges and therefore these owners were not included in this analysis.

Table 6.1
Number of Affected Fleet Owners

Fleet Size Range	Number of Owners	Percentage of Owners	Number of Affected Barges*	Percentage of Affected Barges
Greater than 1000	3	0.5%	4,040	23%
100 to 999	34	5.2%	8,970	50%
20 to 99	59	8.9%	2,594	14%
10 to 19	75	11.4%	1,024	6%
Fewer than 10	489	74.0%	1,329	7%
Total	**660**	**100.0%**	**17,957**	**100%**

* Does not include construction barges

The USACE database did not provide the information necessary to determine large or small entity status for the affected companies. Therefore, the "1998 Directory of Corporate Affiliations[21]", "Standard and Poor's Register of Corporations, Directors, and Executives[22]" and the Internet were used to estimate the number of small and large business entities. In order to avoid the laborious task of researching 660 companies, the top 96 affected companies, ranked by fleet size, were researched (these companies are listed in Appendix C). All these companies had fleets of 20 or more undocumented barges and cumulatively account for 15,604 of the 17,957 barges (87%).

[21] "1998 Directory of Corporate Affiliations", Volumes 3 and 4, National Register Publishing, New Providence, NJ, 1998

[22] "Standard and Poor's Register of Corporations, Directors, and Executives", The McGraw-Hill Companies, New York, NY, 1998

In the case of the 96 researched companies, 58 are classified as small business entities and 38 are classified as large business entities. A company was classified as a small business entity if:

- The company was found to have less than 500 employees; or
- employment information was not found for the company (in some cases, limited or no information was readily available for small companies)

The remaining 564 affected owners all have fleets of less than 20 undocumented barges and were assumed to be small business entities. The total estimated number of affected small and large business entities are 622 and 38, respectively. The average and median fleet size for small entities are 11 and 3, respectively. Table 6.2 summarizes the number of small and large entities.

Table 6.2
Number of Affected Small and Large Entities

Entity	Number of Affected Entities	%	Number of Affected Barges*	%
Small (less than 500 employees)	622	94	7,006	39
Large (500 or more employees)	38	6	10,951	61
Total	**660**	**100**	**17,957**	**100**

* Does not include construction barges (est. 2,000 barges)

6.5 DESCRIPTION OF COMPLIANCE REQUIREMENTS

As the specific means of complying with the numbering provision of the Abandoned Barge Act have not yet been determined, the description of compliance requirements is based on the assumptions described in section 5.2.

The primary compliance requirements for a barge owner evident at this stage of the regulatory process are:

1. Inventory and scheduling of all barges – The first task will be to inventory and locate the barge fleet. If the numbers are to be welded, the fleet will be scheduled for delivery/arrival barge to the proper location for affixing the numbers (e.g., shipyard(s)). If numbers are to painted, arrangements will be made to have the numbers painted on the barge. In the case of owner/operators of small fleets, this will not be a major task but will take some time. In the cases of large fleet owners, especially those who do not operate the barges, which they own, but lease to other companies, this may be quite time consuming.

   Appreciation of the difficulty of locating a fleet of barges is best arrived at by comparison to railroad freight cars. Individual barges travel to a wide array of customer (or owner) locations, some as part of a large tow, others individually

dropped along the way. These hulls usually remain at a designated point until loaded (or unloaded) and then are eventually joined with a tow (fleeting) for delivery to what might be a final or intermediate destination. The task of locating a barge in service is remarkably similar to attempting to locate a rail car, sitting idle at a loading point or identifying which train or railroad is moving the car at a given time.

In the case of an owner who leases barges to other operators, it is not uncommon that the owner only knows who pays him for the lease, while not seeing the barge for several years. Where barges are leased from owner to operator(s), coordination and scheduling problems should be anticipated, with the potential result of service interruptions and barge downtime.

2. Determination of Applicability: The determination of a barge's tonnage relative to the numbering provisions of the Abandoned Barge Act would be based on the simplified measurement system[23] (gt=0.84 x length x depth x bredth/100). Presently, this method of tonnage determination is completed by the owner of the vessel by obtaining and completing a simplified measurement form and returning it to the Coast Guard as part of the documentation process. The project team has noted that hundreds of barges in the Army database have reported tonnage well below 100 gross tons while their dimensions indicate that they are well over 100 gross tons. In many cases, these barges have been previously documented and may have been admeasured according to the cargo carrying capacity of the hull rather than the vessel's physical dimensions (as is the case with simplified measurement). This situation clearly shows examples where standard size barges, that are currently documented will measure below 100 gross tons while sisters of the same hulls that are not currently documented will increase in tonnage and be subject to the Act.

3. Contacting the Coast Guard National Vessel Documentation Center to Obtain the Application for a Certificate of Number, Simplified Admeasurement Form, and Completing the Applications: In the case of owners of large fleets of documented barges, it is becoming common practice to have one clerical staff member employed full time, on a year round basis, to manage documentation applications, and distribution of certificates of documentation. In the case of operators of large undocumented fleets, the same should be anticipated.

4. Movement of Hulls to Where the Number can be Attached (welded numbers only): This aspect of compliance is expected to be the most costly. Given the fact that an individual fleet can be scattered throughout the navigable waterways (especially in the western rivers), substantial charges will be incurred (e.g., towing charges) in the delivery of a hull to a point where the number can be attached, and its ultimate return to service.

[23] 46 CFR Subchapter "G"

5. Marking: If a barge is required to be towed to a shipyard where marking can be performed, the owner will likely incur yard towing fees, and mooring fees. If welded numbers are required, the barge will be "opened up" and gas freed, and the numbers, along with a receptacle for mounting the certificate of number on board the barge will be attached by the yard. If painted numbers are required, the hull must be cleaned and then painted. Upon completion of the work the barge will return to service. During the period that the barge is out of service, lack of revenue due to loss of the barge from service will be experienced.

6.6 COST FOR SMALL BUSINESS ENTITIES

The costs to small business entities will depend on the entity's fleet size and whether the Coast Guard requires numbers to be welded or painted to the hulls. As discussed in section 5.7, the estimated cost per barge for existing barges is $2,577 (tow req.) or $444 (no tow req.) for welding and $215 for painting. Therefore, the cost to an affected entity will be the product of the number of affected barges and the cost per barge.

The median cost impact to small entities if welded numbering is implemented is $7,731 (3 barges x $2,577/barge) and $ 1,332 (3 barges x $444/barge) if the barge does not need to be towed. The median initial cost impact of painted numbering is $459 (3 barges x $153). However, there could be a substantial cost impact to those small entities that have larger fleets (see Appendix C). The initial cost to a small entity with a fleet of 20 barges could cost $51,540 if the number is required to be welded and the barges need to be towed. For entities with 450 barges the cost could be $1,160,000 (450 barges x $2,577).

6.7 FEDERAL RULES THAT MAY DUPLICATE, OVERLAP OR CONFLICT

There are no existing Federal rules that may duplicate, overlap, or conflict with the requirement of an undocumented barge more than 100 gross tons be numbered. The only number that gets issued to an undocumented barge is an inspection number and is issued only to those barges that are required to be inspected per 46 CFR 2.01 (there are currently 577 inspected undocumented barges, per Coast Guard). The inspection number is an internal administrative number issued by the Coast Guard. There is no Federal rule requiring an inspection number be issued and the barge owner is not required to mark the number on the barge.

Although there are no Federal programs that speak to the act of numbering vessels, there are numerous regulatory provisions directly concerned with the protection of the navigable waters of the United States from pollution and obstruction that appear to be more closely aligned with the goals and intent of the Act. Although a thorough analysis of these programs and their related enforcement provisions is outside of the scope of this analysis, mention of the following regulatory programs is appropriate:

Environmental Protection Agency – (Section 404, Clean Water Act, and The Resource Conservation and Recovery Act (RCRA). The EPA exercises limited jurisdiction over

waterways and wetlands; further, hazardous wastes illegally disposed of on vessels are RCRA hazardous wastes.

Army Corps of Engineers – The Army Corps of Engineers exercises primary jurisdiction over waterways for the purposes of maintaining navigability, levees, improvements, and wetlands protection. The Rivers and Harbors Act of 1899 is the basis of much of the Corps' programs (excluding wetlands) and includes criminal sanctions for obstructing navigable waterways, abandonment of a vessel in such a manner that it could become an obstruction to a navigable waterway (as a result of high water, hurricane etc.), and introducing refuse into navigable waterways.

6.8 ALTERNATIVES

For the purposes of this report, two different methods of marking were considered; bead welding (which includes carving in the case of a wooden hull), and painting. The means of marking the vessel has significant impact upon the costs associated with this initiative. The cost of welding the vessel number to the barge is significantly greater than the cost to paint the number. Considering that neither option will prevent someone who is intent on illegally abandoning a barge from deliberately removing the number, painting will significantly reduce the burden of the proposed rule for small business entities.

7.0 SUMMARY AND CONCLUSION

7.1 THE ABANDONED BARGE ACT

The Abandoned Barge Act of 1992 makes the abandonment of undocumented barges more than 100 gross tons illegal. The Act also requires that all undocumented barges more than 100 gross tons be numbered. The intent of the numbering requirement is to provide a means to link a responsible party to an abandoned barge and hold liable the responsible party for the removal of the barge and all hazardous substances deposited in, or released from, the barge.

7.2 AFFECTED BARGES

There are an estimated 20,000 undocumented barges of more than 100 gross tons each currently plying the nation's waterways. Of these 20,000 barges, approximately 17,100 are dry cargo barges, 15,200 of which ply the Mississippi River System and Gulf Intracoastal Waterway. The majority of barges affected by the Act will be dry cargo barges operated in the Mississippi River System.

7.3 COST - BENEFIT ANALYSIS

Both the Federal Government and industry will incur costs from implementing the numbering system. The Coast Guard will incur costs for developing and installing a database system and for administrating the system. Industry will incur administrative costs and costs to affix the number to their barges. The benefits of the numbering system will accrue to the Government through cost avoidance from removal and cleanup of abandoned barges and reimbursement of government incurred costs from the responsible parties. No direct benefits to industry were identified.

Two alternatives for affixing the number to the barge were analyzed: alternative 1-welded numbers and alternative 2-painted numbers. The estimated cost (1998 dollars) to government and industry to number the existing undocumented barges is approximately $46,700,000 and $4,400,000 for alternative 1 and alternative 2, respectively.

Three possible barge abandonment scenarios were identified for this analysis: 1) barges would no longer be illegally abandoned, 2) barges would be illegally abandoned with the barge number intact, and 3) the abandoned barge would be abandoned with the barge number removed or obliterated. The estimated annual benefits (1998 dollars) for scenarios 1, 2, and 3 are approximately $681,390, $245,850, and $0 respectively.

The present values for the costs and benefits were calculated over a 30 year duration and are presented in Table 5.18 (Section 5.0). The costs of Alternative 1 significantly exceeded the benefits for all three scenarios. For Alternative 2, the benefits exceeded the costs for scenario 1, however the costs exceeded the benefits for scenario 2 and scenario 3. The results of the analysis indicate the following:

- The benefits do not exceed the costs of Alternative 1 for all three scenarios.
- The benefits of Alternative 2 exceed the costs only for scenario 1 over a 30-year duration. The costs exceed the benefits for scenario 2 and scenario 3.
- If the barge numbers are removed or obliterated (scenario 3), there are no benefits to either alternative 1 or alternative 2. This results in costs being incurred by both government and industry, with no return of benefits.

This analysis suggests the only alternative that has a potential net benefit is Alternative 2-painted identification numbers (see Table 5.19). The most likely real life scenario is some combination of scenario 2 and scenario 3. As long as a majority of abandoned barges are abandoned with their numbers intact, the benefits of the painted numbering system will most likely exceed the costs. However, if the barge numbers are removed or obliterated, which has happened in the past, the numbering fails its purpose and no benefits will accrue to the government.

7.4 IMPACT TO SMALL BUSINESS ENTITIES

Of the 660 owners of undocumented barges[23], it is estimated that 622 (94%) are small business entities (less than 500 employees). The number of undocumented barges owned by small business entities is estimated at approximately 7,800[23] (38% of affected barges). A majority of small business entities have relatively small fleets, with a median fleet size of 3. The impact of the numbering requirement is dependent on whether the Coast Guard requires the number to be welded or painted to the hull.

The cost impact to small businesses would range from a median cost of $7,731 for welded numbers to $459 for painted numbers. The impact to small entities with large fleets could range from $51,500 (welded numbers) for a fleet of 20 to $1,160,000 (welded numbers) for a fleet of 450. The impact if the numbers are painted would range from $9,200 for a fleet of 20 to $207,000 for a fleet of 450. Therefore, the painted number alternative would have the least impact on small business entities.

[23] does not include construction barges

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APPENDIX A

DOCKET COMMENTS

APPENDIX A

SUMMARY OF DOCKET COMMENTS

1. Numbering Issues

a. "Barges are currently recognized by name and number assigned by the owner, which is generally marked prominently on one or more places on the barge, in three inch or larger characters. To avoid confusion with boat crews and incidental personnel involved with handling unfamiliar barges, any size requirement for marking should be less than three inches. (McDonough Marine Service)

b. The assigned number should be marked in the same manner as documented barges by welding the number into the main beam of the vessel. (Noble Drilling) (TSAC)

c. Barge registration should require the same information held for documentation including accurate lien information, so a mortgage can be perfected. (TSAC) (AWO)

d. Numbers must be made available to manufacturers during the construction process. (Louisiana Shipbuilding and Repair Assn)

e. The number for the barge should be the same six-digit number as on a documented vessel preceded by a "B" for barge. (LCDR Hassler, USCG)

f. The assigned number should be welded 1 foot below (to protect from abrasion) the knuckle on the transom at the CL at least 6" in height . (LCDR Hassler, USCG)

g. The number currently assigned to undocumented barges should be retained as the barge registration number (AWO)

h. The number assigned to undocumented barges should be the same as the number assigned to documented barges (AWO)

i. Noble Drilling Services Inc operates 44 non self propelled MODU's of which 8 are not documented. These 8 have CG numbers for certification purposes. (Noble Drilling)

2. Execution Issues

a. Identification of effected barge numbers is impossible without a complete survey of the industry. One quick estimate is to subtract the number of documented barges from the TSAC estimate of total barges operating in the US (31,000). (TSAC)

b. Industry should be allowed adequate time to comply concurrent with inspection and yard availability schedules. (American Commercial Barge Line Co) (AWO)

c. The information required under 46 CFR 67 should suffice for establishing a clear line of ownership of a new barge. A bill of sale for an existing barge (which is what is required now for the CG numbers on it's undocumented MODU's. (Noble Drilling)

d. In order to be documented a vessel has to be admeasured. In order to reduce costs the simplified method of determining tonnage in 33 CFR should be applied for undocumented barges (L x B x D x .84 / 100 = GT)(American Commercial Barge Line Co)

e. American Commercial Lines has a fleet of 3200 documented barges as well as 200 undocumented barges (work flats) in use in ship yards and repair facilities. (American Commercial Barge Line Co)

3. Cost Issues

a. Costs for marking barges are estimated at between $500 to $1,500 per hull (plus towing and gas freeing).

b. Due to the involuntary nature of marking and registration, initial registration should be free. (TSAC) (AWO)

4. System Maintenance/Execution Issues

a. Maintenance of ownership data from barges must be performed by a Federal Agency. (Louisiana Shipbuilding and Repair Assn.)

b. Registration papers should be for the life of the vessel, or until a status change. It is time consuming and costly to renew documentation, registration on an annual basis. (American Commercial Barge Line Co)

c. The owner should designate the name of the barge the same as with a documented vessel and be held to the same requirements for changing it. (CENAC TOWING)

5. Validity of the Concept

a. ...".the greatest flaw in the whole concept (is that) in contemplating abandonment, an owner will destroy, obliterate or remove the registration number no matter how permanent. If this assumption is reasonably correct, a great deal of time and money would be expended by both the government and owners ...to try to trap a few law breakers who can thwart the attempt with a grinding wheel or cutting torch, and sink the barge making matters worse. Lastly even if a few abandoned barges could be identified through their registration number, it is likely the ownership will be found to reside in a corporation with little or no assets. Short of "piercing the corporate veil" ... and then finding a shareholder with substantial assets, the net result of the legislation will be to have the taxpayer incur the expense for cleaning and removing the barge, which is where

we already are. (McDonough Marine Service) (Louisiana Shipbuilding and Repair Assn.) (NYS Dept of Parks and Recreation)

b. At the present time scrap prices are such that abandoning of barges is not economical. (Louisiana Shipbuilding and Repair Assn.)

c. The Coast Guard working with industry could identify abandoned barges. Continual surveillance by the CG working with industry would identify any future abandoned barges. (Louisiana Shipbuilding and Repair Assn.)

5. Is there an established history of incidents to justify the expense to industry for numbering barges? Are we committing millions of dollars chasing nickels? (Louisiana Shipbuilding and Repair Assn.)

APPENDIX B

CONTACTS

APPENDIX B

CONTACTS

The following barge operators, organizations, and government agencies were contacted as part of this report:

1. American Waterways Operators
2. National Shipyard Association
3. Barge owners
    a. Parker Towing Co.
    b. Hughes Brothers
    c. New York Trap Rock Corp.
    d. Cargill Marine
    e. Alter Barge Line
    f. Eagle Marine Industries
    g. Mid West Marine Management
    h. Campbell Transport
    i. Consolidation Coal Co.
    j. Monongehla River Towing
    k. Martin Marietta Aggregates
    l. American Electric Power, Fuel Supply, River Transportation
    m. American Commercial Barge Line
    n. M/G Transport Services
    o. Mid South Towing
    p. Mulzer Crushed Stone
    q. Ohio River Co.
    r. Glenn E. Daulton, Inc.
    s. Forest Lines Inc.
4. U.S. Army Corps of Engineers, Waterways Operations Center
5. U.S. Environmental Protection Agency, Headquarters and Region 6
6. U.S. Coast Guard
    a. National Vessel Documentation Center
    b. First District
    c. Eight District
    d. Activities New York
    e. MSO New Orleans
    f. MSO Houston
    g. MSO St. Louis
    h. MSO Galveston
    i. MSO Louisville
    j. National Pollution Funds Center
    k. Headquarters Marine Safety Division
7. Louisiana State Oil Spill Response Coordinator

APPENDIX C

BARGE OPERATORS, LOCATIONS, AND CARGO

APPENDIX C
MAJOR BARGE OWNERS, LOCATIONS, AND CARGO

COMPANY	STATE	FLEET	BARGE TYPE	WATERS	CARGO	ENTITY
American River Trans.	LA	1608	Covered dry cargo barge	Miss. river and tribs.,	coal,grain,salt, fertilizer, scrap	L
Ingram Towing	TN	1250	Open dry cargo, and deck	Miss river and tribs, Gulf I.C.W., Cumberland, Illinois,	coal,coke, grain,aggregate	L
Ohio River Co	OH	1182	Open dry cargo barge	Inland waters (gen),Miss river system,	general commodities, dry bulk	L
American Commercial Line	IN	885	Open dry cargo barge	Inland waters (general)	steel, coal, coke, sulphur,sugar, grain	L
Cargill Marine	MN	728	Covered dry cargo barge	Miss. river and tribs.	coal, grain, salt, misc.	L
McDonough Marine	LA	650	Dry cargo, deck barge	Miss river and tribs,Gulf I.C.W.	general cargo	L
Peavey Barge Line	MO	530	Covered dry cargo barge	Miss river and tribs,Missouri,Ohio,Illinois,Arkansas ,Gulf I.C.W.,Green,	grain	L
Marine Equip Mgmt Corp	MO	518	Open dry cargo barge	Miss river and tribs	coal, grain	L
Crounse Corp.	KY	480	Open dry cargo barge	Miss river and tribs.,Ohio, Tennessee, Cumberland, Green, Kanahwa, Monogahela, Licking, Black Warrior, and Tennessee Tombigbee Waterway	coal, bulk freight	S
American Elect Power	WV	472	Open dry cargo barge	Miss. river and tribs., Kanawha, Allegheny	coal	L
Campbell Transport Co	PA	440	Open dry cargo barge	Ohio,Allegheny,Monongahela	general	S
Mid South	IL	302	Open dry cargo barge	Miss river and tribs	coal, phosphate sulphur	L
Consolidation Coal	PA	290	Open dry cargo barge	Ohio, Allegheny, Monongahela	coal	L
Bunge Corp	MO	288	Covered dry cargo barge	Miss river and tribs.,Gulf I.C.W.,	grain	L
Canal Barge Line	LA	250	Open dry cargo barge	Miss. river and tribs.,Gulf I.C.W	coal, grain, fertilizer	S
Riverway Company	MN	236	Covered dry cargo barge	Inland waters	grain, coal, salt	S
M/G Transportation Svcs	OH	229	Covered dry cargo barge	Miss river and tribs.,Gulf I.C.W,Ohio	coal, coke, grain, aggregate	L
Warrior and Gulf	AL	218	Dry open barge	Gulf ICWW & inland waterways	iron ore, coal, coke	L
Superior Barge	MO	170	Covered dry cargo barge	Gulf ICWW & Mississipi River System	grain, bulk commodities	L
Midwest Marine Mgmt.	MO	160	Covered dry cargo barge	Miss river and tribs.,Illinois	grain, fertilizer, coal, salt	S
Mon. River Towing	PA	146	Open dry cargo barge	Ohio,Kanawha,Allegheny,Monongahela		S

L = Large Business Entity S = Small Business Entity

APPENDIX C
MAJOR BARGE OWNERS, LOCATIONS, AND CARGO

COMPANY	STATE	FLEET	BARGE TYPE	WATERS	CARGO	ENTITY
National Marine	LA	141	Covered dry cargo barge	Miss river and tibs.,Gulf I.C.W.,Arkansas	steel, grain, lumber, chemicals	L
Ashland Inc	KY	139	Tank Barge (double hull)	Miss. river and tribs.,Gulf I.C.W,Ohio	bulk petroleum	L
Reed Crushed Stone	KY	137	Dry cargo, deck barge	Miss. river and tribs.	rock and charters	S
Luhr Bros	IL	135	Open, covered drycargo an	Miss river and tribs.,Gulf I.C.W.	limestone, rock, constr. equip.	S
Martin Marietta Aggregates	WV	154	Open dry cargo barge	Ohio,Kanawha,	sand/gravel	L
Mulzer Crushed Stone	IN	129	Dry cargo, deck barge	Ohio	stone	S
Glenn Daulton	MO	127	Dry cargo, deck barge	Miss. river and tribs.,Gulf I.C.W,	charters	S
Tarmac America	VA	125	Deck Barge	Eastern Branch, Elizabeth River, James River	sand and gravel	L
Pinnacle Towing	MO	121	Covered dry cargo barge	Miss river and tribs., Arkansas, Missouri	wheat, beans, rice	S
Patton Tulley Transport	TN	118	Dry cargo deck and other	Miss river and tribs	stone, logs, pilings	L
Alter Barge Line	IA	115	Covered dry cargo barge	Miss. river and tribs.,Gulf I.C.W.,Ohio,	coal, steel, grain, scrap, containers	S
Pine Bluff Sand	AR	115	Dry cargo, deck barge	Miss river and tribs, Arkansas, White, Red	sand/gravel	S
Eagle Marine Industries	IL	116	Covered dry cargo barge	Miss river and tribs.,Gulf I.C.W	grain, soy beans, fertilized, coal, rock, pulpwood	S
Parker Towing	AL	106	Open dry cargo barge	Miss river and tribs,Black warrior and Tombigbee: Tennessee-Tombigbee; Apolachicola, Ohio, and Gulf I.C.W	coal, steel, wood, agricultural cmdty's	S
NY Trap Rock Co.	NY	100	Open dry cargo barge	New York hbr, and adj. Waters)	stone	L
TPT Transport	TX	100	Tank	Gulf ICWW, Mississippi and Ohio Rivers	petroleum, chemicals	L
City of New York	NY	94	Open dry cargo barge	New York hbr, and adj. Waters)	munic. Waste	L
Robet Hiller + Assoc	MO	93	Covered dry cargo and dec	Miss river and tribs	wheat,corn, soybeans, fertilizer	S
Russel J. Flowers	MS	91	Covered dry cargo barge	Inland waters (gen)	charters	S
Hugh Mac Barge Line	LA	88	Covered dry cargo barge	Inland waters (gen)	charters	S
Senstar Capital	PA	87	Dry open barge	inland rivers	charters to others	L
Material Service Corp	IL	86	Dry cargo, deck barge	Miss river and tribs.,Illinois	sand, gravel, stone	L

L = Large Business Entity S = Small Business Entity

APPENDIX C
MAJOR BARGE OWNERS, LOCATIONS, AND CARGO

COMPANY	STATE	FLEET	BARGE TYPE	WATERS	CARGO	ENTITY
Jay Hall Jr	OH	84	Open, covered drycargo an	Miss river and tribs.,Ohio	charters	S
Midland Enterprises	OH	76	Covered dry cargo barge	Inland water (gen),Miss river system	Gen Commodities, dry bulk	L
Serodino, Inc.	TN	76	Dry open barge	Tennessee River	stone, phosphate	S
Tidewater Barge Line	WA	67	Various barges	Wlliamette, Columbia and Snake Rivers	grain, fertilizer, general cargo	S
Olympic Marine	MO	66	Covered dry cargo barge	Miss river and tribs	corn, beans, wheat, milo	S
Weeks Marine	NJ	66	Various barges	East Coast	contracting materials	S
Ingram Material	TN	65	Deck Barge	Patucha KY to Nashville TN	sand	L
Mobro Marine	FL	61	Dry cargo, deck barge	Inland Waters (gen),Miss. River and tribs.	const. Equip, and charters	S
J R Gray	LA	58	Dry cargo, deck barge	Gulf I.C.W.	oil field supplies, charters	S
LaFarge Corp	MI	56	Covered dry cargo barge	Miss river and tribs	cement, fly ash	L
Connell Finance Co.	NJ	55	Open dry cargo barge	Inland waters (gen)	limestone	S
Davison Sand/Gravel	PA	54	Dry cargo, deck barge	Ohio.Allegheny,Monongahela		S
Katheryn Eckstein	FL	49	Covered dry cargo barge	Miss. River and tributaries,	coal, grain, fertilized, salt	S
Cenac Towing	LA	47	Tank Barge (other)	Miss. river and tribs.,Gulf I.C.W,	general dry cargo	S
Vulcan Material Co.	TN	47	Dry open barge	Tennessee River	sand and gravel	L
Agri Industries	IA	44	Covered dry cargo barge	Miss. river and tribs.,Illinois	corn and misc. charters	S
Blaske Marine	IL	44	Covered dry cargo barge	Miss. river and tribs.	coal,grain.salt	S
PML, Inc	IL	44	Covered dry cargo barge	Miss river and tribs	grain	S
T L James	LA	42	Dry cargo, deck barge	Gulf I.C.W,W, Atlanic I.C.W.	dredging equipment	S
Oil Field Barges	LA	40	Dry cargo, deck barge	Miss river and tribs,Gulf I.C.W.	oil field equipment	S
Combined Mgmt	MO	39	Covered dry cargo barge	Inland waters (gen)	dry grain	S
PPG Industries	LA	38	Tank Barge (double hull)	Gulf I.C.W.	liquid chemicals	L
Greater Cincinatti Marine	KY	38	Open dry cargo barge	Ohio	coal,grain, sand, const equipt	S
PH Leasing	OH	38	Open dry cargo barge	Miss river and tribs.	charters	S
Hilliard Lyons	KY	37	Covered dry cargo barge	Miss river and tribs.,Gulf I.C.W.	grain	S
Hughes Bros.	NJ	37	Dry cargo, deck barge	New York hbr, and adj. Waters)	general(charter)	S
Fort James/Western	OR	36	Covered dry cargo barge	Columbia, Willamette, Youngs, Deep, Clark, Lewist, and Snake,Pacific Ocean	general cargo, wood chips, paper	L
Inland Barge Rentals	LA	36	Dry cargo, deck barge	Gulf I.C.W.	general cargo	S
Hamms Harbor Service	IL	34	Covered dry cargo barge	Illinois	sand	S

L = Large Business Entity S = Small Business Entity

APPENDIX C
MAJOR BARGE OWNERS, LOCATIONS, AND CARGO

COMPANY	STATE	FLEET	BARGE TYPE	WATERS	CARGO	ENTITY
McLean Contracting	MD	33	Dry cargo, deck barge	Inland waters (MD to SC)	coal, grain, fertilzer,salt, rock	S
M-I Drilling fluids	LA	33	Covered dry cargo barge	Miss river and tribs,Gulf I.C.W.	drilling fluid products	S
Madison Coal	WV	33	Open dry cargo barge	Ohio.Kanawha.	coal, sand, gravel, alloys, hardwood	S
International Paper Corp.	AL	31	Open dry cargo barge	Miss river and tribs.,Gulf I.C.W.	pulpwood	L
Dupont	TX	30	Tank Barge (double hull)	Atlantic I.C.W., C & D canal	liquid chemicals	L
Nugent Sand	KY	28	Dry cargo, deck barge	Ohio	sand/gravel	S
Wasson Barge	NC	25	Dry open barge	Intercaostal waterway, inland waterways	charters to others, grain	S
Yager Materials, Inc.	KY	25	Deck Barge	Ohio River	sand and gravel	S
Massman Const.	MO	24	Dry cargo, deck barge	Miss river and tribs.	construction and towing materials	S
Tennessess Valley Auth.	TN	24	Deck Barge	Mississippi River	equipment, materials	L
Shiely Company	MN	23	Deck Barge	Mississippi River System	sand and gravel	S
Capitol Sand	MO	22	Open dry cargo barge	Missouri	sand	S
Phils Towing	PA	23	Open dry cargo barge	Ohio,	sand/gravel	S
UnionCamp Corp.	VA	22	Deck Barge	Franklin VA from Williamston, Edenton and South Mills, SC	logs	L
Shell Western E & P	LA	21	Deck Barge	Gulf ICWW and Mississippi River	chemicals, oil field supples	L
Brix Maritime	OR	21	Covered dry cargo barge	Columbia, Willamette, Youngs, Deep, Clark, Lewist, and Snake,Pacific Ocean	grain, logs, woodchips, containers	S
Ellis Const	MO	21	Dry cargo, deck barge	Missouri	stone	S
Sandgravl	TN	21	Dry open barge	Tennessee River	sand and gravel	S
Kimberly Clark	AL	21	Open dry cargo barge	Inland waters (gen),Miss river and tribs,Tombigbee, Alabama, Mobile	logs, pulpwood	L
Brent Transport	TX	20	Tank	Gulf ICWW and Western rivers	liquid fertilizers, gasoline, diesel	L
Limited Leasing	MO	20	Dry cargo, deck barge	Missouri	sand	S
Norman Brothers	IL	20	Dry covered barge	Mississippi and Missouri Rivers	leasing	S
Smith Marine Equipment	MD	20	Deck Barge	Baltimore Harbor, Chesapeake Bay and Delaware River	sand, gravel and rock	S
Zito Towing	LA	20	Dry open barge	Gulf ICWW and Mississippi River	grain, coal	S

L = Large Business Entity S = Small Business Entity

APPENDIX D

LIST OF RELEASES

APPENDIX D

OIL AND HAZARDOUS MATERIAL INCIDENTS FROM ABANDONED BARGES

Year	State	Description	Cost	Fund
1992	LA	Tank Barge (Bayou L'Eau Bleu)	$890,163	OSLTF
	LA	Tank Barge, "Gail L"	$1,300,000	CERCLA
		Total FY92	**$2,190,163**	
1993	LA	Tank Barge, "Ken Adams #3"	$467,789	OSTLF
		Total FY93	**$467,789**	
1994	N/A	None	N/A	
1995	WA	Tank Barge, (Name Unknown)	$4,844	OSLTF
		Total FY95	**$4,844**	
1996	MS	Tank Barge, (Name Unknown)	$4,785	OSLTF
		Total FY96	**$4,785**	
1997	LA	Abandoned Barge	$10,000	OSLTF
	LA	Abandoned Barge	$10,000	OSLTF
	LA	Abandoned Barge	$250,000	OSLTF
		Total FY97	**$270,000**	
		Total Costs	**$2,937,581**	
		Average Annual Cost	**$429,890**	

APPENDIX E

PRESENT VALUE: COSTS AND BENEFITS

ALTERNATIVE 1 - WELDING

Present Value Worksheet								
Cost of Alternative 1-Weld								
Discount Rate			7%					
Existing Affected Barges (1998)			20000					
Existing Affected Barge-Tow Req.			17000					
Existing Affected Barge-No Tow Req			3000					
Years to Comply for Existing Barges			2					
Barge Annual Growth Rate			2.0%					
Government Intial Cost - Database			$ 18,000					
					Newbuild			
			Tow Req. Cos	No Tow Cost	Cost			
Government Cost/Barge			$ 62	$ 62	$ 62			
Industry Cost/Barge			$ 2,577	$ 444	$ 282			
Total Cost/Barge			$ 2,639	$ 506	$ 344			
	Barges	Barges	New Const.	Total		Present	Cumulative	
Year	Tow Req.	No Tow Req.	Barges	Cost	Factor	Value	Present Value	
1999	8500	1500	400	$ 23,345,690	0.96674	$ 22,569,130		
2000	8500	1500	408	$ 23,330,442	0.90349	$ 21,078,869	$ 43,647,999	
2001			416	$ 143,159	0.84439	$ 120,881	$ 43,768,881	
2002			424	$ 146,022	0.78914	$ 115,233	$ 43,884,113	
2003			433	$ 148,943	0.73752	$ 109,848	$ 43,993,961	
2004			442	$ 151,922	0.68927	$ 104,715	$ 44,098,676	
2005			450	$ 154,960	0.64418	$ 99,822	$ 44,198,498	
2006			459	$ 158,059	0.60203	$ 95,157	$ 44,293,655	
2007			469	$ 161,220	0.56265	$ 90,711	$ 44,384,365	
2008			478	$ 164,445	0.52584	$ 86,472	$ 44,470,837	
2009			488	$ 167,734	0.49144	$ 82,431	$ 44,553,268	
2010			497	$ 171,088	0.45929	$ 78,579	$ 44,631,847	
2011			507	$ 174,510	0.42924	$ 74,907	$ 44,706,754	
2012			517	$ 178,000	0.40116	$ 71,407	$ 44,778,161	
2013			528	$ 181,560	0.37492	$ 68,070	$ 44,846,231	
2014			538	$ 185,191	0.35039	$ 64,889	$ 44,911,120	
2015			549	$ 188,895	0.32747	$ 61,857	$ 44,972,977	
2016			560	$ 192,673	0.30604	$ 58,966	$ 45,031,944	
2017			571	$ 196,527	0.28602	$ 56,211	$ 45,088,155	
2018			583	$ 200,457	0.26731	$ 53,584	$ 45,141,739	
2019			594	$ 204,466	0.24982	$ 51,080	$ 45,192,820	
2020			606	$ 208,556	0.23348	$ 48,693	$ 45,241,513	
2021			618	$ 212,727	0.21821	$ 46,418	$ 45,287,931	
2022			631	$ 216,981	0.20393	$ 44,249	$ 45,332,180	
2023			643	$ 221,321	0.19059	$ 42,181	$ 45,374,362	
2024			656	$ 225,747	0.17812	$ 40,210	$ 45,414,572	
2025			669	$ 230,262	0.16647	$ 38,331	$ 45,452,903	
2026			683	$ 234,868	0.15558	$ 36,540	$ 45,489,443	
2027			696	$ 239,565	0.14540	$ 34,833	$ 45,524,276	
2028			710	$ 244,356	0.13589	$ 33,205	$ 45,557,481	
						Total	$ 45,557,481	

ALTERNATIVE 2 - PAINTING

Present Value Worksheet								
Cost of Alternative 2 - Paint								
Discount Rate				7%				
Existing Affected Barges (1998)				20000				
Years to Comply for Existing Barges				2				
Barge Annual Growth Rate				2%				
Government Initial Cost-Database				$ 18,000				
				Exist Barge Cost		Newbuilding Cost		Repaint Cost
Industry Cost/Barge				$ 153		$ 65		$ 93
Government Cost/Barge				$ 62		$ 62		
Total Cost/Barge				$ 215		$ 127		$ 93
	Existing	New Const.	Repaint	Total			Present	Cumulative
Year	Barges	Barges	Barges	Cost		Factor	Value	Present Value
1999	10000	400		$ 2,222,133		0.96674	$ 2,148,217	
2000	10000	408		$ 2,205,149		0.90349	$ 1,992,335	$ 4,140,552
2001		416		$ 52,852		0.84439	$ 44,628	$ 4,185,180
2002		424		$ 53,909		0.78914	$ 42,542	$ 4,227,722
2003		433		$ 54,988		0.73752	$ 40,554	$ 4,268,277
2004		442		$ 56,087		0.68927	$ 38,659	$ 4,306,936
2005		450		$ 57,209		0.64418	$ 36,853	$ 4,343,789
2006		459		$ 58,353		0.60203	$ 35,131	$ 4,378,919
2007		469		$ 59,520		0.56265	$ 33,489	$ 4,412,408
2008		478		$ 60,711		0.52584	$ 31,924	$ 4,444,333
2009		488	10400	$ 1,032,592		0.49144	$ 507,457	$ 4,951,789
2010		497	10408	$ 1,034,577		0.45929	$ 475,170	$ 5,426,959
2011		507	416	$ 103,268		0.42924	$ 44,327	$ 5,471,287
2012		517	424	$ 105,334		0.40116	$ 42,256	$ 5,513,542
2013		528	433	$ 107,440		0.37492	$ 40,281	$ 5,553,824
2014		538	442	$ 109,589		0.35039	$ 38,399	$ 5,592,223
2015		549	450	$ 111,781		0.32747	$ 36,605	$ 5,628,827
2016		560	459	$ 114,017		0.30604	$ 34,894	$ 5,663,721
2017		571	469	$ 116,297		0.28602	$ 33,264	$ 5,696,985
2018		583	478	$ 118,623		0.26731	$ 31,709	$ 5,728,694
2019		594	10888	$ 1,091,662		0.24982	$ 272,722	$ 6,001,416
2020		606	10905	$ 1,094,828		0.23348	$ 255,620	$ 6,257,036
2021		618	923	$ 164,725		0.21821	$ 35,944	$ 6,292,980
2022		631	942	$ 168,020		0.20393	$ 34,264	$ 6,327,244
2023		643	961	$ 171,380		0.19059	$ 32,663	$ 6,359,907
2024		656	980	$ 174,808		0.17812	$ 31,137	$ 6,391,044
2025		669	1000	$ 178,304		0.16647	$ 29,682	$ 6,420,726
2026		683	1020	$ 181,870		0.15558	$ 28,295	$ 6,449,021
2027		696	1040	$ 185,507		0.14540	$ 26,973	$ 6,475,993
2028		710	1061	$ 189,217		0.13589	$ 25,712	$ 6,501,706
							Total	$ 6,501,706

BENEFITS - SCENARIO 1

Present Value Worksheet				
Total Benefits-Scenario 1				
Discount Rate		7%		
Yearly Removal Cost Recovery		$ 250,000		
Yearly Clean Up Cost Recovery		$ 429,890		
Govt. Investigation Savings		$ 1,500		
Annual Benefit		$ 681,390		
	Total		Present	Cumulative
Year	Benefit	Factor	Value	Present Value
1999*	$ 340,695	0.96674	$ 329,362	
2000	$ 681,390	0.90349	$ 615,630	$ 944,993
2001	$ 681,390	0.84439	$ 575,355	$ 1,520,348
2002	$ 681,390	0.78914	$ 537,715	$ 2,058,063
2003	$ 681,390	0.73752	$ 502,538	$ 2,560,601
2004	$ 681,390	0.68927	$ 469,661	$ 3,030,263
2005	$ 681,390	0.64418	$ 438,936	$ 3,469,199
2006	$ 681,390	0.60203	$ 410,221	$ 3,879,419
2007	$ 681,390	0.56265	$ 383,384	$ 4,262,803
2008	$ 681,390	0.52584	$ 358,302	$ 4,621,105
2009	$ 681,390	0.49144	$ 334,862	$ 4,955,967
2010	$ 681,390	0.45929	$ 312,955	$ 5,268,923
2011	$ 681,390	0.42924	$ 292,482	$ 5,561,404
2012	$ 681,390	0.40116	$ 273,347	$ 5,834,751
2013	$ 681,390	0.37492	$ 255,465	$ 6,090,216
2014	$ 681,390	0.35039	$ 238,752	$ 6,328,968
2015	$ 681,390	0.32747	$ 223,133	$ 6,552,101
2016	$ 681,390	0.30604	$ 208,535	$ 6,760,636
2017	$ 681,390	0.28602	$ 194,893	$ 6,955,529
2018	$ 681,390	0.26731	$ 182,143	$ 7,137,672
2019	$ 681,390	0.24982	$ 170,227	$ 7,307,899
2020	$ 681,390	0.23348	$ 159,091	$ 7,466,989
2021	$ 681,390	0.21821	$ 148,683	$ 7,615,672
2022	$ 681,390	0.20393	$ 138,956	$ 7,754,628
2023	$ 681,390	0.19059	$ 129,865	$ 7,884,493
2024	$ 681,390	0.17812	$ 121,369	$ 8,005,863
2025	$ 681,390	0.16647	$ 113,429	$ 8,119,292
2026	$ 681,390	0.15558	$ 106,009	$ 8,225,301
2027	$ 681,390	0.14540	$ 99,074	$ 8,324,375
2028	$ 681,390	0.13589	$ 92,592	$ 8,416,967
			Total	**$ 8,416,967**

BENEFITS - SCENARIO 2

Present Value Worksheet			
Cost/Benefit-Scenario 2			
Discount Rate		7%	
Yearly Removal Cost Recovery		$ 250,000	
Yearly Cleanup Cost Recovery		$ 429,890	
Benefit Subtotal		$ 679,890	
Expected Cost Recover (36%)		$ 244,760	
Govt. Investigation Savings		$ 1,090	
Total Yearly Benefit		$ 245,850	

Year	Total Benefit	Factor	Present Value	Cumulative Present Value
1999*	$ 122,925	0.96674	$ 118,836	
2000	$ 245,850	0.90349	$ 222,124	$ 340,960
2001	$ 245,850	0.84439	$ 207,592	$ 548,552
2002	$ 245,850	0.78914	$ 194,012	$ 742,564
2003	$ 245,850	0.73752	$ 181,319	$ 923,883
2004	$ 245,850	0.68927	$ 169,457	$ 1,093,341
2005	$ 245,850	0.64418	$ 158,371	$ 1,251,712
2006	$ 245,850	0.60203	$ 148,010	$ 1,399,722
2007	$ 245,850	0.56265	$ 138,328	$ 1,538,050
2008	$ 245,850	0.52584	$ 129,278	$ 1,667,328
2009	$ 245,850	0.49144	$ 120,821	$ 1,788,149
2010	$ 245,850	0.45929	$ 112,917	$ 1,901,065
2011	$ 245,850	0.42924	$ 105,529	$ 2,006,595
2012	$ 245,850	0.40116	$ 98,626	$ 2,105,220
2013	$ 245,850	0.37492	$ 92,174	$ 2,197,394
2014	$ 245,850	0.35039	$ 86,143	$ 2,283,537
2015	$ 245,850	0.32747	$ 80,508	$ 2,364,045
2016	$ 245,850	0.30604	$ 75,241	$ 2,439,286
2017	$ 245,850	0.28602	$ 70,319	$ 2,509,605
2018	$ 245,850	0.26731	$ 65,718	$ 2,575,323
2019	$ 245,850	0.24982	$ 61,419	$ 2,636,742
2020	$ 245,850	0.23348	$ 57,401	$ 2,694,143
2021	$ 245,850	0.21821	$ 53,646	$ 2,747,789
2022	$ 245,850	0.20393	$ 50,136	$ 2,797,925
2023	$ 245,850	0.19059	$ 46,856	$ 2,844,782
2024	$ 245,850	0.17812	$ 43,791	$ 2,888,573
2025	$ 245,850	0.16647	$ 40,926	$ 2,929,499
2026	$ 245,850	0.15558	$ 38,249	$ 2,967,748
2027	$ 245,850	0.14540	$ 35,746	$ 3,003,494
2028	$ 245,850	0.13589	$ 33,408	$ 3,036,902
			Total	**$ 3,036,902**

APPENDIX F

NET PRESENT VALUES

Scenario 1 - Net Present Values

Year	Benefit Present Value	Alternative 1 Cost Present Value	Alternative 1 Net Present Value	Alternative 2 Cost Present Value	Alternative 2 Net Present Value
1999	$ 329,362	$ 22,569,130	$ (22,239,768)	$ 2,148,217	$ (1,818,855)
2000	$ 944,993	$ 43,647,999	$ (42,703,007)	$ 4,140,552	$ (3,195,560)
2001	$ 1,520,348	$ 43,768,881	$ (42,248,532)	$ 4,185,180	$ (2,664,832)
2002	$ 2,058,063	$ 43,884,113	$ (41,826,050)	$ 4,227,722	$ (2,169,659)
2003	$ 2,560,601	$ 43,993,961	$ (41,433,360)	$ 4,268,277	$ (1,707,675)
2004	$ 3,030,263	$ 44,098,676	$ (41,068,413)	$ 4,306,936	$ (1,276,673)
2005	$ 3,469,199	$ 44,198,498	$ (40,729,299)	$ 4,343,789	$ (874,590)
2006	$ 3,879,419	$ 44,293,655	$ (40,414,236)	$ 4,378,919	$ (499,500)
2007	$ 4,262,803	$ 44,384,365	$ (40,121,563)	$ 4,412,408	$ (149,606)
2008	**$ 4,621,105**	**$ 44,470,837**	**$ (39,849,732)**	**$ 4,444,333**	**$ 176,773**
2009	$ 4,955,967	$ 44,553,268	$ (39,597,301)	$ 4,951,789	$ 4,178
2010	$ 5,268,923	$ 44,631,847	$ (39,362,925)	$ 5,426,959	$ (158,037)
2011	$ 5,561,404	$ 44,706,754	$ (39,145,350)	$ 5,471,287	$ 90,118
2012	$ 5,834,751	$ 44,778,161	$ (38,943,410)	$ 5,513,542	$ 321,209
2013	$ 6,090,216	$ 44,846,231	$ (38,756,015)	$ 5,553,824	$ 536,393
2014	$ 6,328,968	$ 44,911,120	$ (38,582,152)	$ 5,592,223	$ 736,746
2015	$ 6,552,101	$ 44,972,977	$ (38,420,876)	$ 5,628,827	$ 923,274
2016	$ 6,760,636	$ 45,031,944	$ (38,271,308)	$ 5,663,721	$ 1,096,915
2017	$ 6,955,529	$ 45,088,155	$ (38,132,626)	$ 5,696,985	$ 1,258,544
2018	**$ 7,137,672**	**$ 45,141,739**	**$ (38,004,067)**	**$ 5,728,694**	**$ 1,408,978**
2019	$ 7,307,899	$ 45,192,820	$ (37,884,921)	$ 6,001,416	$ 1,306,483
2020	$ 7,466,989	$ 45,241,513	$ (37,774,524)	$ 6,257,036	$ 1,209,953
2021	$ 7,615,672	$ 45,287,931	$ (37,672,259)	$ 6,292,980	$ 1,322,692
2022	$ 7,754,628	$ 45,332,180	$ (37,577,552)	$ 6,327,244	$ 1,427,384
2023	$ 7,884,493	$ 45,374,362	$ (37,489,868)	$ 6,359,907	$ 1,524,586
2024	$ 8,005,863	$ 45,414,572	$ (37,408,709)	$ 6,391,044	$ 1,614,819
2025	$ 8,119,292	$ 45,452,903	$ (37,333,611)	$ 6,420,726	$ 1,698,566
2026	$ 8,225,301	$ 45,489,443	$ (37,264,142)	$ 6,449,021	$ 1,776,280
2027	$ 8,324,375	$ 45,524,276	$ (37,199,901)	$ 6,475,993	$ 1,848,381
2028	**$ 8,416,967**	**$ 45,557,481**	**$ (37,140,514)**	**$ 6,501,706**	**$ 1,915,261**

Scenario 2 - Net Present Values

Year	Benefit Present Value	Alternative 1 Cost Present Value	Alternative 1 Net Present Value	Alternative 2 Cost Present Value	Alternative 2 Net Present Value
1999	$ 118,836	$ 22,569,130	$ (22,450,294)	$ 2,148,217	$ (2,029,381)
2000	$ 340,960	$ 43,647,999	$ (43,307,039)	$ 4,140,552	$ (3,799,592)
2001	$ 548,552	$ 43,768,881	$ (43,220,328)	$ 4,185,180	$ (3,636,627)
2002	$ 742,564	$ 43,884,113	$ (43,141,549)	$ 4,227,722	$ (3,485,158)
2003	$ 923,883	$ 43,993,961	$ (43,070,078)	$ 4,268,277	$ (3,344,393)
2004	$ 1,093,341	$ 44,098,676	$ (43,005,336)	$ 4,306,936	$ (3,213,595)
2005	$ 1,251,712	$ 44,198,498	$ (42,946,786)	$ 4,343,789	$ (3,092,077)
2006	$ 1,399,722	$ 44,293,655	$ (42,893,933)	$ 4,378,919	$ (2,979,197)
2007	$ 1,538,050	$ 44,384,365	$ (42,846,316)	$ 4,412,408	$ (2,874,359)
2008	$ 1,667,328	**$ 44,470,837**	**$ (42,803,509)**	**$ 4,444,333**	**$ (2,777,005)**
2009	$ 1,788,149	$ 44,553,268	$ (42,765,120)	$ 4,951,789	$ (3,163,641)
2010	$ 1,901,065	$ 44,631,847	$ (42,730,782)	$ 5,426,959	$ (3,525,894)
2011	$ 2,006,595	$ 44,706,754	$ (42,700,160)	$ 5,471,287	$ (3,464,692)
2012	$ 2,105,220	$ 44,778,161	$ (42,672,941)	$ 5,513,542	$ (3,408,322)
2013	$ 2,197,394	$ 44,846,231	$ (42,648,838)	$ 5,553,824	$ (3,356,430)
2014	$ 2,283,537	$ 44,911,120	$ (42,627,583)	$ 5,592,223	$ (3,308,685)
2015	$ 2,364,045	$ 44,972,977	$ (42,608,932)	$ 5,628,827	$ (3,264,782)
2016	$ 2,439,286	$ 45,031,944	$ (42,592,658)	$ 5,663,721	$ (3,224,435)
2017	$ 2,509,605	$ 45,088,155	$ (42,578,550)	$ 5,696,985	$ (3,187,380)
2018	$ 2,575,323	**$ 45,141,739**	**$ (42,566,416)**	**$ 5,728,694**	**$ (3,153,371)**
2019	$ 2,636,742	$ 45,192,820	$ (42,556,077)	$ 6,001,416	$ (3,364,674)
2020	$ 2,694,143	$ 45,241,513	$ (42,547,370)	$ 6,257,036	$ (3,562,893)
2021	$ 2,747,789	$ 45,287,931	$ (42,540,142)	$ 6,292,980	$ (3,545,191)
2022	$ 2,797,925	$ 45,332,180	$ (42,534,255)	$ 6,327,244	$ (3,529,319)
2023	$ 2,844,782	$ 45,374,362	$ (42,529,580)	$ 6,359,907	$ (3,515,126)
2024	$ 2,888,573	$ 45,414,572	$ (42,525,999)	$ 6,391,044	$ (3,502,471)
2025	$ 2,929,499	$ 45,452,903	$ (42,523,404)	$ 6,420,726	$ (3,491,227)
2026	$ 2,967,748	$ 45,489,443	$ (42,521,696)	$ 6,449,021	$ (3,481,273)
2027	$ 3,003,494	$ 45,524,276	$ (42,520,782)	$ 6,475,993	$ (3,472,499)
2028	$ 3,036,902	**$ 45,557,481**	**$ (42,520,579)**	**$ 6,501,706**	**$ (3,464,804)**