



# National Transportation Safety Board

Washington, D. C. 20594

## Safety Recommendation

Log M-351C

Date: February 1, 1989

In reply refer to: M-89-1 through -5

Admiral Paul A. Yost, Jr.  
Commandant  
U.S. Coast Guard  
Washington, D.C. 20593

On January 18, 1988, the fishing vessel WAYWARD WIND with six crewmembers arrived about 25 miles south of Kodiak Island, Alaska. A crewmember then notified the captain that the after deck was under water. The captain ordered the deckhand to tell the crew to don exposure suits, and the mate on watch sent a distress message to the U.S. Coast Guard. The captain attempted to pump one or more compartments, but the vessel continued to sink by the stern, and the captain recognized that the vessel could not be saved. After the crew had donned their exposure suits, they entered the water. The captain's wife took the vessel's class B emergency position indicating radio beacon (EPIRB) with her into the water. The vessel sank stern first about 1/2 hour after the crew entered the water.

Alerted by the distress message, a Coast Guard C-130 aircraft arrived at the search area, located the source of the EPIRB signal, and dropped flares to mark the location of the signal. Later, a Coast Guard helicopter found the captain's wife and the deckhand. The bodies of the remaining four crewmembers were recovered a few hours later by the fishing vessel, COUGAR. The estimated value of the WAYWARD WIND was \$500,000.<sup>1</sup>

This accident reveals a lack of knowledge or concern for the rudiments of safety and survival at sea. Failures to safeguard his vessel and crew suggest that the captain of the WAYWARD WIND may not have been trained adequately to operate his vessel safely. There were other factors which also demonstrate that the captain failed to exercise diligence to keep his vessel seaworthy, including his failure to repair the leaking deck hatches to the after fish hold and to install bilge alarms in the lazarette and after fish hold.

The captain had elected to invest considerable work and funds in creating a raised forecastle. The National Transportation Safety Board believes that had the captain made improvements such as adding a liferaft, installing bilge alarms for the

<sup>1</sup>For more detailed information, read Marine Accident Report--*Sinking of the U.S. Fishing Vessel Wayward Wind in the Gulf of Alaska, Kodiak Island, Alaska, January 18, 1988* (NTSB/MAR-89/01).

lazarette and after fish hold, properly maintaining the safety equipment including exposure suits and EPIRBs, and conducting crew training in water survival, the accident might not have occurred, or if it did, the consequences might not have been nearly so grave.

The captain/owner of an uninspected fishing vessel is free to make critical judgments on whether or not to carry certain safety equipment, such as bilge alarms, and how such equipment is to be maintained. Further, all crew training, especially training in safety and water survival, is a responsibility of the captain; no such training was conducted on the WAYWARD WIND. To ensure the adequacy of safety equipment such as the exposure suits and EPIRBs, training in their use, and safe vessel operation requires the captain to have some minimum amount of training and knowledge. The Safety Board believes that licensing the masters of uninspected fishing vessels would ensure that all masters meet at least minimum standards of training and competence.

As a result of its investigation of the loss of the AMAZING GRACE about November 14, 1984,<sup>2</sup> the Safety Board recommended that the Coast Guard:

M-85-68

Seek legislative authority to require the licensing of captains of commercial fishing vessels, including a requirement that they demonstrate minimum qualifications in vessel safety including rules of the road, vessel stability, firefighting, watertight integrity, and the use of lifesaving equipment.

This recommendation was reiterated in the Safety Board's reports on the UYAK II, NORDFJORD, LARK, SANTO ROSARIO, and the AMERICUS/ALTAIR accidents,<sup>3</sup> and in the Safety Board's fishing vessel safety study.<sup>4</sup>

In its response, the Coast Guard replied, "This recommendation is not concurred with." The Coast Guard has emphasized a voluntary approach based on a set of voluntary guidelines and a training program developed by the North Pacific Fishing Vessel Owners' Association (NPFVOA). Based on the Coast Guard response, the Safety Board on April 3, 1986, classified the recommendation "Open--Unacceptable

<sup>2</sup>Marine Accident Report--Loss of the U.S. Fishing Vessel AMAZING GRACE about 80 Nautical Miles East of Cape Henlopen, Delaware, about November 14, 1984 (NTSB/MAR-85/07).

<sup>3</sup>Marine Accident Reports---Capsizing and Sinking of the U.S. Fishing Vessel UYAK II in the Gulf of Alaska Near Kodiak Island, Alaska, November 5, 1987 (NTSB/MAR-88/08); Disappearance of the U.S. Fishing Vessel NORDFJORD in the Gulf of Alaska, September 19, 1987 (NTSB/MAR-88/07); Capsizing and Sinking of the U.S. Fishing Vessel LARK, Atlantic Ocean Near Nantucket Island, Massachusetts, October 9, 1987 (NTSB/MAR-88/05); Sinking of the U.S. Fishing Vessel SANTO ROSARIO, about 35 Nautical Miles East of New Smyrna Beach, Florida, July 23, 1984 (NTSB/MAR-86/06); and Capsizing of the U.S. Fishing Vessel AMERICUS and Disappearance of the U.S. Fishing Vessel ALTAIR, Bering Sea, North of Dutch Harbor, Alaska, February 14, 1983 (NTSB/MAR-86/01).

<sup>4</sup>Safety Study--Uninspected Commercial Fishing Vessel Safety, September 1, 1987 (NTSB/SS-87/02).

Action" and asked the Coast Guard to reconsider its position because such voluntary programs have not been successful in the past. The Board believes that mandatory licensing would be more effective. On October 15, 1986, the Coast Guard replied that it still did not concur with this recommendation and stated, "Our voluntary approach to fishing vessel safety and training is a viable alternative to seeking legislative authority to require the licensing of captains of commercial fishing vessels." On October 9, 1987, the Safety Board again requested the Coast Guard to reconsider Safety Recommendation M-85-68 based on the information contained in the Safety Board's fishing vessel safety study. On March 11, 1988, the Coast Guard replied:

This recommendation is not concurred with.

\* \* \* \* \*

The Coast Guard feels [that its] voluntary program has the potential for significantly improving safety in the commercial fishing industry. It is not a panacea, but before taking the more radical step of requiring these masters to be licensed, the voluntary program should be given a chance to demonstrate how effective it can be. Since implementing this program, fishing vessel casualty rates for 1986 and 1987 have decreased. In our view, part of this improvement may be attributed to the voluntary program.

Another factor to be considered is the cost to the Federal government necessary to accomplish this goal. For the 30,165 fishing vessels over 5 net tons and the approximately 100,000 persons in the fishing industry, it is estimated that 75,000 new licenses would be issued. At 4.5 hours per license and 1500 hours per licensing official available annually, this would require 225 staff years of additional effort by the Coast Guard. Using an average salary of \$40,000 per official, this represents a cost of \$9 million. In addition, the renewal of those licenses would require an additional 100 staff years over each five year period, or an additional \$800,000 annually. It is unlikely that additional resources of this magnitude will be forthcoming, especially when the gain in overall safety is questionable. Accordingly, the Coast Guard does not intend to seek any other legislative authority concerning this issue, nor are there plans to further pursue the matter should H.R. 1841/S. 849 fail. We therefore request that this recommendation be classified as closed.

On June 7, 1988, the Safety Board classified Safety Recommendation M-85-68 "Open--Unacceptable Action."

The Commercial Fishing Industry Vessel Safety Act of 1988 requires the U.S. Department of Transportation (DOT) to prepare and submit to the Congress a plan for the licensing of the operators of documented fishing, fish processing, and fish tender vessels. The Coast Guard expects that the plan, which must be submitted within 2 years of enactment of the act, will be the basis for future legislation for a licensing program. The Safety Board continues to believe that the licensing of captains of all fishing vessels is essential to vessel and crew safety, and since the Coast Guard believes that legislation is still needed to establish a licensing program for fishing vessels, the Safety Board reiterates Safety Recommendation M-85-68.

In this accident, the crew was alerted in adequate time to obtain and don their exposure suits. The suits were located conveniently on a shelf in a berthing space at the after end of the deckhouse which minimized the time to obtain an exposure suit. However, the exposure suits worn by three crewmembers were not zipped fully when their bodies were recovered, and considerable water was in the suits. An examination of the zippers revealed that they were corroded and very difficult to operate. If the suits had been zipped fully, it is unlikely that they would have become unzipped inadvertently, even if the zippers had been in good condition and operating freely. Since the zippers were very difficult to operate, it is more probable that they were not zipped fully when the three crewmembers entered the water. Although tests subsequently revealed that the exposure suits of the deceased crewmen leaked, appeared to be old, and were not adequately maintained, the suits probably were capable of providing substantial protection for several hours had they been zipped fully. Exposure suits are tested by placing people wearing them in cold water (32° to 37.4 °F) for 6 hours and measuring body temperature drop; thus, it is probable that the crewmembers might have survived for the same or longer time in the 36 °F water.

If some crew training in survival procedures had been conducted on the WAYWARD WIND, it is highly probable that the poor condition of the vessel's exposure suits would have been recognized. Because the crew had never served together on the vessel, they should have received an orientation of the available safety equipment and training in the use of the equipment. In addition to revealing the condition of the exposure suits, a safety indoctrination would have informed the crew about the use of an EPIRB. Since time for safety training is difficult to schedule, it is probable that adequate time for training will never be allocated unless it is made mandatory. The holding of abandon ship and fire drills on inspected vessels is considered essential, and it is mandated by regulations. The Safety Board believes this accident highlights the need for safety training on board fishing vessels.

As a result of its uninspected fishing vessel safety study, the Safety Board issued Safety Recommendations M-87-51 and -52 to the Coast Guard regarding the training of commercial fishing vessel crewmembers:

M-87-51

Establish minimum safety training standards for all commercial fishermen, commensurate with their responsibilities, for all types of uninspected commercial fishing vessels.

M-87-52

Seek legislative authority to require uninspected commercial fishing vessel captains/owners to provide safety training to all crewmembers.

On March 11, 1988, the Coast Guard replied:

[Recommendation M-87-51] is partially concurred with. The establishment and use of industry training courses as discussed in Voluntary Standards for U.S. Uninspected Commercial Fishing Vessels (NVIC 5-86) and the use of the Vessel Safety Manual will accomplish this goal. The Vessel Safety Manual, which was written

by and for fishermen, establishes recommended training standards for emergency procedures; for fire prevention, detection and extinguishment; and for other safety practices aboard fishing vessels. Accordingly, no further Coast Guard action on this recommendation is anticipated, and we therefore request it be classified as closed.

[Recommendation M-87-52] is partially concurred with. The Coast Guard feels it is important to raise the overall level of safety on commercial fishing vessels. However, we believe the establishment and use of industry training courses as discussed in Voluntary Standards for U.S. Uninspected Commercial Fishing Vessels (NVIC 5-86) and the use of the Vessel Safety Manual will accomplish this goal. The Vessel Safety Manual is specifically designed for crewmembers and establishes recommended training standards for emergency procedures; fire prevention, detection and extinguishment; and, safety aboard fishing vessels. The North Pacific Fishing Vessel Owners' Association (NPFVOA) now has its Safety & Survival at Sea videotapes available to the public. They are based on the NPFVOA Crew Training Program and complement the Vessel Safety Manual by bringing this important part of safety to the vessel and its crew. Only after these voluntary programs have been given a chance to work can we determine if we need legislative authority to provide an adequate level of safety training on commercial fishing vessels.

On June 7, 1988, the Safety Board classified Safety Recommendations M-87-51 and -52 "Open--Unacceptable Action." These recommendations were reiterated as a result of the Safety Board's investigations on the disappearance of the NORDFJORD on September 19, 1987, and the sinking and capsizing of the UYAK II on November 5, 1986.

Neither the captain nor crew of the WAYWARD WIND had any safety training, and there was no indication that the captain would eventually require safety training for the crew of his vessel or use the Coast Guard voluntary program. Therefore, the Safety Board reiterates Safety Recommendations M-87-51 and -52.

The flooding that caused the vessel to sink by the stern could have started in either the lazarette or the after fish hold which was normally kept empty. By the time the deckhand discovered that the vessel's stern was submerged, probably one or both compartments were taking on water since the vessel's stern was steadily sinking deeper into the water, the water on deck was rising, and the vessel's steep up angle at the bow was increasing. Regardless of which compartment (lazarette or after fish hold) was open to the sea, the flooding was progressing and there was little time for the crew to take corrective action.

The mate on watch apparently did not observe any signs of danger during his watch. He had awakened the captain because the vessel had arrived at the location where the crab pots were to be set. The captain apparently did not recognize anything peculiar about the vessel's motion or that the vessel was trimmed down further by the stern than it had been when the 21 square pots had been loaded several hours earlier.

If bilge alarms had been installed in the WAYWARD WIND's lazarette and after fish hold, its crew could have been aroused as soon as there was any significant accumulation of water in either space. While bilge alarms do not eliminate the need for periodic inspections, they can provide a warning of flooding before the effects of the flooding, such as a list or a perceptible change in the vessel's motion could occur. The possibility that the WAYWARD WIND could have sunk without any particular warning is of great concern to the Safety Board, since reliable bilge alarms are available and widely used in many fishing vessels.

Bilge alarms could have provided an early warning of flooding and made it feasible for the crew to save the vessel, provided the leak was not due to a large structural failure. Although a difficult task with crab pots on deck, it could have been determined if the hatch cover to the lazarette was missing, and it could have been replaced using the forward fish hold hatch cover. If that were not the case, then the forward fish hold could have been pumped dry, provided pumping was started before the deck was submerged. Crab pots could have been set or jettisoned. Also, the early warning may have provided sufficient time for the captain to request and obtain dewatering pumps from the Coast Guard or other fishing vessels. The rate of progressive flooding may have been controlled or slowed by automatic bilge pumps. Finally, if these efforts failed, the crew probably could have been rescued by the Coast Guard or other fishing vessels before they had to enter the water. The Safety Board believes that all commercial fishing vessels should be equipped with high water (bilge) alarms in lazarettes, engine rooms, auxiliary engine rooms, large voids, and other spaces below deck where unobserved flooding may occur.

As a result of its safety study on uninspected fishing vessels, the Safety Board issued the following safety recommendation to the Coast Guard:

M-87-54

Seek legislative authority to require basic lifesaving equipment for uninspected commercial fishing vessels including but not limited to:

- Flooding detection alarms and automatic dewatering systems.

The Coast Guard responded on March 11, 1988, that it partially concurred with Safety Recommendation M-87-54. The Coast Guard stated, "Fishing vessel safety legislation has been introduced in Congress over the past few years containing requirements ranging from mandatory carriage of basic safety equipment to full Coast Guard inspection. . . ." On June 7, 1988, the Safety Board classified Safety Recommendation M-87-54 "Open--Acceptable Action."

As a result of its investigation of the capsizing and sinking of the U.S. fishing vessel UYAK II on November 5, 1987, the Safety Board reiterated Safety Recommendation M-87-54. The lack of high-water alarms and automatic dewatering systems on the WAYWARD WIND allowed massive, uncontrolled flooding to go undetected by the vessel's crew and again demonstrated the need for these systems on commercial fishing vessels. Since the recently enacted Commercial Fishing Industry Vessel Safety Act of 1988 does not require this equipment for fishing vessels like the WAYWARD WIND, the Safety Board again reiterates Safety Recommendation M-87-54.

It is likely that an inspection program would have revealed that the bilge drainage system on the WAYWARD WIND could cause progressive flooding either through the drain valve in the lazarette or from the engineroom back through the drain lines to the after fish hold and lazarette. Adherence to the criteria in existing Coast Guard regulations for bilge drainage systems required on inspected vessels would have eliminated these paths for progressive flooding.

The alterations on the vessel, such as raising the forecastle, adversely affected the stability of the vessel and possibly the strength of the hull. It also eliminated the protection afforded by the collision bulkhead. As a result of these alterations, the height of weights was increased, apparently without considering the adverse effect on the vessel's stability. As determined by the stability calculations conducted for the Safety Board, the vessel, when tanked and carrying the load of crab pots as it was at the time of the accident, failed to meet the recommended International Maritime Organization stability criteria contained in Navigation and Vessel Information Circular (NVIC) 5-86.<sup>5</sup> Thus, there was less stability to keep the vessel upright in heavy seas or in boarding seas. Also, there would be less time available in case of flooding to discover the source of the flooding and to take corrective action to save the vessel or to abandon the vessel before it could capsize or sink. A vessel certification and inspection program would require each commercial fishing vessel to meet the minimum stability standards that are now recommended in NVIC 5-86.

As a result of its safety study on uninspected fishing vessels, the following safety recommendation was issued to the Coast Guard:

M-87-64

Seek legislative authority to require that all uninspected commercial fishing vessels be certified and periodically inspected by the Coast Guard or its recognized representative to ensure that the vessels meet all applicable Federal safety standards.

On March 11, 1988, the Coast Guard did not concur with this recommendation and stated, "The Coast Guard believes that the combined use of voluntary construction standards and voluntary personnel training will most effectively reduce fishing vessel casualties." On June 7, 1988, the Safety Board classified Safety Recommendation M-87-64 "Open--Unacceptable Action."

The Safety Board reiterated this safety recommendation after its investigation of the capsizing and sinking of the UYAK II. The recently enacted Commercial Fishing Industry Vessel Safety Act requires the DOT to conduct a study of safety problems on fishing vessels and to make recommendations to Congress by January 1, 1990, regarding whether or not an inspection program should be implemented for fishing vessels.

The Safety Board believes that the leaking hatches and the design of the bilge system probably provided a path for progressive flooding which contributed to the loss of the WAYWARD WIND. This accident again illustrates the need for regular maintenance and periodic inspections to ensure that vessels are safe. Such

---

<sup>5</sup>NVIC 5-86 is a set of voluntary technical standards for U.S. uninspected fishing vessels and operating standards for fishing vessel crews developed by a Coast Guard-directed industry task force.

inspections also would prevent alterations that reduce the seaworthiness of a vessel and would improve the level of maintenance of safety equipment. Accordingly, the Safety Board again reiterates Safety Recommendation M-87-64.

Since all of the exposure suits worn by the deceased crewmembers leaked, the Safety Board investigated the quality of the leaking suits. The Safety Board believes the primary fault with the vessel's exposure suits was that the owner failed to maintain them properly and failed to have the inflatable bladders attached to the exposure suits. The Safety Board believes that an inspection program for fishing vessels would provide reasonable assurance that critical lifesaving equipment would be maintained properly.

The chief petty officer of the Coast Guard's survival school in Kodiak stated that 20 new Coast Guard-approved exposure suits manufactured by Bayley Suit, Inc. and received by the survival school leaked. Title 46 CFR 160.071 (now Section 160.171) provided ample guidance to enable manufacturers to produce exposure suits that would not leak. This incident of leaking exposure suits suggests that the regulations were not being met during production of these 20 exposure suits. The Safety Board has not conducted a survey of exposure suits produced by other manufacturers to determine if other brands of exposure suits have similar or other problems; however, no indications or examples of problems in other Coast Guard-approved exposure suits have been brought to the Safety Board's attention. The Safety Board believes that the failure of the manufacturer of these exposure suits to meet Coast Guard-approved standards is cause for concern and indicates that remedial action is required.

A test procedure could be used to determine if manufacturers of Coast Guard-approved exposure suits are, in fact, producing watertight suits. The Safety Board believes that the Coast Guard should investigate thoroughly the manufacturing and testing processes of Bayley Suit, Inc., to determine if there are deficiencies in Bayley's procedures that allowed this to occur. Further, the Coast Guard should establish a test procedure to detect the occurrence of leaks in exposure suits and should require manufacturers of Coast Guard-approved exposure suits to test for leaks before newly manufactured exposure suits are shipped.

The class B EPIRB, which the owner of the WAYWARD WIND voluntarily had on board, transmitted its distress signal on the proper frequency once it was activated by the crewmember. The C-130 pilot reported that the EPIRB signal was weak; this was probably due to the fact that the vessel owner had allowed the battery (with a recommended service life of 2 years) to remain in the EPIRB more than 10 months beyond the recommended battery change date. Nonetheless, the C-130 was able to detect and locate the EPIRB when it approached the position reported by the WAYWARD WIND. The Safety Board believes that in this case, the EPIRB transmitted effectively and its use saved two lives.

While the Federal Communications Commission (FCC) regulations for EPIRBs (Title 47 Code of Federal Regulations 80.1051-80.1055) require class A EPIRBs to float upright and to activate automatically, the regulations do not contain any such requirement for class B EPIRBs. Both class A and B EPIRBs are similar in appearance and many mariners may believe that the only difference between them is that class B EPIRBs must be activated manually. This belief may be reinforced by the *Vessel Safety Manual*<sup>6</sup> since it recommends that every fishing vessel operating more than 20 miles off shore should carry either a class A or class B EPIRB. This belief is not dispelled by NVIC 5-86 which recommends that every fishing vessel



operating more than 20 miles offshore should carry either a class A (preferred) or class B EPIRB, although NVIC 5-86 states that class B EPIRBs are not required to float.

A new regulation will require uninspected fishing vessels to carry category I EPIRBs; however, class A EPIRBs may be carried in lieu of the category I EPIRB until August 17, 1994, provided the class A EPIRBs were on board on October 3, 1988. This new regulation is expected to result in a new generation of improved EPIRBs producing signals at 406 MHz that will be more readily detectable by satellite. The Safety Board believes the new category I EPIRB will greatly improve search and rescue efforts. The class B EPIRB will not be considered to meet the requirements of the new regulation. Since the class B EPIRB is on board many uninspected commercial fishing vessels and its use has been sanctioned in the past by NVIC 5-86 and the *Vessel Safety Manual*, it is expected that this type of EPIRB may be retained by many fishing vessel captains as a backup to the category I EPIRB. However, the retention of a class B EPIRB may foster a false sense of security. The Safety Board believes that it would reduce reliance on the class B EPIRB and expedite acceptance of the new category I EPIRB if all mariners were informed that because of shortcomings in the way some class B EPIRBs have been manufactured, some class B EPIRBs may fail to transmit on the designated distress frequency and may leak. Also, mariners should be informed that since FCC regulations do not require class B EPIRBs to float, some class B EPIRBs may fail to do so.

Five aircraft involved in the search and rescue (SAR) experienced some type of equipment failure. The failure of the direction finding antenna on the first helicopter probably had little or no effect on the search effort as the radio tuned to the EPIRB frequency was operating, and it was connected to an omnidirectional antenna according to usual practices. The Safety Board believes that the capability both to detect and locate an EPIRB is a very important capability for aircraft on a SAR mission and the pilot should know if either capability is not available. It is recognized that there may be times, such as during good visibility or even times during poor visibility, when launching a SAR aircraft that cannot detect an EPIRB signal is warranted, but knowing this limitation may cause the pilot to alter his search method, such as using alternate equipment or putting more dependence upon visual or radar detection. The Safety Board believes that testing the EPIRB detection and locating equipment before departure is warranted.

As a result of its investigation, the National Transportation Safety Board reiterates Safety Recommendations M-85-68, M-87-51, and -52, -54, and -64 to the U.S. Coast Guard, and further recommends that the U.S. Coast Guard:

Establish standards for leak testing and require the manufacturers to test for leaks in Coast Guard-approved exposure suits. (Class II, Priority Action) (M-89-1)

Investigate the circumstances that permitted several defective Coast Guard-approved exposure suits manufactured by Bayley Suit, Inc., to be produced and sold, establish procedures to prevent a recurrence of the production and sale of defective exposure suits, and

---

<sup>6</sup>The *Vessel Safety Manual* is produced by the NPVOA.

take action to ensure that any defective suits manufactured by Bayley Suit, Inc., are disposed of or repaired. (Class II, Priority Action) (M-89-2)

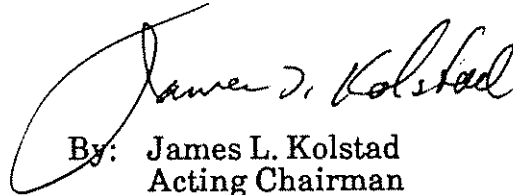
Issue an advisory to inform mariners that some class B emergency position indicating radio beacons (EPIRBs) have failed to transmit on the proper frequency and are not watertight and that class B EPIRBs are not required by Federal regulations to float, and therefore, mariners should not rely on class B EPIRBs as backup safety equipment unless they have been tested and found to transmit on the designated frequency, are watertight, and will float upright. (Class II, Priority Action) (M-89-3)

Expedite the development of regulations to require fishing vessels to carry the items of safety equipment mandated by the Commercial Fishing Industry Vessel Safety Act of 1988, such as immersion suits and liferafts. (Class II, Priority Action) (M-89-4)

Require that emergency position indicating radio beacon detection and locating equipment on search and rescue aircraft be checked for proper operation before departing on a search and rescue mission. (Class II, Priority Action) (M-89-5)

Also, as a result of its investigation, the Safety Board issued Safety Recommendations M-89-6 through -8 to the Federal Communications Commission, M-89-9 and -10 to Guest Company, Inc., and M-89-11 to the U.S. Department of Transportation.

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.

  
By: James L. Kolstad  
Acting Chairman