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RESEARCH MEMORANDUM

RETENTION IN THE NAVAL RESERVE FORCE

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A Division of CNA Hudson Institute

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RETENTION IN THE NAVAL RESERVE FORCE

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units had similar compositions, then the loss rates for NRF units would be even higher.

Among NRF personnel, continuation rates were higher for the highest and lowest paygrades, for those with more SELRES experience, and for Sea and Air Mariners (SAMs). On the other hand, geographical area, rating, and ship class had little effect on continuation rates.

CALCULATING CONTINUATION RATES

The data for this study are taken from the Inactive Enlisted Master File (IEMF) of the Inactive Manpower and Personnel Management Information System (IMAPMIS). The IEMF gives the Reserve forces' personnel inventory. CNA has continuous quarterly IEMF data from September 1985 through September 1987, or for nine quarters. To calculate continuation rates, all SELRES personnel serving in NRF units in one quarter were identified and followed to determine if they remained in an NRF unit the next quarter. Appendix A discusses how the data set for this study was constructed and provides additional detail on how the refinements discussed in this section were performed.

A simple method of identifying people serving in NRF units is to see whether their Active Unit Identification Code (AUIC) corresponds to the unit number of an NRF ship. The AUIC gives a SELRES member's mobilization unit. A person who will mobilize to an NRF ship may be in one of three types of crews. The SELRES crew for a ship will start to be assembled and trained up to two years before the ship is scheduled to enter the Reserve forces. In this paper, such a crew is called a pre-crew. In addition, ships that are already in the NRF sometimes have two SELRES crews: a main crew and an alternate crew. The alternate crew is often located in a nearby city with an abundant supply of Reservists but few NRF ships (e.g., New York City, for ships homeported in Philadelphia). The alternate crews will drill on their own most weekends but join the ship on occasional weekends and for their two weeks of Active Duty for Training (ACDUTRA).[1] A list of all the NRF ships and pre-, main, and alternate crews included in the data set is given in appendix A.

Table 1 shows raw NRF personnel inventories calculated using AUICs and the continuation rates for people in these inventories. For example, of the 2,780 people in the September 1985 inventory, 2,152 (or 77.4 percent) still had NRF AUICs in December 1985. The quarterly continuation rates range from 67.7 percent to 81.0 percent. The average quarterly NRF continuation rate is 76.8 percent; the implied annual

1. Pre- and alternate crews can be identified by their Reserve Unit Identification Codes (RUICs), which are different from their AUICs. Main crews have RUICs that are the same as their AUICs.

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INTRODUCTION AND SUMMARY

The Naval Reserve Force (NRF) consists of ships that have been assigned to Reserve duty. At the end of fiscal year 1987, there were 42 ships in the NRF: 19 frigates, 1 destroyer, 2 amphibious ships, 18 minesweepers, and 2 salvage ships. Current plans call for 10 additional ships to join the NRF by 1993. Even more ships may be added to these plans, however, as the result of cuts in the Navy's budget.

Although only 2 to 3 percent of Selected Reserve (SELRES) personnel serve in NRF units, the manning of these units is an important concern. The NRF is a highly visible program, and the readiness of NRF ships depends on their having full SELRES crews. Furthermore, several of the ratings that are needed to man NRF ships are in short supply in SELRES. Finally, the manpower must be found in the geographical areas where the ships are homeported.

The Center for Naval Analyses (CNA) has done several studies of NRF manpower availability (see [1], [2], and [3]). Reference [2] raises the possibility that past manpower availability forecasts may be in error because they assume that NRF retention rates are equal to retention rates for all SELRES personnel. This assumption conflicts with the widely held belief that the more arduous duty on NRF ships leads to lower retention rates. A further complication arises if continuation rates are significantly different in different geographical areas, on different types of ships, or for different types of personnel. If significant differences exist, then manpower availability forecasts should take them into account.

The purpose of this paper is to investigate continuation in the NRF by tracking individuals' records from quarter to quarter. The first section that follows explains how continuation rates were calculated and demonstrates how the rates change as difficulties with the data are corrected. The second section investigates the dates people leave the NRF and where they go when they leave. Continuation rates for all NRF personnel are presented and compared to SELRES continuation rates. The third section presents continuation rates broken down by geographical area, paygrade, length of SELRES service, rating, program of entry into the Reserve, and type of ship.

The results show that in fiscal years 1986 and 1987, 42.3 percent of the NRF personnel inventory left NRF units each year. Because 10.7 percent of the inventory transferred to non-NRF units, the SELRES loss rate for NRF personnel was 31.6 percent. This compares to an annual loss rate for all SELRES personnel of 28.0 percent. Although this difference may not seem large, NRF units have relatively more people with longer terms of SELRES service and relatively more people who have SELRES obligations than do non-NRF units. If NRF and non-NRF

units had similar compositions, then the loss rates for NRF units would be even higher.

Among NRF personnel, continuation rates were higher for the highest and lowest paygrades, for those with more SELRES experience, and for Sea and Air Mariners (SAMs). On the other hand, geographical area, rating, and ship class had little effect on continuation rates.

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continuation rate is 34.7 percent.[1] In other words, over 23 percent of the raw NRF inventory is lost each quarter and over 65 percent is lost each year.

TABLE 1

NRF CONTINUATION RATES BASED ON RAW INVENTORIES

	Quarter ending									
	9/85	12/85	3/86	6/86	9/86	12/86	3/87	6/87	9/87	Average
Raw inventory	2,780	2,842	2,883	2,595	2,371	2,020	2,804	3,070	--	2,671
Remaining from last quarter	--	2,152	2,230	1,951	1,992	1,921	1,606	2,256	2,291	2,050
Quarterly continuation rate (%)	--	77.4	78.5	67.7	76.8	81.0	79.5	80.5	74.6	76.8[a]
Annual continuation rate (%)										34.7[b]

a. Average number remaining from the last quarter as a percentage of the average raw inventory.
b. Average quarterly continuation rate to the fourth power.

The continuation rates in table 1 understate true NRF continuation rates for several reasons. First, some of the inventory will no longer have an AUIC equal to an NRF unit because they have lost their mobilization billets. The instability of SELRES mobilization billets is a significant problem, as noted in [4]. Many times a person who appears to be a loss, based on a change in their AUIC, has moved into an In Assignment Process (IAP) status. This person may continue drilling with the NRF unit while IAP and may shortly be assigned to another valid NRF

1. The average quarterly rate is calculated by taking the ratio of the average number remaining in NRF units between quarters to the average raw inventory. The average quarterly continuation rate is converted to an annual continuation rate by taking it to the fourth power.

mobilization billet.[1] Such people are not true losses to the NRF and should be added to the number of people continuing in the NRF. Table 2 shows that on average the raw NRF inventory can be increased by 200 people, or by 7.5 percent, by taking into account IAP people who are still drilling with their NRF units.

TABLE 2

NRF CONTINUATION RATES BASED ON REFINED INVENTORIES

	Quarter ending									
	9/85	12/85	3/86	6/86	9/86	12/86	3/87	6/87	9/87	Average
Raw inventory	2,780	2,842	2,883	2,595	2,371	2,020	2,804	3,070	--	2,671
IAP added	0	123	77	474	209	335	207	175	--	200
Cross-assigned deleted	416	379	377	240	160	212	288	336	--	301
Crews deleted	467	506	479	448	48	70	297	453	--	346
Refined inventory	1,897	2,080	2,104	2,381	2,372	2,073	2,426	2,456	--	2,224
Remaining from first quarter	--	1,675	1,779	1,872	2,030	2,083	1,819	2,091	2,157	1,938
Quarterly continuation rate (%)	--	88.3	85.5	89.0	85.3	87.8	87.8	86.2	87.8	87.2[a]
Annual continuation rate (%)	--	--	--	--	--	--	--	--	--	57.7[b]

a. Average number remaining from the last quarter as a percentage of the average raw inventory.
b. Average quarterly continuation rate to the fourth power.

1. Personnel who are IAP but are still drilling with their NRF unit can be identified by their Training Unit Identification Code (TRUIC). No people who were IAP in the first quarter of the sample can be added back in because it is not possible to test whether their TRUIC is the same as their previous quarter's NRF unit.

Another problem with the raw NRF inventories in table 1 is that they include people that are cross-assigned into an NRF mobilization billet. These people drill with another SELRES unit closer to where they live but have a mobilization billet with the NRF unit. Cross-assignment into NRF units is discouraged because the SELRES crew of NRF ships should be present to drill on the ship. Nevertheless, an average of 301 out of the raw NRF inventory of 2671 people, or 11.3 percent, were cross-assigned into the units.

The cross-assigned personnel have an annual continuation rate in the NRF of only 7.9 percent--significantly lower than the continuation rate for personnel who are not cross-assigned. There are at least two reasons for the lower rate. First, filling a billet with a cross-assignment is often a temporary measure taken only until someone in the local area can be found. Second, in the summer of 1986 there was an attempt to remove all cross-assigned personnel from the NRF. Table 2 shows evidence of this in the decrease in cross-assignments in June and September of 1986; thus, there are large declines in the continuation rates of cross-assigned personnel in these quarters. (Notice, however, that cross-assignments began to increase again in December 1986.) Continuation rates that are calculated from NRF inventories that include cross-assigned personnel will understate the continuation rates of people who are filling NRF billets legitimately. For this reason, cross-assigned personnel were excluded from the final data set used in this study.

The final adjustment made to the data set was to exclude eight NRF crews that had peculiar retention patterns. The major deletions were the main and alternate crews of USS *Gray* and USS *Lang*. These frigates moved homeports from Long Beach to San Francisco during FY 1987 and in the process exchanged their main and alternate crews. What happened to retention in these crews as a result is discussed in a following section. The other four crews that were deleted are discussed in appendix A.

The NRF inventories given in table 2, then, are refined by adding IAP personnel who were drilling with NRF units and deleting people who were cross-assigned or who were in crews with peculiar retention patterns. The average quarterly NRF continuation rate based on the refined inventories is 87.2 percent; the range of quarterly rates is from 85.3 to 89.0 percent. The implied annual continuation rate is 57.7 percent. Refining the inventories results in an annual NRF continuation rate that is 23 percentage points higher than the rate based on the raw inventories.

It is obviously important to make adjustments to the IEMF data when using them to calculate continuation rates. Not only do the raw data imply low continuation rates, they also result in larger variations in the rates from quarter to quarter. If NRF continuation appears to have fallen to an unusually low level, an investigation of the decline

should be made. The decline may not reflect a retention problem but rather unusually high billet instability, a change in the enforcement of the cross-assignment policy, or something unusual happening to a few large crews.

THE NATURE OF ATTRITION

As shown in the previous section, 42.3 percent of NRF personnel leave the NRF each year. This section examines where people go when they leave the NRF and how long people stay in the NRF before they leave. Continuation rates for NRF personnel are compared to rates for all SELRES personnel. Finally, retention of *Gray* and *Lang* personnel is examined when the ships changed homeports and interchanged main and alternate crews.

Transfers and Losses

Turnover in one component of the Selected Reserve, such as NRF units, will be higher than turnover for SELRES as a whole. This is because some NRF losses will transfer to other SELRES units and thus will not be losses to SELRES. Table 3 separates people who left NRF units into those who joined non-NRF SELRES units and those who left SELRES. The transfer rate is the number of people joining non-NRF units this quarter as a percentage of the previous quarter's inventory. The average quarterly transfer rate was 3.8 percent; the implied annual transfer rate was 10.7 percent.[1] The rate at which NRF personnel continue in the Selected Reserve is given by the sum of the NRF continuation rate and the transfer rate. The annual SELRES continuation rate for NRF personnel in this sample was 68.4 percent. In other words, an average of 31.6 percent of NRF personnel left SELRES each year.

Continuation rates were also calculated for all SELRES personnel. Eight quarterly continuation rates were calculated using the nine quarters of IEMF data. The resulting average annual continuation rate was 72.0 percent. This implies an annual loss rate for all SELRES personnel of 28 percent, which is 3.6 percentage points lower than the SELRES loss rate for NRF personnel. The higher loss rate for NRF personnel cannot be interpreted as meaning that NRF duty is less attractive. The difference could be because of differences in the composition of NRF and all SELRES personnel inventories. For example, continuation rates generally rise as the length of service (LOS) in the Reserves increases. Therefore, if the NRF inventory has relatively more people with short LOSs than the SELRES inventory, one would expect lower continuation rates in the NRF. The composition of the NRF personnel inventory is investigated in the section on the "Determinants of Continuation Rates" that follows.

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1. The annual transfer rate is calculated by taking the difference between the NRF and SELRES annual continuation rates.

TABLE 3

SELRES CONTINUATION RATES FOR NRF PERSONNEL

	Quarter ending									
	9/85	12/85	3/86	6/86	9/86	12/86	3/87	6/87	9/87	Average
NRF inventory	1,897	2,080	2,104	2,381	2,372	2,073	2,426	2,456	--	2,224
Remain in NRF	--	1,675	1,779	1,872	2,030	2,083	1,819	2,091	2,157	1,938
Transfer to non-NRF	--	78	85	66	138	72	69	75	89	84
Leave SELRES	--	144	216	166	213	217	185	260	210	201
NRF continuation (%)	--	88.3	85.5	89.0	85.3	87.8	87.8	86.2	87.8	87.2
Transfer rate (%)	--	4.1	4.1	3.1	5.8	3.0	3.3	3.1	3.6	3.8
SELRES loss rate (%)	--	7.6	10.4	7.9	8.9	9.1	8.9	10.7	8.6	9.0

Annual rates (%)	NRF continuation	57.7	
	Transfer	10.7	
	SELRES continuation		68.4
	SELRES loss		31.6
	All SELRES personnel		
	Continuation rate		72.0
	Loss rate		28.0

To illustrate the effect of the different continuation rates on forecasts of personnel availability, assume that there are 3,000 people currently serving in NRF units. If the 28-percent loss rate for all SELRES personnel were used, 840 people would be predicted to be lost within a year. If the 31.6-percent loss rate for NRF personnel were used, predicted losses would be 948. However, an additional 10.7 percent of the inventory, or 321 people, would be expected to transfer to non-NRF units within SELRES. Thus, the yearly loss of people from NRF units would be 1,269.

Several qualifications should be noted regarding the predicted losses. If any NRF crews were dissolved or reorganized, if the inventory included cross-assigned personnel, or if people who went into IAP but continued to drill with their NRF units were counted as losses, actual losses would be significantly higher than 1,269. Furthermore, predicting future losses using historical continuation rates assumes that none of the underlying determinants of continuation is changing. Thus, the paygrade and LOS mix of NRF personnel would be assumed to remain constant. Also, the relative proportions of Navy veterans (NAVETs), Sea and Air Mariners (SAMs), and Active Mariners (AMs) in the NRF would have to remain constant. Finally, economic factors such as pay and unemployment rates that might affect retention rates would be assumed to remain constant. If any of these factors did change from the levels prevalent during the sample period, actual and predicted losses would differ.

Further investigation was made of transfers within the NRF and transfers from NRF units to Shore Intermediate Maintenance Activities (SIMAs). The NRF continuation rates reported include all people who remained in the NRF, whether or not they transferred from one NRF unit to another. The number of people who made intra-NRF transfers was small: only 38 people during the sample period. On average, then, only five people per quarter moved from one NRF unit to another. The rate at which people continued on the same NRF crew was 57.2 percent per year, only 0.5 percentage points lower than the rate at which people continued on any NRF crew.

It would seem desirable for people to transfer between NRF units and SIMAs. Similar skills and training are needed in these units, and the SIMA offers relief from the longer drills in NRF units. In spite of this, the number of transfers to SIMAs was low. Over the sample period, a total of 36 people transferred from NRF units to SIMAs, or an average 4.5 transfers per quarter. Transfers to SIMAs accounted for only 5.4 percent of all transfers to non-NRF units.

The Timing of Attrition

Assignment to NRF units is not meant to be permanent. Rather, SELRES policy calls for three years of NRF duty followed by rotation to a non-NRF unit. In the IEMF data from September 1985 through September 1987, however, very few people followed a three-year rotation pattern. Table 4 gives the distribution of the length of service in an NRF unit before a person either transfers to a non-NRF unit or leaves SELRES. For transfers, the NRF unit LOS was calculated by comparing the Date Received (DRCD) at the NRF unit to the DRCD at the subsequent unit (see appendix A for more detail). For losses, the date of loss was not readily available, so the date of the quarter in which the person no longer appeared in SELRES was used. Because the person would have left sometime between this date and the date of the previous quarter, the LOS

for losses will be overstated. For this reason, no importance should be attached to the longer average LOS for losses.

TABLE 4

DISTRIBUTION OF NRF UNIT LENGTH OF SERVICE

Years in NRF unit	Percentage of transfers	Percentage of losses
Up to 1	53.0	40.6
Over 1 up to 2	26.5	35.8
Over 2 up to 3	10.9	17.6
Over 3 up to 4	6.7	4.0
Over 4	3.0	2.0
Average LOS		
Months	15.4	17.7
Years	1.3	1.5

Table 4 shows that over half of the people who transferred out of NRF units did so during their first year of NRF duty. Almost 80 percent of the transfers took place during the first two years. The average transfer took place after 15.4 months in an NRF unit. More detailed data show that only 10.1 percent of all transfers occurred within six months of the three-year rotation point. This means that, on average, 34 people per year rotated within six months of having completed a three-year tour.

For people who left SELRES when they left their NRF units, over 40 percent left after having served less than a year with the unit. Over three-fourths of the losses occurred during the first two years. The average loss occurred after 17.7 months in the NRF, although this is an overstatement because of the manner in which LOS was calculated for losses. Of all SELRES losses from NRF units, 8.5 percent occurred within six months of the three-year service point.

USS *Gray* and USS *Lang*

USS *Gray* and USS *Lang* provide a test case of the effect on retention of drilling on a ship. Through FY 1986, these *Knox* class frigates were homeported in Long Beach. They had main SELRES crews in Long Beach and alternate SELRES crews in San Francisco. During the first quarter of FY 1987, the ships moved their homeport to San Francisco. The old alternate crews were to become the new main crews, with the members being discouraged from transferring to other SELRES units. In this case, people who were accustomed to drilling without a ship were

expected to drill on a ship. The old main crews were dissolved, with the members being encouraged to join other NRF units or non-NRF units as appropriate. In this case, people who were accustomed to drilling on a ship were given a choice of continuing to do so or not.

The IEMF reflects the restructuring of the crews beginning with the June 1986 files. In March 1986, mobilization billets (AUICs) indicate that a total of 415 people were serving in the two main and two alternate crews (see table 5). In June 1986, only 92 people had AUICs corresponding to *Gray* or *Lang*; in September and December 1986, no one did. Although it is difficult to trace the March 1986 crews on the June and September IEMFs, by December 1986 and March 1987 the location of many of these individuals can be determined by their training units (TRUICs).[1]

Table 5 shows the locations of the March 1986 crews in December 1986 and March 1987. In December 1986, 27 percent of *Gray's* Long Beach main crew were drilling with the new main crew in San Francisco. By March 1987, this percentage had dropped to 13. Relatively more people in both old main crews joined other NRF units than joined non-NRF SELRES units. A year after the crew changes had begun, 59 percent of *Gray*'s alternate crew and 54 percent of *Lang*'s alternate crew had joined the main crews. The transfer rates to either other NRF units or non-NRF SELRES units were low for both alternate crews.

Movements for the two main crews and the two alternate crews by March 1987 can be used to construct annual continuation, transfer, and loss rates. In the bottom section of table 5, these rates are compared to the rates given in table 3 for all other NRF crews. The NRF continuation rate was slightly lower for the old main crews than for other crews. Because these crews were dissolved and the members had to seek out new NRF crews to serve with, it is striking that the NRF continuation rate is as high as it is. The high rate of transfers to non-NRF units for the old main crews means a SELRES loss rate that was 10.7 percentage points lower than the loss rate for other NRF crews. In contrast, the alternate crews experienced a somewhat higher than normal loss rate. This can be attributed to a low transfer rate, as the NRF continuation rate for alternate crews was virtually the same as the rate for other NRF crews.

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1. In June and September 1986, some of the individuals were in the Individual Ready Reserve (IRR), that is, the nondrilling Reserve. Many of these individuals were only temporary SELRES losses, since they would reappear in SELRES the following quarter. Others remained in SELRES in an IAP status, but no TRUIC appeared on the IEMF. By December 1986 and March 1987, people were either still IAP but had had TRUICs filled in, or they had been reassigned to valid mobilization billets. People who remained in the IRR were counted as losses to SELRES.

TABLE 5

MOVEMENTS OF THE MARCH 1986 CREWS OF USS *GRAY* AND USS *LANG*

Numbers in the March 1986 crews:

USS *Gray*'s main	100
USS *Gray*'s alternate	114
USS *Lang*'s main	91
USS *Lang*'s alternate	110
	415

	USS *Gray*				USS *Lang*					
	Main		Alternate		Main		Alternate		Both main	Both alternate
Percentage of 3/86 crew to:	12/86	3/87	12/86	3/87	12/86	3/87	12/86	3/87	3/87	3/87
Join new main	27	13	68	59	14	12	57	54	13	56
Join other NRF	31	34	0	1	44	48	5	2	41	1
Join other SELRES	26	28	5	6	22	23	5	8	26	7
Leave SELRES	16	25	27	34	20	16	31	36	21	35

Annual rates	Main	Alternate	Other NRF
NRF continuation	53.4	57.6	57.7
Transfer	25.7	7.1	10.7
SELRES loss	20.9	35.3	31.6

It seems that members of the crews that had been drilling with the ships in Long Beach had strong attachments to SELRES service. The crews in San Francisco that gained a ship to drill on were neither more nor less likely to continue with their units as a result. People from these alternate crews were, however, more likely to leave SELRES, perhaps because they were discouraged from transferring to other SELRES units.

DETERMINANTS OF CONTINUATION RATES

In this section, continuation rates are calculated for different groups of people based on several criteria. First, differences in crew type (main, alternate, or pre-), ship class, and geographic location are examined. Second, differences in continuation rates among personnel having different paygrades, lengths of SELRES service, ratings, and programs of entry into the Selected Reserve are presented. In several instances, it would be useful to know whether there are significant differences among the continuation rates for different groups. First, if the continuation rate improves with longer LOS, for example, then the LOS of NRF and non-NRF should be held constant when determining whether

retention is worse in NRF units. Furthermore, if people with different LOSs continue at different rates, this should be taken into account when forecasting personnel availability.

Tables are presented that show the continuation rates for NRF crews or groups of NRF personnel with different characteristics. In all cases, the percentage of the sample that fell into each category is presented. The percentages are averages over the nine quarters in the sample of the people appearing in the refined NRF inventory at the beginning of each quarter. Annual continuation rates are also presented. These annual rates are calculated from average quarterly continuation rates.

For each attribute, a statistical test is made of whether there are significant differences among the average continuation rates for people in different categories. Two-way analysis of variance (ANOVA) is used to test the hypothesis that the average continuation rate for all categories is the same. The ANOVA technique divides the total variation in a set of data into components that can be ascribed to particular sources. For example, with eight quarterly continuation rates for each of six paygrade groups, the data set consists of 48 continuation rates. The total variation among these 48 rates can be split into three parts: one representing differences among the paygrade groups in their average continuation rates, one representing differences among the quarters in their average rates, and the residual variation. An F-statistic to test whether average continuation rates are the same across paygrades is calculated by taking the ratio of the variation due to differences among paygrade rates to the residual variation. If average rates for different paygrades are much different, then the numerator of this ratio will be larger and the F-statistic will be larger. If the F-statistic exceeds some critical value, the hypothesis that average continuation rates are equal for all paygrades can be rejected. These F-statistics are presented, and it is indicated whether they exceed critical values at either 1-, 5-, or 10-percent confidence levels (see [5], pp. 382-399, for a discussion of the ANOVA technique).

Table 6 presents differences in continuation rates based on crew type, ship class, and geographical area. There is no evidence that continuation rates are different for main, alternate, and pre-crews. There is only weak evidence that rates differ by ship class or by geographical area as measured by the Naval Reserve Readiness Command (REDCOM). Forecasts of personnel availability would be improved only marginally, if at all, by incorporating geographical differences in retention. Furthermore, changes in the types of ships that are in the NRF are not likely to affect continuation rates very much. Continuation rates for individual NRF ships are given in appendix B. The sample size was too small to determine whether the average continuation rate for all ships was the same.

TABLE 6

ANNUAL CONTINUATION RATES BY CREW TYPE, SHIP CLASS, AND REDCOM

Crew type	Percentage of sample	Continuation rate
Main	64.0	59.1
Alternate	22.4	56.9
Pre-	13.5	53.3
	(F = 1.87)	
Ship type		
MSO	16.4	56.2
FFG	34.9	54.9
FF	35.5	60.0
Other	13.2	61.4
	((F = 2.34*)	
REDCOM (location)		
1 Newport, RI	12.9	55.8
2 Scotia, NY	20.5	62.1
4 Philadelphia, PA	19.1	58.6
6 Washington, DC	4.1	48.4
7 Charleston, SC	5.3	54.2
8 Jacksonville, FL	4.7	58.9
19 San Diego, CA	20.1	55.2
20 San Francisco, CA	5.3	57.4
22 Seattle, WA	7.7	62.7
-- Unknown or other	0.2	--
	(F = 2.08*)	

NOTE: The F-statistics are for the ANOVA test of the hypothesis that the average continuation rates for all groups are equal. The degrees of freedom for the test statistic are $(k - 1)$, and $(k - 1)(n - 1)$, where k is the number of groups and n is the number of quarterly continuation rates ($n = 8$). One asterisk indicates significance at the 10-percent level, two asterisks, the 5-percent level, and three asterisks, the 1-percent level.

Table 7 presents the results for paygrade, SELRES length of service (LOS), and rating group. Of these three attributes, only the rating group has little effect on continuation rates. Ratings that are used in NRF units are divided into functional groups in table 7. The F-statistic for whether average continuation rates are the same for all rating groups is significant only at the 10-percent level. This indicates that differences in the rating composition of NRF and non-NRF units are not likely to contribute to differences in continuation rates. Also, the same continuation rates can be used to predict future inventories of personnel in different ratings. Appendix B gives continuation rates for individual ratings. Given the size of the data sample, there are too many ratings for a test of differences in the continuation rates among individual ratings to have much power.

Paygrades 1 and 2 and paygrades 7 through 9 were grouped together to avoid having categories that included very small percentages of the sample. There are strongly significant differences between the continuation rates for different paygrades. In particular, continuation rates are higher in paygrades 1 through 3, decline in paygrades 4 and 5, and are the highest in paygrades 6 through 9. Personnel in the junior paygrades would largely be SAMS who have an obligation to drill. Paygrade 4 and 5 personnel would most likely be NAVETs who joined SELRES after one term of active duty and who have not been in SELRES long enough to advance to higher paygrades.

The length of service in the Selected Reserve was computed using data from the Reserve Components Common Personnel Data System (RCCPDS) (see appendix A). The LOS is for the current enlistment only; it does not include time spent in SELRES in any previous enlistments. Again, there is strong evidence that continuation rates differ for people with different LOSs. People who have served longer in SELRES have higher continuation rates in the NRF.[1]

One question that arises in comparing continuation rates for NRF and other SELRES personnel is whether these rates differ because the characteristics of NRF and other SELRES personnel differ. Table 8 compares the paygrade and SELRES LOS distributions for NRF personnel and all SELRES personnel. The comparisons are made using the September 1987 IEMF. There were 101,384 people in the SELRES inventory and 2,413 people in the refined NRF inventory.

The NRF units have more junior paygrade personnel and fewer senior paygrade personnel. Because continuation rates are higher in both the junior and senior paygrades than in the middle paygrades, it is hard to predict the net effect of the different paygrade composition on

1. The only exception is the decline in the continuation rate for people with between five and six years of service. This could be the result of the small number of people in this LOS category.

TABLE 7

ANNUAL CONTINUATION RATES BY PAYGRADE, SELRES LOS, AND RATING GROUP

Paygrade	Percentage of sample	Continuation rate
1-2	15.6	62.5
3	24.2	58.8
4	19.9	46.9
5	21.9	56.6
6	13.9	64.9
7-9	4.5	72.3
	(F = 20.5***)	
SELRES length of service (years)		
Up to 1	20.1	48.8
Over 1 up to 2	24.1	52.5
Over 2 up to 3	17.9	57.9
Over 3 up to 4	11.6	65.8
Over 4 up to 5	6.6	66.8
Over 5 up to 6	4.4	58.0
Over 6	15.3	70.9
	(F = 9.97***)	
Ratings		
1 BM, MA, QM, SM	10.9	55.8
2 OS, EW, ST	14.2	60.1
3 FC, GM, TM	7.6	56.9
4 ET	2.8	65.6
5 DK, MS, PC, PN, RM, SH, SK, YN	19.3	57.9
6 BT, EM, EN, GS, HT, IC, MM	19.9	56.3
7 Unrated	24.5	57.9
- Other	0.9	--
	(F = 2.06*)	

NOTE: The F-statistics are for the ANOVA test of the hypothesis that the average continuation rates for all groups are equal. The degrees of freedom for the test statistic are $(k - 1)$, and $(k - 1)(n - 1)$ where k is the number of groups and n is the number of quarterly continuation rates ($n = 8$). One asterisk indicates significance at the 10-percent level, two asterisks, the 5-percent level, and three asterisks, the 1-percent level.

continuation rates. For LOS, the result is unambiguous. The NRF inventory includes only about half as many people with a SELRES LOS of one year or less. In addition, NRF units have more people with over three years of SELRES service. The greater experience of the NRF units, then, would lead them to have higher continuation rates. This implies that if LOS were held constant between NRF and all SELRES units, the continuation rates for NRF units reported in table 3 would be even lower. This would accentuate the discrepancy in retention between NRF and all SELRES personnel.

TABLE 8

COMPARISON OF PAYGRADE AND LOS DISTRIBUTIONS:
SEPTEMBER 1987 NRF AND SELRES INVENTORIES

Paygrade	NRF	SELRES
1-2	11.2	8.8
3	27.6	18.9
4	21.8	21.2
5	20.6	26.1
6	13.5	16.8
7-9	5.3	8.1
SELRES years of service		
Up to 1	17.2	33.8
Over 1 up to 2	20.5	19.4
Over 2 up to 3	15.8	12.8
Over 3 up to 4	16.1	10.2
Over 4 up to 5	9.7	7.1
Over 5 up to 6	5.3	4.9
Over 6	15.5	11.9

The final attribute to be considered is the program of entry into the Selected Reserve. The most common source of SELRES recruits is veterans of active Navy duty (NAVETs). The Sea and Air Mariner (SAM) program brings in recruits with no prior military service. SAMs have a six-year SELRES obligation. Active Mariners (AMs) serve three years on active duty and then have a two-year SELRES obligation. The remaining sources of SELRES personnel are the Advanced Paygrade (APG) and Other Service Veteran (OSVET) programs. The greatest differences in continuation rates are expected to be found between programs in which SELRES participation is mandatory (SAMs and AMs) and those in which it is voluntary (NAVETs and APG/OSVETs). This distinction becomes blurred, particularly for AMs, when people who originally entered through a

mandatory drilling program remain in SELRES after their obligation has expired.

The IEMF does not directly identify original entry programs. One method of determining program of entry is to match people from the IEMF to data from the RESULTS module of the Reserve Training and Support System (RTSS). The RESULTS files contain recruiting data that explicitly identify program of entry. RESULTS data, however, were available only for people entering SELRES since FY 1983. As a result, in September 1987, 42.4 percent of the refined NRF inventory and 49.3 percent of the total SELRES inventory could not be located in the RESULTS files. An alternative is to use various fields on the IEMF to infer a person's program of entry. Appendix A describes the data fields and algorithm used to assign programs of entry to people who could not be found in the RESULTS data.

Table 9 shows the percentages of people coming from each program of entry and their continuation rates. When persons who could only be found on RESULTS are considered, 41.5 percent of the refined NRF inventory were recruited through the SAM program (on average over the nine quarters in the data sample). The continuation rate for SAMs is about 40 percent higher than that of the program with the next highest rate. Continuation rates for all other programs do not differ very greatly.

The IEMF algorithm assigns people the incorrect program of entry about 12 percent of the time (see appendix A). The most frequent mistakes are that only about 10 percent of all APG/OSVETS are correctly classified; instead most are classified as NAVETs. Also, people that the IEMF algorithm calls AMs are often actually NAVETs. When IEMF data are used to infer the program of entry for anyone not appearing on RESULTS, the percentage of SAMs falls to 32.9. Most of the people not found on RESULTS are NAVETs and AMs who entered SELRES before FY 1983. Because people with longer SELRES LOSs have better continuation rates, the continuation rates for entrants other than SAMs rise. The SAM continuation rate is still significantly higher, but now by 20 rather than 40 percent.

There is still little difference in continuation rates among the NAVET, AM, and APG/OSVET entry programs. Because the IEMF algorithm labels some APG/OSVETs as NAVETs and some NAVETs as AMs, there is some "noise" introduced into the continuation rates for these programs. The inclusion of NAVETs and AMs with longer LOSs, however, probably results in better measures of average continuation rates for these programs.

TABLE 9

ANNUAL CONTINUATION RATES AND DISTRIBUTION COMPARISONS FOR PROGRAM OF ENTRY

	Using RESULTS only			Using RESULTS and IEMF algorithm	
Program of entry	Percentage of sample	Percentage of those found	Continuation rate	Percentage of sample	Continuation rate
NAVET	19.3	31.3	42.6	36.8	53.1
SAM	25.6	41.5	68.2	32.9	66.4
AM	14.1	22.9	46.8	25.8	54.8
APG/OSVET	2.7	4.3	48.9	4.4	53.9
Not found	38.4	--	--	--	--
		(F = 9.22***)		(F = 8.89***)	

Program of entry	Distributions of September 1987 inventories: NRF	SELRES
NAVET	37.5	44.1
SAM	32.9	26.6
AM	26.0	20.1
APG/OSVET	3.6	9.2

NOTE: The F-statistics are for the ANOVA test of the hypothesis that the average continuation rates for all groups are equal. The degrees of freedom for the test statistic are $(k - 1)$, and $(k - 1)(n - 1)$ where k is the number of groups and n is the number of quarterly continuation rates ($n = 8$). One asterisk indicates significance at the 10-percent level, two asterisks, the 5-percent level, and three asterisks, the 1-percent level.

The second part of table 9 compares the program of entry distributions for NRF units and all SELRES units in September 1987. The distributions presented are those obtained using RESULTS data when available and the IEMF algorithm otherwise. NRF units use relatively more SAMs and AMs and relatively fewer NAVETs and APG/OSVETs than do all SELRES units. The use of more people who have an obligation to remain

in SELRES should increase the SELRES continuation rates of people in NRF units.

Both the longer SELRES length of service and the greater numbers of mandatory drillers in NRF units would tend to increase continuation rates. Continuation rates for NRF units are, however, lower than rates for all SELRES. This suggests that if LOS and program of entry were held constant, retention differences between NRF and non-NRF units would be even greater. Further work should be done to confirm this result.

CONCLUSIONS AND RECOMMENDATIONS

The major findings and recommendations of this study are as follows:

- If inventory data from the IEMF are used to calculate NRF continuation rates, attention must be paid to people who lose their mobilization billets, people who are cross-assigned into NRF units, and crews that are restructured. Continuation rates within the NRF increase from 34.7 to 57.7 percent annually when adjustments are made for these situations.

- Of the 42.3 percent of the NRF inventory that left NRF units each year, 10.7 percent transferred to non-NRF SELRES units and 31.6 percent left SELRES. This 68.4 percent SELRES continuation rate for NRF personnel compares to a 72.0 percent continuation rate for all SELRES personnel.

- Over half of all people who transferred out of NRF units did so within their first year with the unit: almost 80 percent within their first two years. Only 10.1 percent of all transfers, or 34 people per year, transferred within six months of having completed a three-year tour.

- There are significant differences in NRF continuation rates for people in different paygrades, with different lengths of SELRES service, and in different programs of entry. Junior and senior paygrade personnel have higher continuation rates than middle paygrade personnel. People who have served longer in SELRES have higher NRF continuation rates. SAMs have higher continuation rates than people who entered through any other program.

- The type of crew, ship class, REDCOM, and rating group have little effect on NRF continuation rates. Forecasts of personnel availability would be improved only marginally, if at all, by adjusting for differences in crews, ships, geographical areas, or ratings.

- NRF units have relatively more people with longer terms of SELRES service and relatively more SAMs than non-NRF SELRES units. If these characteristics were held constant for NRF and all SELRES units, the continuation rates for NRF units would be even lower.

REFERENCES

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[3] CNA Research Memorandum 87-159, *Manning Issues in the Surface-Expansion TAR Program*, by Martha E. Shiells, Aug 1987 (27870159)

[4] CNA Research Memorandum 87-114, *The Navy Manpower-Requirements System*, by Peter F. Kostiuk, Aug 1987 (27870114)

[5] Edwin Mansfield. *Statistics for Business and Econometrics*, 2nd. ed. New York: W. W. Norton, 1983

APPENDIX A

CONSTRUCTION OF THE NRF DATA SAMPLE

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CONSTRUCTION OF THE NRF DATA SAMPLE

Analysts identified Naval Reserve Force (NRF) personnel on nine quarterly Inactive Enlisted Master Files (IEMFs)--September 1985 through September 1987--by matching their Active Unit Identification Codes (AUICs) with a list of NRF unit numbers. It was necessary not only to identify the NRF unit, but also the type of crew: pre-, main, or alternate. If the Reserve Unit Identification Code (RUIC) matched the AUIC, the crew was a main crew; otherwise, the ship's date of entry into the NRF program determined the type of crew. If the date of the IEMF was after the entry date , the crew was an alternate crew; if not, it was a pre-crew. Table A-1 lists the NRF AUICs and crews found on the IEMFs. Ten AUICs were eliminated from the sample because their NRF entry dates were after June 1988.

Initial distributions revealed sharp declines and gaps in crew inventories. These gaps implied high losses and demanded closer examination. Many of these crew members' AUICs changed to 99999, which identifies individuals going in assignment processing (IAP) awaiting mobilization billets. Although these individuals were not assigned to any AUIC or RUIC, they were attached to a reserve training unit (TRUIC). The TRUIC can be used to identify individuals who continue to drill with their NRF units. Answering these questions establishes the IAP rule. This rule states that when a NRF member goes IAP, the TRUIC will determine whether the individual has left the NRF. If someone's TRUIC matches their previous AUIC or RUIC, they remain in the NRF. This implies that the values of AUIC, RUIC, and TRUIC from the NRF quarter will extend into the IAP quarter. Table A-2 shows how this rule affected the inventory of several crews.

Even though the IAP rule may have filled some of the gaps, others remained a problem. For example, the rule helped the AUIC 20967 in December 1986, but not September 1986. Of its 63 members in June 1986, 44 had a blank TRUIC in September, so the IAP rule failed to identify continuing crew members. Because blank TRUICs are rare and should not exist, the IAP rule was extended for AUICs 20967 and 20968. If any crew member went IAP and has a blank TRUIC in September 1986 and subsequently returned to the crew in December, he remained in the NRF for September 1986. For AUIC 20967, 43 crew members were found; for AUIC 20968, 29.

This extension failed to aid other crews, in particular the alternate crews of 04662 and 21034. None of the alternate crew members found prior to the gaps returned to their respective crews. Old crews were dissolved; new crews were formed. Because of these peculiar gaps in the inventories, eight crews were removed from the data sample: any main and alternate crew associated with AUICs 54049 and 54055; any pre-crew of 54053 and 20974; and any alternate crew of 04662 and 21034.

TABLE A-1

NRF AUICs FOUND ON THE QUARTERLY IEMFS
(SEPTEMBER 1985 THROUGH SEPTEMBER 1987)

NRF AUIC	Entry date	Crew type	NRF AUIC	Entry date	Crew type	NRF AUIC	Entry date	Crew type
02533	8306	M	07994	7207	M	20972	8701	PMA
02535	8609	PM	08146	7209	M	20973	8701	PM
02537	8609	PMA	08147	7207	M	20974	8711	P
04662	7605	MA	08150	7207	M	20975	8801	P
07957	7207	M	08157	7307	M	20976	8706	PM
07963	7408	M	08159	7307	M	20978	8801	P
07967	7407	M	20029	8012	MA	21028	8405	MA
07968	7210	MA	20030	8101	M	21033	8509	PMA
07969	7207	M	20069	8206	MA	21034	8401	MA
07970	7307	M	20074	8209	MA	21052	8801	P
07971	7207	M	20964	8509	M	54048	8706	PM
07972	7407	M	20965	8601	PM	54049	8207	MA
07976	7408	M	20966	8606	PMA	54053	8806	P
07979	7408	M	20967	8608	PM	54055	8206	MA
07985	7207	M	20968	8609	M	54056	8307	MA
07986	7408	M	20969	8408	MA	54067	8306	MA

Note: P stands for pre-crew; M, main crew; A, alternate crew.

TABLE A-2

SOME NRF CREW INVENTORIES BY QUARTER
BEFORE AND AFTER APPLYING THE IAP RULE

AUIC	Crew	Time	S85	D85	M86	J86	S86	D86	M87	J87	S87
02533	Main	Before	23	0	30	28	25	21	26	31	29
		After	23	18	30	28	26	22	28	32	29
20966	Pre-main	Before	62	57	62	57	54	0	61	50	47
		After	62	58	64	60	59	51	64	50	47
20967	Pre-main	Before	60	61	59	56	0	0	49	49	43
		After	60	65	61	63	0	43	52	53	46
20968	Pre-main	Before	61	61	51	1	1	0	51	45	44
		After	61	61	52	40	1	29	54	47	45
04662	Alternate	Before	52	51	0	14	28	19	39	40	39
		After	52	51	0	14	30	24	39	40	39
21034	Alternate	Before	49	54	52	0	0	0	51	52	55
		After	49	54	54	48	1	0	51	54	55

As described in the main text, cross-assigned (CA) personnel had lower continuation rates that were significantly different from the continuation rates of locally assigned personnel. In the final data sample, these individuals were also excluded. Cross-assigned personnel were not training at the reserve unit they were attached to, i.e., their TRUIC did not match their RUIC. However, individuals were assumed to be locally assigned if their RUICs or TRUICs were blank.

The IAP rule added more NRF personnel to December 1985 through September 1987. When calculating the final continuation rates from quarter to quarter, the "bad" crews and the CA personnel were excluded only from the starting inventories.

Some characteristics of the NRF personnel were merged in from other data sources. The Reserve Component Personnel Data System's (RCCPDS) transaction files from FY 1981 through FY 1986 were used to calculate the length of service (LOS) for the current enlistment. LOS was calculated for each quarter. The starting date of the current enlistment was the latest RCCPDS gain transaction found prior to the quarter. If no RCCPDS gain date was found, the IEMF files were used to obtain a date. By tracking the individual through previous snapshots, the first appearance of the individual was discovered. The date that someone was received by the unit they were attached to at this snapshot (DRCD) becomes the start date of the enlistment.

For people who left SELRES when they left their NRF units, the length of service in an NRF unit was calculated by subtracting the DRCD at the unit from the date of the first quarter that the person no longer appeared in the unit. For people who transferred to another SELRES unit when they left their NRF units, the NRF LOS was determined by the difference between the DRCDs at the two units. In doing this calculation, 77 out of the 672 transfers were found to have an LOS of zero. That is, in 77 cases, the DRCD at the new unit was the same as the DRCD at the NRF unit. The most likely cause of this was a failure to update the DRCD field after the transfer. If a person appeared in an NRF unit on one quarter's IEMF and in the subsequent quarter appeared in another unit, they must have transferred out of the NRF unit sometime during the three-month period. Therefore, their NRF unit LOS would be somewhere between zero and three months. These 77 people were thus assigned an LOS of 1.5 months.

There are several programs through which people enter SELRES: Navy Veteran (NAVET), Active Mariner (AM), Sea and Air Mariner (SAM), or Advanced Paygrade/Other Service Veteran (APG/OSVET). Because the IEMF does not identify original entry programs, they must be inferred by examining various fields, such as the following:

- A training category (TCAT) of F denotes SELRES performing initial period of active duty for training (ACTDUTRA), that is, SAMs.

- If total active service (TOTAS) is between 1 and 17 months, individuals are labeled SAMs provided their paygrades are less than 4; otherwise, they are APG/OSVETs.

- If TOTAS is between 18 and 42 months, the individual is an AM.

- If TOTAS is greater than 42 months, the individual is a NAVET.

- When the TOTAS is zero or unknown, other fields are examined. If individuals have a military obligation designator code (MOD) of C, which denotes a six-year obligation with a minimum of four months ACTDUTRA, they fall in the 1-to-17-month TOTAS category. If they have a MOD of B, which denotes a six-year obligation with two years of active duty, they are labeled AMs. For the other unknowns, a TOTAS is computed using the pay entry base date (PEBD) and the date released from active duty (LPAD) or the first SELRES appearance date; however, if someone possesses a military drill code (MDC) of 1, 2, or 8, they cannot be NAVETs since these codes are restricted to AMs and SAMs.

Recently, CNA received data from the RESULTS module of the Reserve Training Support System (RTSS), which is maintained by Commander, Naval Reserve Force (COMNAVRESFOR). RESULTS contains enlistment data for recruits between October 1982 and September 1986. Because the SAM data are incomplete on the RESULTS, CNA also received data from PRIDE-R, which tracks SAM recruiting and accessions.

For the NRF study, two program-of-entry variables were created. One variable uses the data from RESULTS and PRIDE-R only; however, 2,423 (or 35 percent) of the 6,900 people in the NRF data set do not appear in the RESULTS or PRIDE-R files. The other variable uses the RESULTS and PRIDE-R data, but for those 35 percent that cannot be identified, the method using the IEMF data is used. Table A-3 compares the entry program determined by the RESULTS and PRIDE-R files with the program determined by the IEMF algorithm. Of the 4,477 people found in the RESULTS and PRIDE-R files, 532 or 11.9 percent are misallocated by the IEMF algorithm. APG/OSVETs are most likely to be assigned the wrong entry program, with only 10.8 percent assigned correctly. Twenty-one percent of the people that the IEMF algorithm label as AMs are actually from some other entry program, mostly NAVETs.

TABLE A-3

ENTRY PROGRAM TOTALS

Program	RESULTS, PRIDE-R (percent)	IEMF algorithm (percent)
NAVET	1,524 (34)	2,470 (35.9)
AM	1,128 (25.2)	2,170 (31.5)
SAM	1,612 (36)	2,126 (30.8)
APG/OSVET	213 (4.8)	133 (1.9)
Total	4,477	6,899

COMPARISON OF PROGRAM OF ENTRY FROM RESULTS DATA AND IEMF ALGORITHM

	IEMF algorithm				
RESULTS	NAVET	AM	SAM	APG/OSVET	Total (percent)
NAVET	1,207	241	69	7	1,524 (34)
AM	23	1,096	8	1	1,128 (25.2)
SAM	0	10	1,598	4	1,612 (36)
APG/OSVET	106	40	44	23	213 (4.8)
Total	1,336	1,387	1,719	35	4,477
(percent)	(29.8)	(31)	(38.4)	(.8)	

APPENDIX B

CONTINUATION RATES FOR INDIVIDUAL SHIPS AND RATINGS

TABLE B-1

CONTINUATION RATES FOR INDIVIDUAL SHIPS

Class	Hull number	Name	Percentage of sample	Continuation rate
MSO	427	*Constant*	0.8	37.8
	433	*Engage*	0.8	46.8
	437	*Enhance*	1.0	64.7
	438	*Esteem*	0.9	71.9
	439	*Excel*	0.9	61.1
	440	*Exploit*	0.9	43.8
	441	*Exultant*	1.0	69.1
	442	*Fearless*	0.9	59.8
	446	*Fortify*	0.8	37.0
	449	*Impervious*	0.9	67.8
	455	*Implicit*	1.1	65.6
	456	*Inflict*	0.8	39.0
	464	*Pluck*	0.9	50.8
	488	*Conquest*	0.9	55.6
	489	*Gallant*	0.9	51.0
	492	*Pledge*	0.9	68.1
	509	*Adroit*	0.9	53.6
	511	*Affray*	1.0	73.8
FFG	7	*Perry*-main	2.6	63.0
		-alternate	3.0	42.0
	9	*Wadsworth*	2.8	58.5
	10	*Duncan*	2.7	69.7
	11	*Clark*	2.1	48.2
	12	*Philip*	2.3	44.7
	13	*Morison*	1.6	55.0
	14	*Sides*	2.1	54.3
	15	*Estocin*	1.9	50.1
	16	*Sprague*-main	2.6	72.3
		-alternate	2.3	60.0
	19	*Moore*	2.0	52.9
	20	*Antrim*	2.0	56.0
	23	*Puller*	1.6	39.7

TABLE B-1 (Continued)

Class	Hull number	Name	Percentage of sample	Continuation rate
FF	1053	*Roark*	2.8	66.7
	1061	*Patterson*-main	4.7	70.5
		-alternate	3.9	60.8
	1072	*Blakely*-main	2.4	52.0
		-alternate	4.4	48.2
	1091	*Miller*-main	4.7	66.0
		-alternate	4.4	71.0
	1096	*Valdez*-main	4.5	46.5
		-alternate	3.8	61.2
ARS	38	*Bolster*	1.0	63.7
DD	946	*Edson*	1.8	54.0
LST	1190	*Boulder*	4.2	71.9
LST	1191	*Racine*	4.0	61.4
Other	--	--	5.4	--

NOTE: Ships will appear in this table only if they were in the refined NRF sample and had at least one crew member in every quarter in the sample.

TABLE B-2

CONTINUATION RATES FOR INDIVIDUAL RATINGS

Rating	Percentage of sample	Continuation rate
BM	4.4	52.5
BT	1.3	49.0
EM	3.6	54.7
EN	5.5	54.9
ET	2.8	65.6
EW	2.2	64.0
FC	3.2	54.1
GM	3.5	60.7
HT	5.2	58.9
IC	1.4	65.9
MM	2.5	53.7
MS	5.0	58.6
OS	8.4	57.0
PC	0.7	65.4
PN	1.3	46.2
QM	3.3	59.5
RM	6.7	59.1
SH	1.5	56.0
SK	2.9	60.0
SM	2.7	59.1
ST	3.7	63.0
TM	0.9	52.9
YN	0.7	53.2
Unrated	24.5	57.9
Other	2.2	--

NOTE: Ratings appear in this table only if at least 0.5 percent of the people in the refined NRF inventories held rating.