



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

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In reply refer to: M-00-10 through -16

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About 1950 on April 4, 1998, a tow of the M/V *Anne Holly*, comprising 12 loaded and 2 empty barges, which was traveling northbound on the Mississippi River through the St. Louis Harbor, struck the Missouri-side pier of the center span of the Eads Bridge. Eight barges broke away from the tow and drifted back through the Missouri span. Three of these barges drifted toward the *President Casino on the Admiral (Admiral)*, a permanently moored vessel (PMV) below the bridge on the Missouri side of the river. The drifting barges struck the moored *Admiral*, causing 8 of its 10 mooring lines to break. The *Admiral* then rotated clockwise downriver, away from the Missouri riverbank. The captain of the *Anne Holly* disengaged his vessel from the six remaining barges in the tow and placed the *Anne Holly*'s bow against the *Admiral*'s bow to hold it against the bank. About the time the *Anne Holly* began pushing against the *Admiral*, the *Admiral*'s next-to-last mooring line parted. The *Anne Holly* and the single mooring wire that remained attached to the *Admiral*'s stern anchor held the *Admiral* near the Missouri bank. No deaths resulted from the accident; 50 people were examined for minor injuries. Of those examined, 16 were sent to local hospitals for further treatment. Damages were estimated at \$11 million.¹

The National Transportation Safety Board determined that the probable cause of the ramming of the Eads Bridge in St. Louis Harbor by barges in tow of the *Anne Holly* and the subsequent breakup of the tow was the poor decision-making of the captain of the *Anne Holly* in attempting to transit St. Louis Harbor with a large tow, in darkness, under high current and flood conditions, and the failure of the management of American Milling, L.P., to provide adequate policy and direction to ensure the safe operation of its towboats.

The National Transportation Safety Board also determined that the probable cause of the near breakaway of the *President Casino on the Admiral* was the failure of the owner, the local and State authorities, and the U.S. Coast Guard to adequately protect the permanently moored vessel from waterborne and current-related risks.

¹ For additional information, see forthcoming Marine Accident Report NTSB/MAR-00/01: *Ramming of the Eads Bridge by Barges in Tow of the M/V Anne Holly with Subsequent Ramming and Near Breakaway of the President Casino on the Admiral, St. Louis Harbor, Missouri, April 4, 1998*, (Washington, DC: National Transportation Safety Board, 2000).

During its investigation, the Safety Board examined the factors that could have affected the *Anne Holly* captain's decision-making. On the night of the accident, the principal task of the *Anne Holly* captain was to navigate the 14-barge tow upriver from the Eagle fleeting area past four bridges. Under normal river stage (less than 20 feet on the St. Louis gage) and in daylight, someone with experience and skills similar to the captain's could routinely accomplish this task. Conditions, however, were unfavorable in that the river was in flood and it was dark.

The captain's decision to proceed with the transit under the prevailing conditions of darkness and flood (which resulted in minimal vertical clearance at the Eads Bridge and a swift current of 6 mph) is critical to understanding the probable cause of this accident. On the night of the accident, the *Anne Holly* captain was aware of the difficult navigation task that he was undertaking; once he left the fleeting area he requested a helper boat to assist him in taking his tow through the St. Louis Harbor bridges. When he learned that no helper boat was immediately available, he chose to attempt the transit without one.

The transit of this tow under the prevailing conditions was a difficult task and presented risks that increased the likelihood of an accident. The captain, although experienced and familiar with the navigational demands of the area, decided on the evening of April 4, 1998, to move the *Anne Holly* tow through the area under recognizably adverse conditions. The Safety Board concluded that, given the difficult navigation task, the darkness, the flood conditions (which resulted in a swift current and minimal vertical clearance at the Eads Bridge), and the lack of a helper boat, the captain should have chosen to pursue another option on the evening of April 4, 1998.

Although the immediate cause of the accident was the *Anne Holly* captain's operational error or errors, the underlying cause was the owner's lack of effective safety management of its towing operations. The absence of corporate management input into the captain's strategic decision-making process about whether to proceed with the transit of St. Louis Harbor that night placed an unreasonable burden on the captain and forced him to make unilateral safety-critical decisions from the narrow perspective of the pilothouse.

As a small business, American Milling often contracts for boats and operators as its workload requires and does not maintain an extensive shoreside operations infrastructure. According to American Milling management, the company relies on the captain to make all decisions regarding the tow's operation. The company does not have written policies that its captains should follow to consistently ensure safe towing operations or procedures to assist the captains in choosing the proper course of action in safety-critical situations. The company has not established policies that address high water, nighttime transit, and other conditions that might affect the safety of towing operations. In addition, American Milling has provided no written guidance to its captains describing situations in which they may be justified in recessing operations for safety reasons. Nor does the company provide basic guidance concerning the proper way to make up a tow or use the tow's equipment when underway. Company officials told the Safety Board that they rely exclusively on the knowledge, experience, and discretion of the individual captain to decide what is safe and proper under the prevailing circumstances.

American Milling, which is not an American Waterways Operators (AWO) member, did not participate in the Responsible Carrier Program (RCP) and did not have a similar safety management system. The absence of such a system meant that American Milling had no comprehensive method to provide effective management oversight of safety operations, a responsibility that the company should have proactively pursued. This responsibility is not one that can be delegated to the towboat captain. The lack of an effective safety management system that provided procedures governing the safe operation of the *Anne Holly* was substantially responsible for creating an environment that increased the likelihood that this accident would occur.

Night operation increases the risk of accidents, and American Milling should have developed night operations procedures for its captains. Operations during high water also pose greater risks, and American Milling should have addressed them through management instruction and policy. Certain areas of operation, such as the transit through St. Louis Harbor, present unique risks that likewise should have been the subject of management policy and oversight. The procedures should have anticipated the need for a helper boat and should have delineated alternative actions that the captain might take under various foreseeable circumstances. Moreover, the hazard of collision with other river traffic is always present. Had the *Anne Holly*'s tow struck and ruptured other barges loaded with petroleum products or hazardous materials, the resulting spill could have seriously harmed the environment. The captain should have been provided guidance concerning such an eventuality.

By not providing guidance through a comprehensive safety management system, American Milling left the captain of the *Anne Holly* to his own devices to make safety-critical decisions, increasing the likelihood that the captain would make an inappropriate decision. Consequently, the Safety Board concluded that the captain of the *Anne Holly* would have been better able to make prudent decisions concerning the operation of his tow, and this accident might thereby have been prevented, had American Milling developed and implemented an effective safety management system.

The Safety Board has previously addressed the need for safety management systems in the U.S. towing industry and has recommended that the Coast Guard require such systems. As a result of its investigation of the 1996 accident involving fire aboard the tug *Scandia* and the subsequent grounding of the tug and the tank barge *North Cape*,² the Safety Board issued the following safety recommendation to the Coast Guard:

M-98-104

In conjunction with the towing vessel industry, develop and implement an effective safety management code to ensure adequate management oversight of the maintenance and operation of vessels involved in oil transportation by barges.

² National Transportation Safety Board. *Fire Aboard the Tug Scandia and the Subsequent Grounding of the Tug and the Tank Barge North Cape on Moonstone Beach, South Kingston, Rhode Island, January 19, 1996*. Marine Accident Report NTSB/MAR-98/03. (Washington, DC: National Transportation Safety Board, 1998).

In its November 5, 1998, reply to the Safety Board, the Coast Guard stated that it concurred with the intent of the recommendation, that it believed use of safety management systems would result in significant benefits, and that it supported the development of such programs. However, the Coast Guard's letter also stated that 46 *United States Code* (U.S.C.) 3202, which affirms that U.S. domestic vessels may *voluntarily* meet the requirements of the chapter, does not provide the Coast Guard with statutory authority to require safety management systems on domestic vessels. The Coast Guard further stated that it had issued *Navigation and Vessel Inspection Circular 2-94*, providing "Guidance Regarding Voluntary Compliance with the International Management Code for the Safe Operation of Ships and for Pollution Prevention," and that it had worked with the AWO in developing the RCP. The Coast Guard considered that these actions fulfilled the intent of Safety Recommendation M-98-104 and requested that it be closed.

In a September 22, 1999, reply, the Safety Board stated that because not all U.S. towing companies are AWO members, some may not use the RCP, so a safety management system remains necessary for the industry. Further, the Safety Board found the Coast Guard's efforts insufficient to fulfill the recommended action. Consequently, the Safety Board classified the recommendation "Open-Unacceptable Response."

This accident demonstrated that the Safety Board's concern regarding the lack of safety management systems for towing industry companies that are not AWO members was well founded. American Milling was not an AWO member and had no safety management system. Approximately 15 percent of the tonnage that is moved on U.S. waterways is transported by towing companies that are, like American Milling, not AWO members. These non-AWO members are not required to follow a safety management system similar to the RCP and therefore may not benefit from the organized safety procedures that such systems provide. The Safety Board concluded that the lack of a safety management system requirement for all U.S. towing industry companies represents a threat to waterway safety. Consequently, the Safety Board reclassifies Safety Recommendation M-98-104 "Closed-Unacceptable Action/Superseded" and believes that the Coast Guard should seek authority to require domestic towing companies to develop and implement an effective safety management system to ensure adequate management oversight of the maintenance and operation of all towing vessels.

The Safety Board considers that the immediate cause of the accident was the *Anne Holly* captain's decision to undertake the transit under adverse conditions. Once he was committed to transiting St. Louis Harbor on the evening of April 4, 1998, the captain of the *Anne Holly* faced the challenging task of navigating past the MacArthur, Poplar Street, Eads, and Martin Luther King, Jr., Memorial Bridges. The maneuvering of inland river towboats relies heavily on the operator's visual acuity and ability to make accurate visual estimates of speed and distance. The operator not only needs to judge the speed of the tow correctly, but also to assess the speed and effect of the currents that the tow encounters. Much of this proficiency is developed through experience and practice. However, the towboat operator's ability to make accurate velocity and spatial estimations also depends on his ability to see visual cues, such as changes in the current.

Naturally, this ability is diminished when visibility is limited. The operator's task on the night of the accident was made unusually difficult by the darkness, particularly given the high current speed and the tow's length.

In maneuvering the tow through St. Louis Harbor, the captain would have experienced background illumination from shoreside lighting and shadows near bridge structures and a general lack of visual cues due to darkness. The Safety Board previously investigated an accident in St. Louis Harbor in which the glare from lighting was a safety issue.³ In that instance, the accident occurred in high water while the tow was downbound in St. Louis Harbor at night because the operator failed to identify the navigation span of Poplar Street Bridge in time to align the tow for safe transit. Through its investigation, the Safety Board surmised that the background lighting in St. Louis Harbor hampered the operator's ability to distinguish the navigation lights on the bridge and resulted in the operator's misaligning the tow. In its report on this accident, the Safety Board recommended that the Coast Guard:

M-85-23

Conduct a comprehensive review of shore lighting in St. Louis Harbor to determine which lights adversely affect identification of bridge span navigation lights and take action to minimize the effect of the shore lights that interfere with bridge light identification.

The Coast Guard concurred with Safety Recommendation M-85-23. It conducted a harbor survey and met with towboat operators to identify troublesome shore lighting so that these lights might be altered or screened to limit their interference with safe navigation. The Coast Guard made changes to the bridge navigation lights in St. Louis Harbor to make them easier to distinguish from the background lights. On December 23, 1993, the Safety Board classified Safety Recommendation M-85-23 "Closed-Acceptable Action."

In the years since the Coast Guard conducted its survey, the *Admiral* and the *Casino Queen* gaming PMVs, which are brightly lit at night, began operating in St. Louis Harbor. Given the combined effect of the city lights along the waterfront, the lights from area marine facilities, and the lights on the bridges, the ambient light level may be high enough to impair the night vision of towboat operators. During the Safety Board's public hearing on the *Admiral* accident, a towboat captain who testified as an expert in St. Louis Harbor towing operations stated that he thought the high-intensity lights in the harbor could be distracting and could impede night vision.

The *Anne Holly* captain testified that he had no trouble seeing the navigation markers on the Eads Bridge. Nevertheless, the fact that the captain could see the navigation markers on the bridge does not necessarily mean that he had no night vision problems. The Safety Board, therefore, concluded that glare from shoreside lighting may have impaired the *Anne Holly* captain's night vision and may have been a factor in his failure to align the tow properly for transit through the Eads Bridge. Consequently, the Safety Board believes that the Coast Guard

³ National Transportation Safety Board. *Ramming of the Poplar Street Bridge by the Towboat M/V Erin Marie and Its Twelve-Barge Tow, St. Louis, Missouri, April 26, 1984*. Marine Accident Report NTSB/MAR-85/02. (Washington, DC: National Transportation Safety Board, 1985).

should conduct a study of the lighting in St. Louis Harbor to determine whether the light level impairs nighttime navigation and take corrective action as necessary.

Once the *Admiral* was struck by the breakaway tows from the *Anne Holly*, the PMV personnel had to provide an appropriate emergency response. The *Admiral* often accommodates thousands of patrons and hundreds of staff members at a time. All would have to be evacuated safely in an emergency. Such evacuations are best conducted by trained personnel who are assigned, and trained in carrying out, specific responsibilities during an evacuation. As a result of its investigation of a 1994 fire aboard the *Argo Commodore*,⁴ the Safety Board issued the following recommendation to the Passenger Vessel Association (PVA):

M-95-43

Develop and provide to your members crew drills for on-board crew emergency procedures/standards that include pre-incident planning for a variety of shipboard emergencies, including fires, and the deployment of crew resources for proper response to the emergency without compromising passenger safety.

The PVA developed a section for its *Training Manual for Passenger Vessel Safety* entitled “Non-marine Crew Training” that outlines a comprehensive training program for nonoperating crewmembers. The introduction to this section states that specialized safety training for nonoperating employees “makes sense when management realizes that, more often than not, [these employees] will be the first person[s] on the scene in any kind of emergency.” Based on the PVA’s support for comprehensive training for nonoperating employees and the organization’s development of the training manual, the Safety Board classified Safety Recommendation M-95-43 “Closed–Acceptable Action” on July 21, 1997.

As an operator of several passenger vessels on the Mississippi River, President Casinos, Inc., is a PVA member. Personnel on the PMV *Admiral* face many of the same emergency response challenges as crewmembers of other types of large passenger vessels.

The Safety Board understands that, since the accident, President Casinos has had three *Admiral* security employees trained in crowd management techniques. The Board considers that this effort, if continued, will improve the vessel’s on-board emergency response capability. To ensure the development of permanent crowd management capabilities throughout the organization, the training should include all *Admiral* personnel. Such broad provision of training is prudent because even those vessel employees who do not have safety-related duties in an emergency can affect the response either positively or negatively. The Safety Board noted as a result of the *Bright Field* investigation⁵ that nonoperating crewmembers on both the *Queen of New Orleans* and the *Creole Queen* had not received training covering the full range of emergency scenarios and were unprepared to properly carry out their responsibilities.

⁴ National Transportation Safety Board, *Fire Aboard U.S. Small Passenger Vessel Argo Commodore in San Francisco Bay, California, December 3, 1994*, Marine Accident Report NTSB/MAR-95/03. (Washington, DC: National Transportation Safety Board, 1995).

⁵ National Transportation Safety Board, *Allision of the Liberian Freighter Bright Field with the Poydras Street Wharf, Riverwalk Marketplace, and New Orleans Hilton Hotel in New Orleans, Louisiana, December 14, 1996*. Marine Accident Report NTSB/MAR-98/01. (Washington, DC: National Transportation Safety Board, 1998).

According to a comment made by a patron after the *Admiral* allision and near breakaway, some *Admiral* staff members “appeared to be just as confused as we were.” One cashier even shouted that the vessel was sinking. Staff confusion and inflammatory remarks can only increase the level of panic on board a vessel or a permanently moored casino during an emergency. Training in crowd management would help staff understand the importance of maintaining calm and order. The Safety Board concluded that *Admiral* security personnel and other staff members were not adequately trained and drilled in crowd management techniques and therefore were not successful in ensuring that the vessel’s patrons and staff behaved in a calm and orderly fashion in the aftermath of the April 4, 1998, accident. Therefore, the Safety Board has recommended that President Casinos should require and document that all *Admiral* personnel receive formal training in crowd management techniques and conduct periodic drills to reinforce this training so that vessel staff can perform effectively in an emergency and that President Casinos amend the *Admiral’s Emergency Evacuation Procedures* to reflect crowd management techniques.

St. Louis Harbor contains three PMVs in addition to the *Admiral* and its support barge—the *McDonald’s* restaurant barge, the *Robert E. Lee* restaurant barge, and the Gateway Riverboat Cruises support barge. The *Robert E. Lee* is not operating, but the other two PMVs face some of the same safety challenges as the *Admiral*. Both are accessible to the public, so the personnel that staff them need the same type of crowd management training as *Admiral* personnel. The Safety Board concluded that formal training in crowd management techniques for staff on all operating PMVs that are accessible to the public would enhance safety on board PMVs. The city of St. Louis does not require crowd management training for the staff members of any PMVs within its jurisdiction. Because the city of St. Louis has primary enforcement responsibility for PMVs in St. Louis, it should ensure that all operating PMVs accessible to the public have staff trained in crowd management techniques. Therefore, the Safety Board has recommended that the city of St. Louis take the following three actions: a) require that the owners of all operating PMVs that are accessible to the public in St. Louis Harbor provide and document formal training in crowd management techniques for all personnel on such vessels; b) require that periodic drills be conducted to reinforce the crowd management training; and c) require that the vessel owners amend their emergency plans to reflect crowd management techniques. In view of the need to ensure that such measures are applied to all PMVs and the fact that the Coast Guard is best positioned to establish uniform crowd control requirements, the Safety Board believes that the Coast Guard should take the following three actions under its Ports and Waterways Safety Act authority: a) require that the owners of all operating PMVs that are accessible to the public provide and document formal training in crowd management techniques for all personnel on such vessels; b) require that periodic drills be conducted to reinforce the crowd management training; and c) require that the vessel owners amend their emergency plans to reflect crowd management techniques.

Harbor emergency response was another factor reviewed by the Safety Board’s investigation. The Coast Guard coordinated the development of the St. Louis Harbor Emergency Response Plan in cooperation with State and local fire and rescue services and the local marine industry. The intent of the plan was to allow the emergency response agencies, the industry, and the Coast Guard to achieve coordinated and effective use of public and private response resources during an emergency. Although the Coast Guard has Federal responsibility for the overall safety of the port during an emergency, the responsibility for emergency response rests

with local fire and rescue services and State response services. While, as a policy matter, the Coast Guard responds to emergencies to the extent that its resources allow, it does not have primary search and rescue responsibility in inland areas, such as St. Louis Harbor. The Coast Guard does not have firefighting or search and rescue capabilities in St. Louis Harbor, yet its personnel helped coordinate the plan, participated in drills, and provided information about marine risk mitigation measures to the incident commander. The Coast Guard Commander of the Port also assisted in crises by restricting vessel movements on the Mississippi River.

The Safety Board evaluated the St. Louis Harbor Emergency Response Plan and found that it adequately identified the agencies that would participate in marine emergency responses in St. Louis Harbor and provided a comprehensive contact listing for critical responders. The plan further identified the interagency command and control responsibilities of the various agencies and designated the radio frequencies to be used during responses.

The response plan, however, did not take into account the various types of accidents that might occur in the harbor. For instance, the plan did not anticipate an accident similar to that involving the *Admiral* on April 4, 1998—the breakaway or near breakaway of a high-capacity PMV. The possibility of such an accident, especially during a period of high water, was reasonably foreseeable. The St. Louis Harbor Emergency Response Plan did not identify all foreseeable emergencies or create strategies to deal with them. Without identifying the types and magnitudes of the possible emergencies for which St. Louis Harbor authorities would have to be prepared, response planners could not determine the amounts, types, and sources of emergency equipment and other resources that would be needed to conduct a successful response.

A 1994 search and rescue exercise sponsored by the Coast Guard in New Orleans, Louisiana, revealed that local contingency plans and responses for the New Orleans area were inadequate for rescuing large numbers of people from the Mississippi River. The exercise illustrated that responding to emergencies requiring the rescue of large numbers of people from the Mississippi River can overwhelm local resources, even in municipalities that may have greater marine resources than St. Louis.

It is conceivable that, had the *Anne Holly* not held the *Admiral* against the riverbank on April 4, 1998, the *Admiral* might have broken free of its last mooring wire and floated downriver, possibly causing collisions and sinking or capsizing under one of the lower bridges. The risk to the *Admiral* and its more than 2,000 occupants would have been high in such a scenario because the *Admiral* did not have means of propulsion or navigational control, marine lifesaving equipment (such as life floats or personal flotation devices), or an experienced marine crew.

Therefore, the Safety Board concluded that the St. Louis Harbor Emergency Response Plan did not sufficiently prepare emergency response agencies to deal with an emergency involving the rescue of a large number of people on or in the Mississippi River. Consequently, the Safety Board believes that the Coast Guard should take the lead, in cooperation with appropriate port and waterways stakeholders, in developing contingency plans to assist in marine-related incidents, such as search and rescue operations, fires, capsizings, or sinkings involving passenger vessels or permanently moored public facilities within St. Louis Harbor.

Also, the Coast Guard should amend the St. Louis Harbor Emergency Response Plan to reflect these changes.

The Safety Board further believes that the Coast Guard should conduct, in cooperation with the States of Missouri and Illinois and the cities of St. Louis and East St. Louis, regular drills to exercise the contingency plans for a variety of different marine scenarios, such as stopping breakaway vessels or rescuing large numbers of people from the Mississippi River.

One of the major questions that arose during this investigation was the adequacy of PMV safety oversight. PMV safety falls under the purview of many entities, from the owner and local jurisdictions, such as the fire department and the city building commissioner, to State and Federal authorities, including the Coast Guard and the U.S. Army Corps of Engineers (USACE). The overlapping of these authorities' responsibilities can result in confusion or worse. In some instances, gaps in safety have resulted because authorities have assumed that another entity is administering PMV safety oversight. Under this assumption, these authorities have then allocated their own limited resources to other priorities rather than using them to provide PMV oversight.

After the Coast Guard designated the *Admiral* as a PMV, the city of St. Louis assumed responsibility for its safety. In the absence of Coast Guard involvement, the city had general oversight responsibility for public safety for the entire operation. Yet city authorities did not have a mechanism for regulating the marine safety aspects of the operation of PMVs located in St. Louis Harbor. Local building and safety codes did not address the waterborne and current-related risks and risk reduction measures associated with PMVs in the harbor. The Safety Board therefore concluded that the city of St. Louis did not exercise effective marine safety oversight for the *Admiral* because the city treated the *Admiral* as a commercial building on land.

The State of Missouri Gaming Commission also placed safety requirements on the operation of the *Admiral*. In a July 9, 1998, letter to the Safety Board, the Commission stated that it requires its licensees to meet the minimum standards for safety and environment established by the Coast Guard, the USACE, and the Environmental Protection Agency. It also requires that licensed casino PMVs meet Missouri's fire safety standards, the National Fire Protection Association's (NFPA's) fire safety standards for the construction and fire protection of marine structures, and the NFPA Life Safety Code.

In addition, the Commission requires that the vessel comply with all local fire and safety codes. However, because the Coast Guard did not impose any safety requirements beyond "secure and substantial mooring" of the vessel and because none of the other authorities or standards addressed all the waterborne and current-related risks to which the *Admiral* was exposed, the Commission's actions fell short of its intended purpose.

The Commission also said in the July 1998 letter that it does not employ safety experts but relies on government agencies with safety standard and inspection expertise. The Commission recognized that it does not possess the requisite expertise to establish safety standards or to provide safety oversight of the *Admiral's* operations.

Although the State Gaming Commission required the owner to contract with American Bureau of Shipping (ABS) Marine Services to assess the stability of the *Admiral* and to

periodically inspect its hull and watertight closures to ensure their integrity, ABS Marine Services did not, nor was it requested to, assess the adequacy of the mooring design, fire safety, lifesaving, or any other marine safety systems related to the *Admiral's* operation. The Safety Board therefore concluded that the oversight provided by the State of Missouri, as represented by the State Gaming Commission, did not address marine safety systems, such as the PMV's mooring design, fire safety, and lifesaving capabilities, and did not protect the safety of people on board the *Admiral*.

In the Safety Board's opinion, city and State authorities should recognize their limitations in marine safety expertise. The Coast Guard is the primary recognized marine safety regulatory authority and should regulate the operation of floating casinos exposed to waterborne and current-related risks. The Safety Board therefore believes that the Coast Guard, the city of St. Louis, and the State of Missouri should either require owners of PMVs to protect their vessels from waterborne and current-related risks so that their PMVs are, in fact, equivalent to buildings or require that the owners obtain Coast Guard certificates of inspection for their PMVs.

Tows regularly pass the *Admiral's* site on the Mississippi River. In an average year, about 8,000 tows pass through St. Louis Harbor, transporting 80,000 to 85,000 barges. Between January 1989 and April 1999, about 30 barge breakaways took place in St. Louis Harbor. The *Admiral*, sited below the Eads Bridge, had been struck three times by upriver tows before it was struck by the *Anne Holly* tow. Thus, based on experience, a future strike was a predictable event. In fact, during the USACE site permit process, the Coast Guard correctly predicted that the *Admiral* would be struck again. However, when President Casinos subsequently argued that a protective cell was unnecessary, the Coast Guard agreed. Neither the Coast Guard nor President Casinos took any further action to assess and mitigate the risk to the *Admiral* from a future allision.

The fact that the *Admiral* was hit on April 4, 1998, by barges from the *Anne Holly* was merely a function of circumstance; any number of breakaway or wayward vessels or objects traveling with the river current could have struck it. The overriding consideration is that the *Admiral*, as it is currently sited below the Eads Bridge, is vulnerable to allision from breakaway tows and other vessels or objects due to its location.

At the time of the April 1998 accident, Coast Guard policy did not provide local Coast Guard representatives with adequate practical guidance for determining whether a PMV was safely sited. Guidance on PMV siting could provide information on the relative risks of various types of site locations. Such risks might include those associated with the outside and inside bends of rivers, obstructions such as bridge piers, the water depth, and the natural and artificial protective barriers in the vicinity. At its location directly below the Eads Bridge in the busy Mississippi River, the *Admiral* was at risk from an allision and the potential consequences of that event. Therefore, the Safety Board concluded that the *Admiral* should not have been sited in a location where it was subject to waterborne and current-related risk events, including breakaways, which could have put more than 2,000 lives in jeopardy.

PMVs, as they are treated in existing Coast Guard policy, are unique in that they possess certain characteristics of both vessels and buildings, so their risks do not fall entirely into either

category. A *vessel*, as the term is used in the Coast Guard's enabling statute, 46 U.S.C. Subtitle II, is defined as a craft "used or capable of being used as a means of transportation on the water" (46 U.S.C. 2101[45], citing 1 U.S.C. 3). The Coast Guard's authority to regulate design, construction, equipment, staffing, and inspection of vessels derives from Subtitle II. Most vessels, because they are subject to waterborne and current-related risks, require Coast Guard inspection and certification under 46 U.S.C. Subtitle II. Thus, according to the Coast Guard, if a craft is no longer "used or capable of being used as a means of transportation on the water," it is not subject to this Coast Guard inspection authority.

Under such a flexible, fact-bound test, and given the wide disparity of judicial precedent on the subject, the Coast Guard had considerable discretion in its categorization of PMVs. The Coast Guard chose to treat all PMVs, including the *Admiral*, as "substantially land structures," which, once sited, were the regulatory responsibility of the land jurisdiction to which they were moored. And, although the Coast Guard has extensive and broad authority under the PWSA to act to safeguard navigation and protect waterfront facilities and the marine environment, the Coast Guard did not exercise its authority to protect PMV occupants. Therefore, the Safety Board concluded that the Coast Guard has extensive discretionary authority over PMVs in navigable waters, such as the *Admiral*, but has chosen not to fully exercise it.

It is noteworthy that several large casino boats have been placed in moats in shallow water, where they are in no danger of sinking or capsizing, and are surrounded by enclosures so that other vessels could never allide with them. These "vessels" are not used in transportation but are nonetheless considered "vessels" under the Coast Guard's inspection authority and are required to meet Coast Guard safety standards, including the carriage of life preservers for all people on board. It is completely incongruous that these PMVs, which are not vulnerable to waterborne and current-related risks, are under Coast Guard safety oversight while the *Admiral*, which is vulnerable to such risks, is not.

The policy issued by Coast Guard headquarters regarding PMVs—the Coast Guard's PMV safety net—not only failed to recognize the risk to the *Admiral* from breakaways, it failed to recognize that the *Admiral* and similar vessels would be exposed to other serious waterborne and current-related risks. Because the *Admiral* was exposed to many of the same risks as vessels in navigation, it was also vulnerable to being struck by passing marine traffic, to sinking, and to capsizing. The *Admiral*, in effect, fell through the safety nets on April 4, 1998, and a major disaster may have been narrowly averted by the *Admiral*'s last mooring line holding and the *Anne Holly* captain acting to help stabilize the *Admiral* against the riverbank.

The Safety Board considers that the Coast Guard PMV policies, and the decisions that were made based on those policies, failed to adequately protect the *Admiral* from the risk of a marine accident. In essence, the Coast Guard PMV policy stated that removing the vessel from active navigation and attaching it to land by mooring lines changed the basic character of the *Admiral* so that it was no longer a vessel and ceased to be subject to Coast Guard inspection jurisdiction. The Safety Board questions the wisdom of this policy and of its application to the *Admiral* in particular. The Coast Guard was the only public safety organization in St. Louis Harbor with the knowledge and experience to regulate the public safety of PMVs at risk from waterborne and current-related events.

Although the *Admiral* was moored in a stationary position, it was still exposed to many of the same hazards to which it would have been exposed were it a vessel in active navigation. Hundreds of towboats and thousands of barges passed close by the *Admiral* every year. These passings were made in all weathers and at all times of the day and night. Further, when changing conditions made navigation riskier, as when the river reached flood stage, the risks to the *Admiral* likewise increased. The *Admiral* was vulnerable to being struck by a passing vessel, and, if holed as a result, it could have flooded, sunk, capsized, or broken away.

An accident involving the *Admiral* caused by a waterborne or current-related risk could easily endanger 2,000 or more lives. Yet the Coast Guard PMV policy at the time of the *Admiral* accident did not consider anything other than the mooring system in determining whether the vessel would be granted PMV status.

Instead of protecting PMVs from waterborne and current-related risk events, the Coast Guard's policy focused on the adequacy of the mooring arrangement. However, a mooring system, no matter how well engineered, cannot compensate for the consequences of locating a PMV at a risky site. The *Admiral*'s mooring system, which was designed by a professional engineer, was, as a consequence of the allision with the *Anne Holly*'s barges, unable to keep the *Admiral* and its entry barge secure in position against the riverbank. After the allision, without the gangways in place, emergency egress from the PMV was jeopardized. Had the circumstances of this accident been different and had the *Admiral* been set adrift in the river during flood stage, the risk to the *Admiral* and the people on board could have been extreme.

As the Coast Guard determined in its review of PMV safety, 68 percent of waterway accidents occurred at high-risk locations, making location the single most important factor in PMV waterborne and current-related risk. Nevertheless, the Coast Guard PMV policy failed to account for and remedy the *Admiral*'s risky location through site selection or other means. The Safety Board therefore concluded that the Coast Guard PMV policy, as it existed at the time of the accident, did not adequately provide for the safety of the *Admiral* or its patrons.

As a result of the *Bright Field*, *Admiral*, and less prominent accidents involving PMVs, the Coast Guard reviewed its PMV policy. In 1999, the Coast Guard revised the policy to improve and standardize the way the Coast Guard treats PMVs. The new policy requires all local Coast Guard Officers in Charge of Marine Inspection to re-evaluate the safety of all existing PMV designations within their zones, using the risk assessment and reduction methodology developed by the Coast Guard's Quality Action Team for PMVs.

The Safety Board reviewed the new Coast Guard policy on PMVs and found it to be an improvement over the policy used at the time of the *Admiral* accident. The Safety Board is pleased with this Coast Guard action but considers it does not go far enough to ensure the safety of PMV operations in U.S. navigable waters. The new policy does not change the basic premise of the Coast Guard's treatment of PMVs at risk from waterborne and current-related events—that local and State authorities will eventually have safety and enforcement responsibility over these vessels. Expecting local and State authorities to adequately oversee and regulate PMV safety regarding waterborne and current-related risks is unrealistic because building safety considerations do not address issues such as collision potential, mooring requirements, or

waterway safety considerations. Therefore, the Safety Board concluded that the Coast Guard's new policy on PMVs is inadequate because it still fails to provide for the safety of people on PMVs subject to waterborne and current-related risk events, including breakaways, allisions, sinking, and capsizing. Consequently, the Safety Board believes that the Coast Guard should not allow PMVs to be sited in locations in which they are not protected from waterborne and current-related risk events, including breakaways, allisions, sinking, capsizing, etc.

Therefore, the National Transportation Safety Board makes the following safety recommendations to the U.S. Coast Guard:

Seek authority to require domestic towing companies to develop and implement an effective safety management system to ensure adequate management oversight of the maintenance and operation of all towing vessels. (M-00-10)

Conduct a study of the lighting in St. Louis Harbor to determine whether the light level impairs nighttime navigation, and take corrective action as necessary. (M-00-11)

Take the following three actions under your Ports and Waterways Safety Act authority: a) require that the owners of all operating permanently moored vessels that are accessible to the public provide and document formal training in crowd management techniques for all personnel on such vessels; b) require that periodic drills be conducted to reinforce the crowd management training; and c) require that the vessel owners amend their emergency plans to reflect crowd management techniques. (M-00-12)

Take the lead, in cooperation with appropriate port and waterways stakeholders, to develop contingency plans to assist in marine-related incidents, such as search and rescue operations, fires, capsizings, or sinkings involving passenger vessels or permanently moored public facilities within St. Louis Harbor. Also, amend the St. Louis Harbor Emergency Response Plan to reflect these changes. (M-00-13)

Conduct, in cooperation with the States of Missouri and Illinois and the cities of St. Louis and East St. Louis, regular drills to exercise the contingency plans for a variety of different marine scenarios, such as stopping breakaway vessels or rescuing large numbers of people from the Mississippi River. (M-00-14)

Either require owners of permanently moored vessels to protect their vessels from waterborne and current-related risks so that their permanently moored vessels are, in fact, equivalent to buildings or require that the owners obtain U.S. Coast Guard certificates of inspection for their permanently moored vessels. (M-00-15)

Do not allow permanently moored vessels to be sited in locations in which they are not protected from waterborne and current-related risk events, including breakaways, allisions, sinking, capsizing, etc. (M-00-16)

Also, the Safety Board issued safety recommendations to the Research and Special Programs Administration, the States of Missouri and Illinois, the cities of St. Louis and East St. Louis, the National League of Cities, the American Association of Port Authorities, the American Gas Association, the American Public Gas Association, President Casinos, Inc., Laclede Gas Company, and American Milling, L.P.

Please refer to Safety Recommendations M-00-10 through -16 in your reply. If you need additional information, you may call (202) 314-6170.

Chairman HALL and Members HAMMERSCHMIDT, GOGLIA, BLACK, and CARMODY concurred in these recommendations.

By: Jim Hall
Chairman