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An Investigation of NEC Utilization

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This report investigates the extent to which trained enlisted personnel are assigned to jobs requiring their specific skills. The analysis quantitatively measures the utilization of "C" school training for a selected subset of Navy Enlisted Classifications (NECs). It addresses the variability of NEC utilization, reasons for NEC nonutilization, and utilization trends. The study found that utilization differed significantly across NECs with the variance attributable to a variety of reasons, including differences in sea/shore rotation, manning conditions, reporting errors, and interchangeability of skills at assignment. Utilization differed over time mostly in response to changes in equipment and the subsequent increase or decline in the demand for a given NEC.

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FOREWORD

This report was prepared as part of work unit WR 35107 ("C" School Planning) in response to a request by the Director, Program Resources Appraisal Division of the Navy Program Planning Office (OP-914). Despite consistently high retention of trained personnel, the increase in advanced training costs precipitated investigation of the management of Navy "C" school resources and of the utilization of enlisted personnel that graduate from "C" schools. This report describes the extent to which trained personnel are assigned to jobs requiring their specific skills.

Appreciation is expressed to the individuals working for the Deputy Chief of Naval Operations (Manpower, Personnel, & Training, OP-01) and to those in the Naval Military Personnel Command (NMPC) who provided assistance in interpreting study results and in reviewing preliminary reports.

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SUMMARY

This report describes an investigation of the extent to which personnel awarded Navy Enlisted Classifications (NECs) are assigned to positions that require those NECs ("utilization"), whether utilization differs among NECs, and whether the date of an NEC award is related to utilization.

NEC utilization was examined for a subset of NECs carefully selected to represent institutional variety. For example, NECs were chosen for different ratings, principal skill communities (e.g., nuclear-trained personnel), manning conditions, and training requirements. Initially, a measure of utilization, known as a utilization rate, was defined. Then, historical enlisted personnel data were processed to obtain a collection of descriptive utilization statistics. Finally, several rounds of data analysis supported by interviews with detailers were conducted to refine and interpret the statistics.

NEC utilization rates varied over time and across NECs. Rates varied over time mostly in response to changes in equipment (e.g., introduction of new equipment or phasing out of old equipment). Average utilization rates across NECs fall within the relatively broad range from 40 to 80 percent. But, significant numbers of NECs studied lay well outside this range. The variance in utilization among NECs was attributable to a variety of reasons, including differences in sea-shore rotation, manning conditions, reporting errors, and interchangeability of skills at assignment. No relationship between the average date of an NEC award (its "age") and an NEC's utilization was found.

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INTRODUCTION

The Navy spends over $600 million annually on advanced skill or "C" school training.[1] Successful completion of many of the courses results in the award of a Navy Enlisted Classification (NEC). Recently, several issues involving the management of "C" school resources and NEC-qualified personnel have surfaced. Among these issues is why "C" school training costs have increased despite consistently high retention of trained personnel.[2] A related issue focuses on the extent to which trained personnel are assigned to jobs requiring their specific skills.

In response to the latter issue, NPRDC has investigated the utilization of NECs. This report documents the investigation.

OVERVIEW OF THE INVESTIGATION

The investigation centered on a quantitative analysis of NEC utilization within a carefully selected subset of NECs. Initially, a measure of utilization, known as a utilization rate, was defined. Then, historical enlisted personnel data were processed to obtain a collection of descriptive utilization statistics. Finally, several rounds of data analysis supported by interviews with detailers were conducted to refine and interpret the statistics.

The NEC Subset

The Navy currently maintains over 1,000 NECs, although the exact number changes frequently. Any investigation that attempted to explore all or even a majority of NECs would be prohibitively expensive and time-consuming. The most reasonable alternative was to study a selected subset of NECs. A subset of 71 NECs was chosen by personnel representing OP-914, NPRDC, NMPC-4, and OP-135. (The NECs selected are listed in Appendix A.)

The subset is not a scientifically chosen sample intended to permit statistical inference. Instead, it was selected for its institutional variety. For example, the subset contains NECs belonging to different ratings (e.g., Electronics Technician and Machinist's Mate) and principal skill communities (e.g., divers and nuclear-trained personnel). Other selections represent NECs with large (e.g., OS 0317) and small (e.g., ST 0452) personnel inventories; still others represent varying manning conditions, for example, RM 2319 (undermanned) versus MS 3524 (overmanned). Some of the NECs are "parents" with one or more components or prerequisite NECs (e.g., ET 1420, ET 1422, ET 1425, and ET 1453 are components of ET 1428). Other NECs share some common skills and/or training and are

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[1] Center for Naval Analyses Memorandum (CNA) 85-0510, "Concept Paper on Advanced Skill Training", by Bruce Angier, 21 March 1985.

[2] A 5 July 1984 Vice Chief of Naval Operations (VCNO) Memorandum ("CNO Executive Board (CEB) Decision Memorandum on Education and Training") addresses issues raised in the 30 May 1984 CEB briefing on training. During the briefing, the Chief of Naval Operations (CNO) stated that "... the Navy must do a better job explaining why near-term training costs are not falling in light of better retention."

considered "related" NECs. For example, OS 0313, OS 0314, and OS 0317 are related NECs. Some NECs were chosen because they are earned strictly through classroom instruction; others, because they are earned through on-the-job training (e.g., RM 2319). NECs with expensive and/or lengthy training pipelines were also added (e.g., HM 8425, nuclear NECs). Some NECs represent under-utilized training pipelines (e.g., SK 2818) and overutilized courses (e.g., most ET NECs in the subset). Finally, some NECs were picked because their qualification is not indefinite, but expires and requires requalification (e.g., most nuclear NECs).

Table 1 summarizes the NEC subset by rating or community. In addition, the table shows the number of NECs from each rating in the subset relative to each rating's total complement of NECs. Finally, for additional perspective, the FY84 end fiscal year inventory for the subset is provided. Appendix B displays FY81-84 end fiscal year inventories for each NEC in the subset.

Table 1

Summary of NEC Utilization Subset
by Rating or NEC Community

Rating or Community	Abbreviation	Total NECs in Rating	NECs in Subset	FY84 End Year Inventory of Subset
Aviation Electronics Technician	AT	135	13	2409
Boiler Technician	BT	18	5	1388
Data Systems Technician	DS	14	1	69
Engineman	EN	27	1	104
Electronics Technician	ET	109	10	3394
Fire Control Technician	FT	72	5	144
Gas Turbine Technician	GS	7	2	507
Hospital Corpsmen	HM	37	3	1654
Hull Technician	HT	15	1	683
Machinist's Mate	MM	28	1	1772
Mess Management Specialist	MS	7	1	1338
Operations Specialist	OS	14	6	2928
Radioman	RM	36	5	3596
Storekeeper	SK	10	1	477
Sonar Technician	ST	44	6	421
Diver	Diver	17	3	1218
Nuclear	NUC	22	7	5301
Total		1037	71	27403

Defining NEC Utilization

The Navy does not officially measure NEC utilization. To investigate utilization then, utilization had to be defined. Although several alternative definitions were considered, the match between a member's skills (i.e., his or her NECs) and the skills required by the job was measured as follows.

Although an enlisted member can hold an indefinite number of NECs,[3] this study focused on the most recently awarded NEC only. While a member could be serving in a billet requiring a previously earned NEC, the study confirmed that a member is more likely to use the skill for which he or she was most recently trained.

Utilization occurs if a member is assigned to a billet requiring his or her most recently awarded NEC. In practice, this occurs if a member's latest NEC matches his onboard Distribution NEC, or DNEC. The DNEC indicates the specific skill(s) required by the billet the member is filling.[4]

To measure utilization, members with any of the 71 subset NECs were extracted from the enlisted master record (EMR) for end fiscal year 1981 through 1984. The extracted records were then processed to count the number of matches between members' most recent NECs and their DNECs.

To describe the extent of an NEC's utilization at the end of a fiscal year, a utilization rate was defined as follows:

$$\text{Utilization Rate}_{ij} = \frac{\Sigma \text{ Personnel w/NEC}_{ij} = \text{DNEC}_{ij}}{\Sigma \text{ Personnel w/NEC}_{ij}}$$

where
NEC = Most recently awarded NEC
DNEC = Distribution NEC
i = NECs in subset (1, 2, ... , 71)
j = Fiscal year (81 ... 84)

Figure 1 gives a simplified illustration of a utilization rate.

In the example, four Boiler Technicians hold NEC 4532 (Automatic Combustion Control Console Operator, Hagen) as their most recent NEC. Two sailors (Smith and Jones) are currently assigned to billets requiring 4532 (NEC = 4532 = DNEC). Two others (White and Black) are assigned to billets that do not (according to the definition) require 4532. Therefore, the Utilization Rate is 2/4 or 50 percent. Appendix C contains annual utilization rates by NEC for FY81-84.

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[3] While a member may hold an unlimited number of NECs, a maximum of eight are maintained on the service record and five on the Enlisted Master Record (EMR).

[4] The most recent NEC is determined from the date of NEC award associated with each NEC. A member's billet may require more than one NEC. To reflect this, the EMR has two DNEC fields. A match on either field was considered acceptable for utilization.

Member	Most Recent NEC	NEC = DNEC	NEC ≠ DNEC
BT1 Smith	4532	X	
BT1 Jones	4532	X	
BT1 White	4532		X
BT1 Black	4532		X
	4	2	2
	4532 Utilization Rate =	2/4 = 50%	

Figure 1. Computing an NEC utilization rate.

UTILIZATION RATES AND THEIR VARIABILITY

Brief observation of the utilization rates in Appendix C will reveal that the rates varied over time, but especially among NECs.

Table 2 displays weighted (by annual inventories) average utilization rates by NEC. The NECs are ordered from highest to lowest average rate. Accompanying each average rate is the standard deviation, a statistical measure of variance in the rates composing the average. The standard deviation serves as a useful indicator of the stability of the average. The larger the standard deviation, the more variable the historical data and the less useful the average. Many NECs in the subset had relatively small standard deviations, implying relatively constant utilization over the 4-year period. Several of the NECs with large standard deviations, such as FT 1106 and GS 4120, were NECs in transition. They are associated with new equipment. For reasons to be addressed, their utilization rates climbed steadily between FY81 and FY84.

At the outset of the investigation, the question was raised: Is there an expected or common utilization rate among NECs? The data summarized in Figure 2 suggests not.

The figure displays the distribution of the average utilization rates by discrete percentage ranges (e.g., 11 to 20%, 81 to 90%). The data indicate that the majority (51 of 71 NECs) of average utilization rates fall within the relatively broad range from 40 to 80 percent. But, significant numbers of NECs lie well outside this range in the high (greater than 80%) and low (less than 40%) bands. Statistically, the mean utilization rate of the entire subset is 63.4 percent, with a standard deviation of 21.5 percent.

Table 2

Average NEC Utilization Rate by NEC, FY81-84

Rating/NEC	Utilization Rate	Standard Deviation	Rating/NEC	Utilization Rate	Standard Deviation
HM 8452	.9183	.0058	DS 1615	.5477	.0905
NU 3383	.9088	.0234	OS 0319	.5322	.0877
NU 3385	.8993	.0167	AT 6653	.5259	.0313
NU 3351	.8886	.0086	AT 6605	.5248	.0344
NU 3353	.8663	.0074	OS 0312	.5196	.0430
ST 0452	.8547	.0278	AT 6609	.5135	.0379
HM 8425	.8205	.0199	ET 1422	.5128	.0275
NU 3363	.8044	.0724	AT 6673	.5084	.0333
ET 1572	.7926	.0458	AT 6611	.5070	.0350
DI 5342	.7816	.0704	OS 0317	.5049	.0311
ET 1588	.7806	.0298	AT 6683	.5036	.1392
NU 3355	.7788	.0457	OS 0318	.4795	.0484
NU 3393	.7787	.0261	FT 1107	.4750	.1130
GS 4121	.7678	.0768	MM 4294	.4737	.0314
ST 0457	.7658	.0497	AT 6659	.4673	.1925
ST 0434	.7566	.0324	ST 0492	.4667	.1010
ET 1428	.7533	.3257	AT 6607	.4588	.1025
RM 2318	.7458	.0250	ST 0482	.4500	.1010
HT 4955	.7380	.0104	FT 1115	.4474	.1952
HM 8451	.7317	.0868	FT 1114	.4366	.2427
RM 2346	.6911	.0158	AT 6606	.4330	.0263
ET 1453	.6877	.0595	AT 6663	.4286	.1111
RM 2313	.6788	.0056	ET 1425	.4216	.1967
ET 1436	.6678	.0558	BT 4503	.4126	.0354
DI 5343	.6584	.0423	ET 1420	.3844	.1884
AT 6652	.6547	.0472	GS 4120	.3786	.2080
RM 2319	.6471	.0510	MS 3524	.3697	.0586
ST 0435	.6333	.0619	OS 0313	.3284	.0328
EN 4398	.6215	.0391	SK 2818	.1963	.0148
ET 1438	.6190	.0676	BT 4532	.1877	.0335
RM 2342	.6077	.0201	BT 4512	.1789	.0372
AT 6612	.5918	.0373	BT 4533	.1537	.0212
FT 1106	.5663	.2934	ET 1437	.1329	.0231
FT 1108	.5581	.2292	BT 4531	.1026	.0284
OS 0314	.5500	.2023	DI 5345	.0525	.0212
			AT 6686	.0000	.0000

Note: Average computed by weighting each NEC's FY81-FY84 utilization rates by its FY81-FY84 end year inventories.

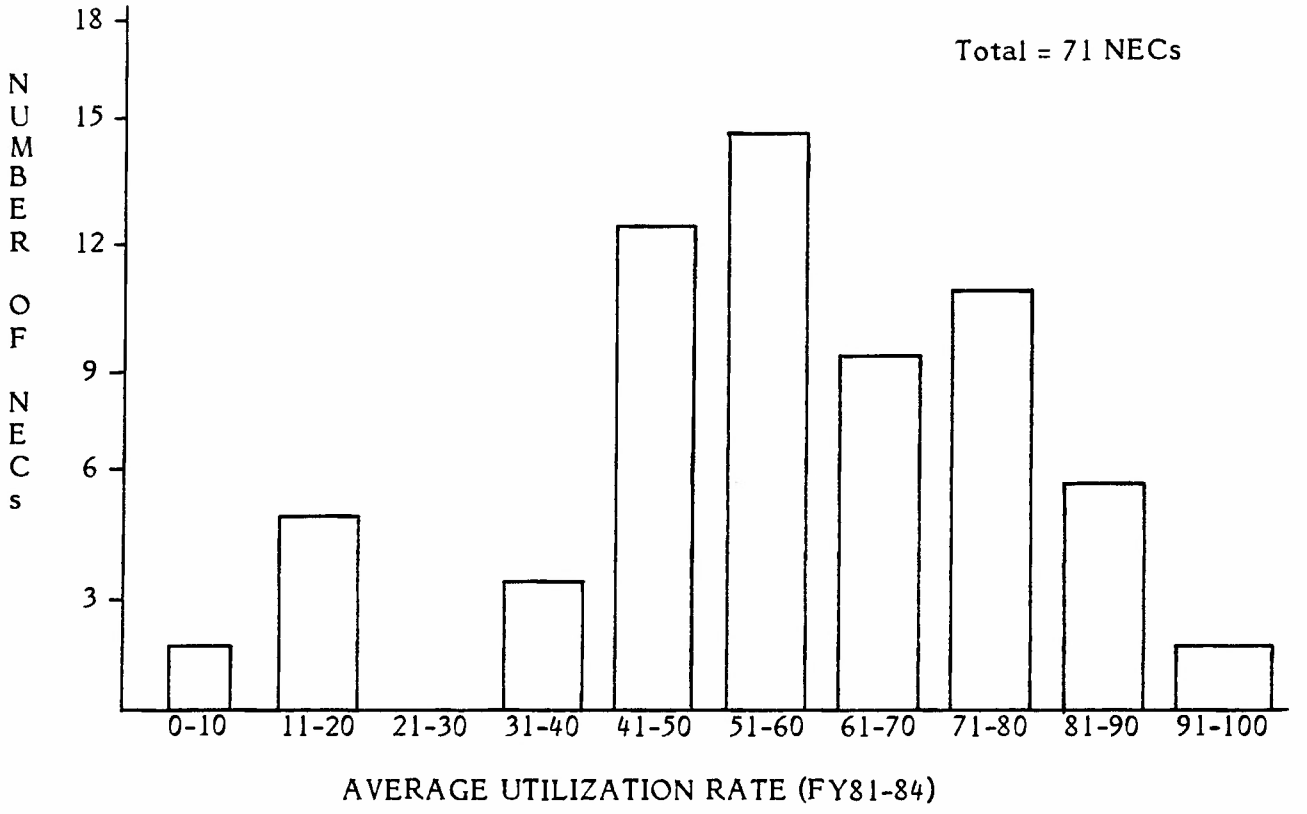


Figure 2. Variability in NEC utilization rates.

INTERPRETING UTILIZATION RATES

Across the subset, utilization rates ranged from less than 10 percent to greater than 90 percent. A significant portion of the investigation was devoted to understanding the variability in the utilization data. Interpreting the data required several iterations of data processing and analysis, each generating more questions and additional analyses and occasionally new issues to pursue. Interviews with assignment personnel also made an important contribution.

During this interpretation phase, utilization rates were examined from three perspectives: (1) why NECs are sometimes not used, (2) similarities in utilization rates within and across enlisted ratings or communities, and (3) the influence of age of NEC awards on utilization rates.

Measuring Non-Utilization

There can be many reasons that for a member's NEC is not used. They are categorized in "states" for the purposes of this study. The states in which a member not using his most recent NEC can reside are summarized in Figure 3. Some portion of each NEC population is expected to be in transit from one assignment to another, in training for another NEC, or in the hospital or detainee status. Collectively, transients, patients, separatees, and detainees (TPS&D) and students form the Individuals Account.

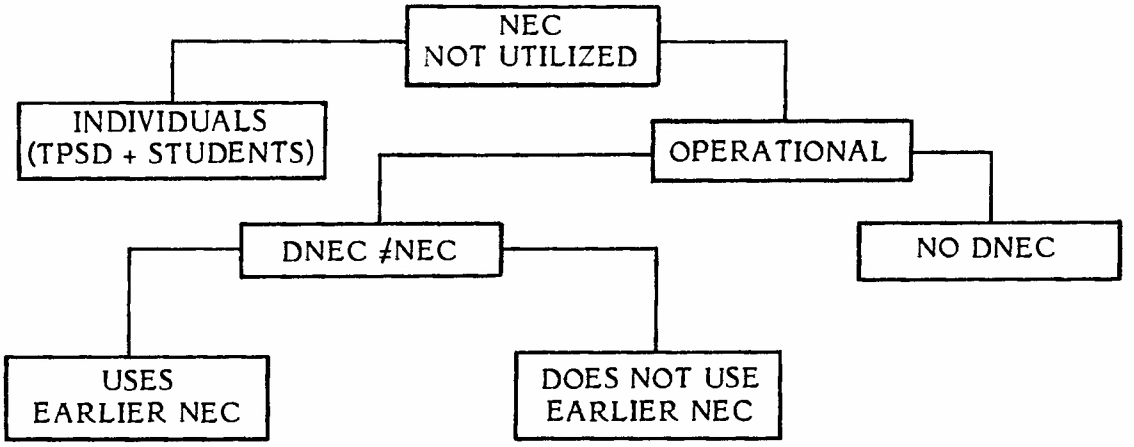


Figure 3. Interpreting NEC utilization.

In addition, members serving in operational billets may be (1) assigned to a billet requiring a previously awarded (not most recent) NEC (DNEC ≠ NEC **and** USES EARLIER NEC), (2) assigned to a billet with no NEC requirement (NO DNEC), or (3) assigned to a billet requiring an NEC the member does not have (DNEC ≠ NEC **and** DOES NOT USE EARLIER NEC).

Figure 4 shows the distribution of the FY84 total NEC subset among utilized and non-utilized states. The non-utilized population is divided among the individuals account (individuals, 7.6%), members whose assignments require no NEC (DNEC = 0; 17.0%), those who use a previous NEC (NEC = PREV; 2.2%), and those whose assignments require an NEC that the member does not have (DNEC ≠ NEC; 10.1%).

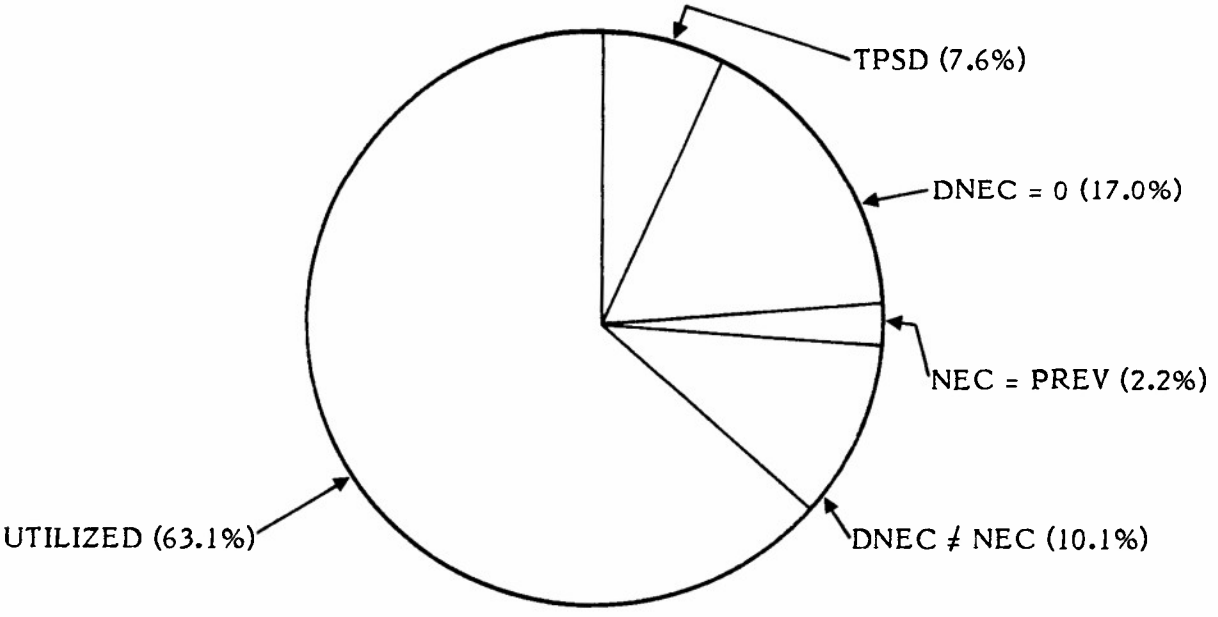


Figure 4. Distribution of FY84 NEC subset among utilization and non-utilization.

For each NEC in the subset, Appendix D displays the distribution of members at the end of FY84.

Just as utilization rates differ markedly across NECs, the composition of their non-utilized populations are also quite different. For example, Figure 5 contrasts the distribution of the nuclear community in the subset with that of the Operations Specialist (OS). A sizeable portion of the personnel with OS NECs in this sample were serving in billets with no NEC requirement (27.1%) contrasted to almost none (.05%) for the nuclear community. Even within a rating, distributions by NEC can be distinctly different.

Similar Utilization Trends

When utilization rates are grouped by rating or community, as in Figure 6, the values tend to cluster. Note, for example, AT, BT, ET, OS, and RM. Still, within a rating and especially across ratings, similar utilization rates mean little. The institutional reasons why an NEC achieved its rate are generally different from one NEC to the next. This section discusses similar rates: high utilization rates, low or declining rates, increasing rates, and average rates. To help interpret the utilization rates, interviews with detailers and/or rating assignment officers in each rating or community in the subset were conducted. (Appendix E lists the personnel interviewed.) Information from these interviews supplements the discussion in this section.

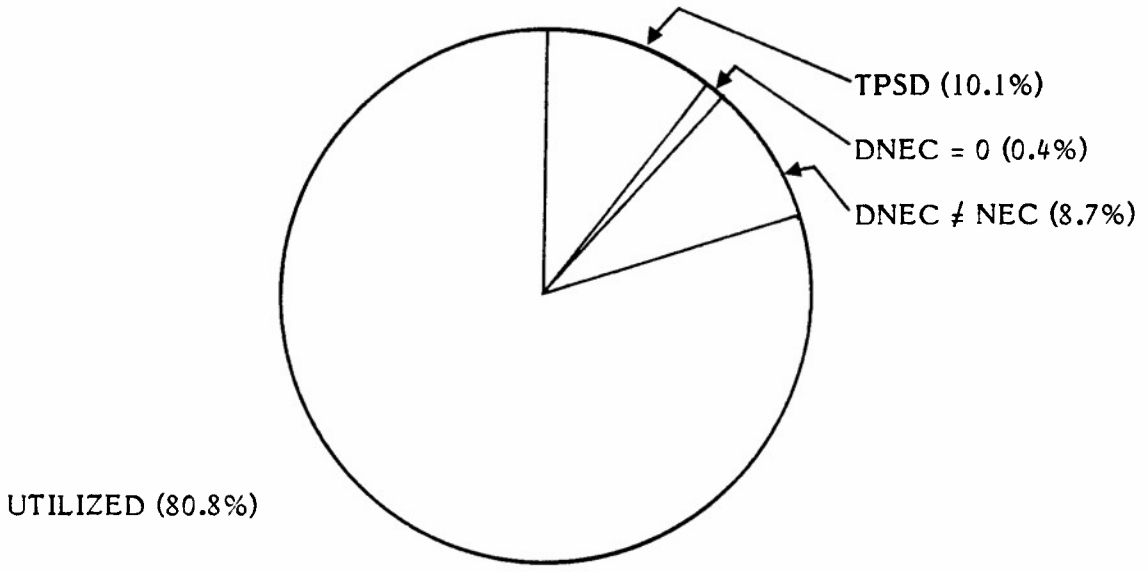
High Utilization Rates

Within the subset, the nuclear community NECs and Hospital Corpsman had the overall highest utilization rates. All seven nuclear NECs examined had utilization rates of 70 percent or better. Five of the seven had rates that exceeded 80 percent (see Figure 6). (Table 3 displays the FY81-84 end average utilization rates for the nuclear NECs and others discussed in this section.) But, nuclear NECs are unique. Not only is the training pipeline expensive and trained personnel carefully managed to achieve high utilization, but administrative procedures within the community ensure high utilization. Nuclear personnel hold an NEC--such as 3353, 3355, or 3363--only when they are assigned to a billet requiring those NECs. The billets are typically aboard ships or submarines with nuclear reactors. Later, when an individual is reassigned to a billet that does not require the NEC, the member receives, as his most recent NEC, a special purpose NEC of 3359 or 3389.

Should members subsequently be ordered to a billet again requiring a nuclear NEC, they are requalified by the Nuclear Enlisted Program Manager (OP-131C); and either the same or a new nuclear NEC becomes the most recent. This careful control of NECs guarantees high utilization rates for nuclear NECs.

Even among nuclear NECs, differences exist. NECs 3355 (Submarine Nuclear Propulsion Plant Operator--Mechanical) and 3393 (Surface Ship Nuclear Propulsion Plant Supervisor--Reactor Control) have the lowest utilization rates among the nuclear subset. A portion of individuals awarded 3355 remain at a prototype nuclear power plant as instructors. Their DNECs in those billets are not always 3355. Another group of 3355s typically continue training as Engineering Lab Technicians. To qualify for 3393, a member must first hold NEC 3383 and have the required on-the-job experience. Then, an individual's unit must submit a NAVPERS 1221/1 requesting the NEC be awarded. An assignment is made only after a review of the individual's record and approval by OP-131C. However, units often do not change an individual's DNEC when the new NEC is approved. To the extent this occurs, the computed utilization rate probably understates actual utilization.

NUCLEAR COMMUNITY



OPERATIONS SPECIALIST (OS)

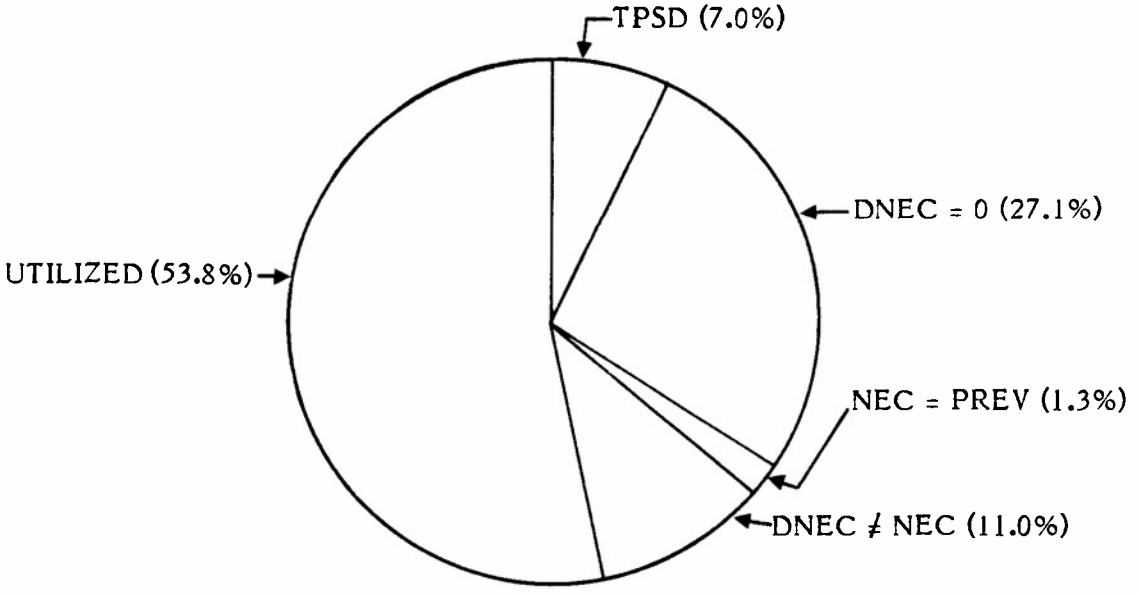


Figure 5. Distribution of nuclear community and Operations Specialist (OS) FY84 utilization and non-utilization.

Average Utilization Rates, FY81-84

Rating/Community	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
AT					6663 6659 6607 6606	6683 6673 6653 6612 6611 6609 6605	6652			
BT		4533 4532 4531 4512			4503					
DS						1615				
EN							4398			
ET		1437		1420	1425	1422	1453 1438 1436	1588 1572 1428		
FT					1115 1114 1107	1108 1106				
GS				4120				4121		
HM								8451	8425	8452
HT								4955		
MM					4294					
MS				3524						
OS				0313	0318	0319 0317 0314 0312				
RM							2346 2342 2319 2313	2318		
SK		2818								
ST					0492 0482		0435	0457 0434	0452	
DIVER	5345						5343	5342		
NUC								3393 3355	3385 3363 3353 3351	3383

Figure 6. Distribution of average NEC utilization rates by rating or community.

Table 3

FY81-84 Average Utilization Rates for Selected NECs

NEC	UTILIZATION RATE				
	FY81	FY82	FY83	FY84	AVERAGE
NU 3351	.87	.89	.90	.89	.89
NU 3353	.87	.88	.86	.86	.87
NU 3355	.84	.80	.75	.72	.78
NU 3633	.86	.83	.86	.68	.80
NU 3383	.91	.91	.94	.88	.91
NU 3385	.91	.90	.91	.87	.90
NU 3393	.77	.79	.81	.74	.78
HM 8425	.79	.83	.84	.83	.82
HM 8451	.83	.67	.62	.80	.73
HM 8452	.91	.91	.92	.93	.92
BT 4512	.23	.19	.18	.13	.18
BT 4531	.14	.09	.11	.06	.10
SK 2818	.22	.19	.20	.18	.20
GS 4120	.05	.21	.34	.62	.38
FT 1106	.00	.29	.55	.79	.57
FT 1107	.25	.42	.43	.57	.48
ET 1420	.07	.52	.40	.55	.38
ET 1422	.50	.49	.50	.56	.51
ET 1425	.13	.24	.47	.63	.42
ET 1453	.63	.63	.74	.76	.69
ET 1572	.71	.77	.83	.81	.79
MM 4294	.53	.45	.46	.45	.47
MS 3524	.27	.34	.41	.42	.37
OS 0312	.49	.47	.50	.58	.52
OS 0313	.38	.36	.32	.29	.33
OS 0314	.71	.67	.25	.33	.55
OS 0317	.50	.46	.50	.55	.50
OS 0318	.49	.44	.44	.56	.48
OS 0319	.57	.41	.48	.65	.53
DI 5342	.68	.75	.84	.86	.78
DI 5343	.73	.68	.64	.62	.66

Like the nuclear community, individuals within the HM community are detailed in a "closed loop." With few exceptions (e.g., HMs assigned duty as divers or with UDT/SEAL units), Hospital Corpsmen are allowed only one primary NEC. For example, an individual who has earned 8542, Advanced X-ray Technician, would not be subsequently trained as an 8425, Advanced Hospital Corpsman, without first removing the 8542 qualification. HM detailers run monthly checks to insure NEC-DNEC matches and to identify reasons for any non-matches. These rigid community management and detailing practices result in a high rate of utilization (see Table 3).

Low or Declining Utilization Rates

In contrast to the nuclear or Hospital Corpsman NECs, the Boiler Technician (BT), Storekeeper (SK), and Gas Turbine (GS) NECs provide good examples of low utilization. In the BT rating, nearly 95 percent of the "C" school quotas are filled by 6-year obligors (6YOs). According to the BT detailer, the 6YOs are often ordered to "C" school to fulfill their enlistment contract even if no specific assignment requisition exists for that skill. BT NEC 4512 (Automatic Combustion Control Maintenanceman) is affected by this practice (see Table 3). The result is an inventory in excess of authorized billets (according to the detailer) and, hence, reduced utilization.

Low utilization rates also occur when equipment is being phased out of the Fleet. BT NEC, 4531 (Automatic Combustion Control Console Operator, Bailey) had a relatively low average rate (10.26%) for this reason. Billets requiring 4531 were significantly reduced with the retirement of the DD 945, Hull-class destroyer, beginning in the early 1980s. Personnel holding this NEC are being assigned elsewhere or are undergoing training for a new skill.

Like 4531, the SK NEC, 2818 (Supply and Accounting Analyst, NSA class 207) is being discontinued. But, the utilization rate is probably low for another reason as well (see Table 3). Typically, about 50 percent of individuals earn this NEC through on-the-job training. Many individuals felt this NEC would be career-enhancing, so they had their units qualify them. Gradually, the population for the NEC grew to exceed requirements, contributing to lower utilization.

Increasing Utilization Rates

While the utilization of NECs being phased out is low and declining, rates for NECs associated with new equipment may be low for a time, then tend to increase dramatically. GS NEC 4120 (FFG-7 Class Gas Turbine Operator; see Figure 7 and Table 3) illustrates this trend. From FY81 through FY84, the 4120 utilization rate rose steadily from 5 to 62 percent. In the early years, personnel were being trained in anticipation of the arrival of the new FFG-7 class ships. With few units commissioned, opportunities for utilizing 4120 were limited. As more units joined the Fleet, utilization rose quickly. Two other NECs belonging to the FT rating showed a similar utilization pattern during this period. FT NECs 1106 and 1107 are both attached to the new AEGIS system. Their utilization rates are also shown in Figure 7.

Average Utilization

Figure 6 demonstrates that the average utilization rates of most NECs in the subset fell in the middle-range, between 40 and 80 percent. A number of NECs with utilization rates in the midrange may be at or near their maximum possible utilization. Like their counterparts with higher or lower utilization, numerous explanations account for the

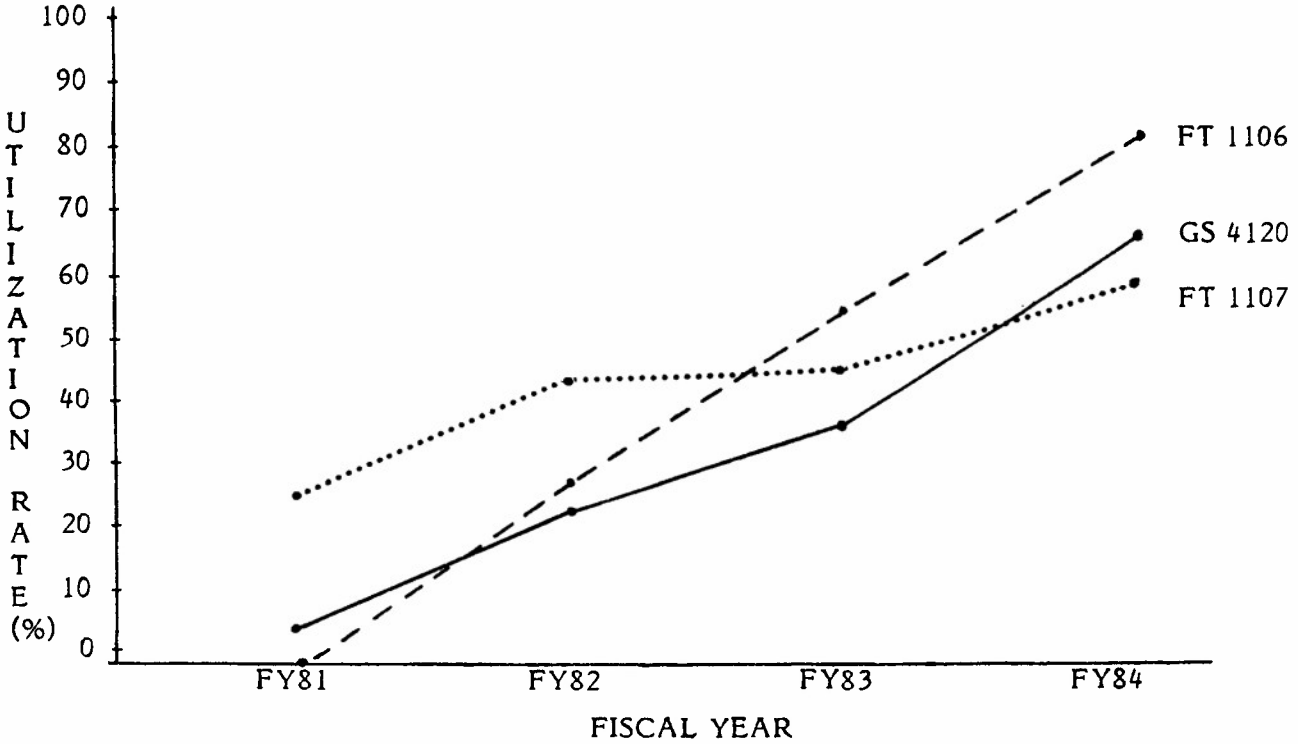


Figure 7. Growth in utilization of New NECs.

differences among the NECs in this range (as well as between NECs in this range and those outside).

1. Sea-Intensive NECs. These NECs, exemplified by the ETs in the subset, are usually attached to billets at sea. When an individual is rotated ashore, the likelihood of using his NEC is smaller. Figure 8 illustrates this effect for five of the ET NECs and for the ET subset as a whole. For example, in FY84, over 70 percent of personnel with ET NEC 1425 (Communications Equipment (WSC-3) Technician) serving in sea billets used their skill. Only 41 percent of the 1425s serving in shore billets used their NEC. The impact was an overall NEC utilization rate of 65 percent. In each case in the example, the sea utilization rate far exceeds the shore rate. The overall rate is reduced by the need to provide sea-shore rotation. Other ratings with a similar pattern are OS and FT. While further investigation is required, including an examination of each NEC's billet structure, the sea-intensive NECs may have a maximum possible utilization well below 100 percent. (The FY81-84 utilization rates for these NECs appear in Table 3.)

2. NECs with specific grade ranges. While personnel in paygrades E-3 to E-9 may hold an NEC, few members above E5 may be ordered to billets requiring the NEC. Instead, many of the senior members are assigned to supervisory billets (DNEC = 0). The MM NEC 4294 (Refrigeration and Air Conditioning Mechanic) is an example of this.

3. NECs with a high inventory-to-billet ratio. MM 4294 falls into this category as well. The FY84 end year inventory of personnel holding 4294 was three times the number of billets requiring the NEC. This excess permits the detailers to utilize another of an individual's skills in assignment and still cover 4294 requisitions.

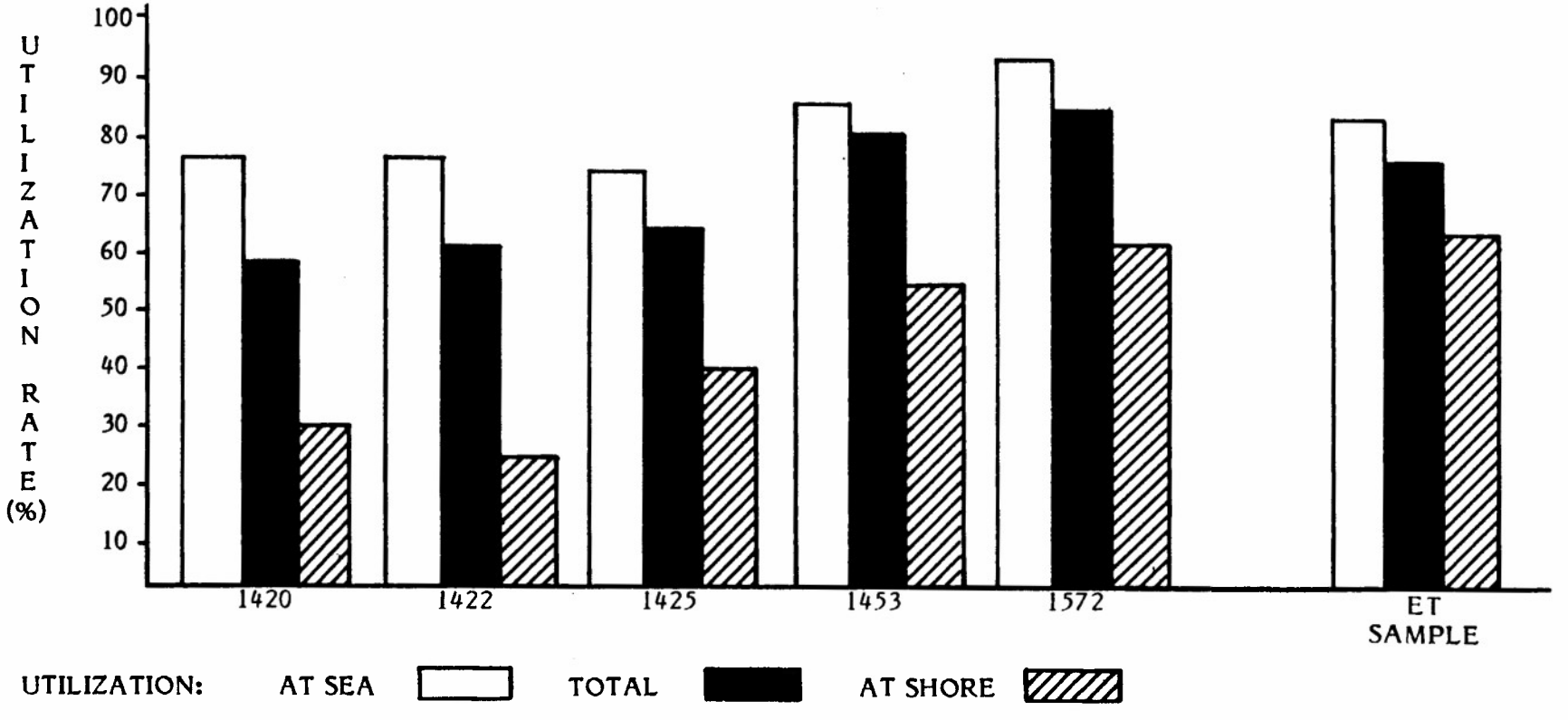


Figure 8. FY84 NEC utilization at sea and at shore (selected electronic technician NECs).

4. Errors in NEC reporting. About one-half of school quotas for MM 4294 are requested by individual activities and granted on a "returnable" basis. The unit is responsible for changing an individual's DNEC to match his newly awarded NEC, but when the unit fails to report the change, the utilization rate is reduced.

The MS 3524 (Bachelor Quarters (BQ) Management Specialist) rate also appears to be affected by reporting delays (see Table 3). With the increased emphasis on stability and quality of life, trained members are needed for BEQ management. Every shore command with enlisted barracks should have one or more billets requiring a 3524; however, many commands still have the billets coded as DNEC = 0000. Utilization may then be lower for two reasons: The miscoding may prevent an individual from being assigned to a billet which, in fact, requires the skill. Then, even if assigned, utilization will not be counted.

In addition to DNEC reporting errors, NEC awards are not always included in the Enlisted Master Record (EMR). When a student graduates from an NEC-producing "C" school, an NEC qualification is added to his service record and to the training command's Navy Integrated Training Resources and Administration System (NITRAS) database. These data are used to update the EMR information on NEC awards. NITRAS takes from 60 to 90 days to update the enlisted personnel records. In some cases, due to disconnects in the NITRAS/EMR update process, valid NEC awards can be rejected. The commanding officer (CO) at an individual's assigned duty station must report these omissions to the Navy Military Personnel Command (NMPC) before the NEC can be awarded. The CO must also act if an OJT NEC award is to be included in the EMR. Unfortunately, these awards may not be reported reliably. Finally, expired NECs are not always removed from personnel records. For example, air intercept controllers must requalify for their NECs every 6 months. Many commands neglect to have the NEC removed when members fail to requalify. All of these NEC reporting errors will reduce the computed utilization rate.

5. Interchangeable NECs. At first the NECs from the OS rating would appear to be counter-examples to the sea-shore rotation explanation offered for reduced utilization. (Their rates are shown in Table 3.) Even though OS billets are located predominantly at sea, over 70 percent of those personnel with OS NECs use their skills while at sea and while on shore duty. However, something else, a situation common to several other ratings, affects utilization: Similar NECs in this rating, for example 0312 (OJ-194 Console Operator) and 0317 (NTDS-Input/Utilization Display Equipment Operator) are used interchangeably for assignment when a major portion of the duties involve common experience or training. NECs 0313 and 0318, and 0314 and 0319 are also interchangeable, respectively. The interchangeability was not accounted for when deriving the OS utilization rates. The rates are likely to be artificially low, not reflecting true use of the skills.

6. Indirect use of NEC Training. The diver principal skill community provides an example of indirect use of training. Two of the community NECs, DI 5342 (Diver First Class) and DI 5343 (Diver Second Class) are closed-looped. With some exceptions, members receive assignments to billets requiring their newly acquired skills immediately upon graduation. The average utilization of 78.16 percent and 65.89 percent for 5342 and 5343, respectively, reflects this assignment strategy. However, some personnel receiving diver training may be EOD technicians, while others are UDT/SEALS. These individuals will likely be assigned another DNEC, such as 5326 (Combatant Swimmer) or 5332 (EOD Diver). Another group earning the diver NECs is Seabees. They typically continue training for underwater construction and are assigned to billets with a DNEC of 5932 (Basic Underwater Construction Technician). Each of these exceptions will not appear to be utilizing their NECs.

7. Other factors. According to detailers interviewed, several other factors may affect utilization:

-- Many NECs are prerequisites for other NECs. Individuals possessing a prerequisite NEC may be in "C" school earning another prerequisite or the parent NEC. In the subset, ET 1420 and 1422 are examples of prerequisite NECs. Appendix D displays the large Individual Account content of these two NECs.

-- Some NECs have long training pipelines. Often, individuals must be ordered to school without a requisition, simply in anticipation of a requirement. If a billet is not available upon graduation, the NEC may not be utilized immediately. ST 0452, with a 56-week school, is a good example.

-- Large numbers of women are now earning NECs. However, they are prevented by regulations from filling billets aboard combatant vessels. Ratings significantly affected include Personnelman (PN), Yeoman (YN), and Data Systems Technician (DS).

Age of an NEC

Does the average date of an NEC award relate to its utilization rate? Figure 9 suggests the hypothesis is probably false. The figure displays FY84 utilization rates for the 71 NECs, relative to their corresponding average age[5] of each NEC (as of September 1984). For the hypothesis to be verified, average age should have declined as the utilization rates rose. The broad scattering of average ages implies that many other reasons (such as the factors discussed earlier) contribute to utilization.

CONCLUSIONS AND RECOMMENDATIONS

The investigation supports the following conclusion: NECs in the subset have a variety of utilization rates attributable to a variety of explanations. While no sweeping conclusions about NEC utilization can be drawn, some trends or commonalities were identified.

Since a better understanding of utilization may improve both the development and execution of "C" school plans, extension of this initial investigation is warranted and recommended. In addition to utilization refinement tasks, an examination of the relationship between utilization and "C" school requirements would be necessary. Currently, NEC utilization plays no role in the construction of "C" school requirements. Nevertheless, it seems intuitive that utilization matters and should be considered. Identifying and measuring the contribution utilization rates make to "C" school requirements and, then, incorporating the findings in the planning process will require a careful and significant research effort.

Tasks necessary to improve the Navy's understanding of NEC utilization are described as follows.

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[5] For each NEC, average age was derived by subtracting the date of NEC award from 30 September 1984 for each individual utilizing the NEC at the end of FY84. The ages were then averaged over this utilizing population.

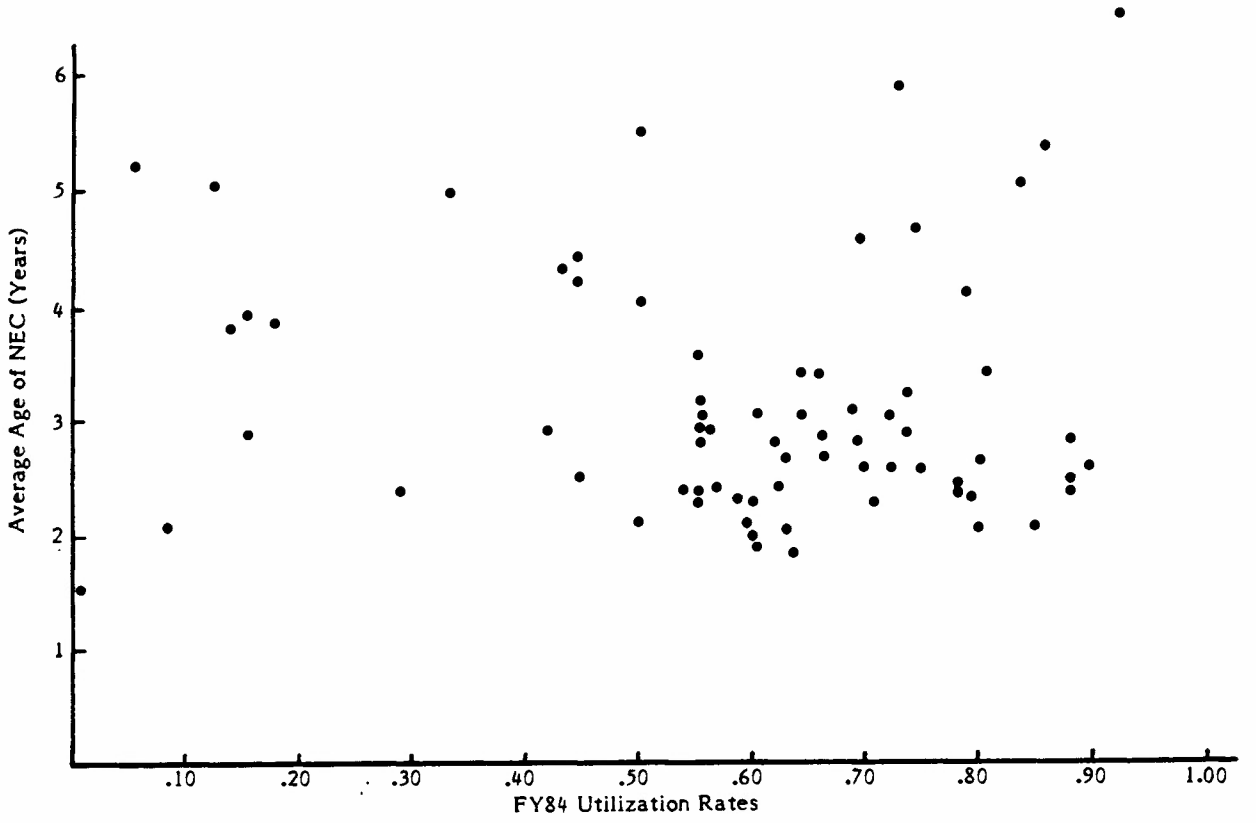

Figure 9. FY84 NEC utilization rates versus average age of the NEC.

1. Examine the Relationship Between NEC Manning Levels and Utilization

The EMR reflects only those personnel assigned to billets requiring a specific NEC. It does not indicate an NECs total authorized billets. To derive NEC manning conditions (inventory vs. authorized strength), the billet file would need to be processed and then compared to inventory counts already derived. A careful comparison should be made of (1) the number of personnel assigned to an NEC, (2) the number of personnel with the NEC (the inventory), and (3) the number of billets requiring the NEC. Then, the hypothesis that utilization rates are higher among undermanned NECs, and vice versa, could be tested. In addition, a comparison among billets, trained inventory, and NEC utilization would provide valuable feedback to "C" school planners.

2. Re-evaluate NEC Utilization Based on Detailer Remarks

During interviews, several detailers argued that the rate defined by the investigation probably represented minimum utilization. For example, this paper describes the effect of sea-shore rotation on the utilization of sea-intensive NECs. Other modifications to the utilizations measure should also be examined. First, many NECs are used interchangeably in assignment. Recall the OS 0312/0317 example. If utilization were redefined to include matches of an NEC with an interchangeable set of DNECs accuracy of the utilization measure would likely increase and the amount of the increase could be identified. Five ratings and 24 NECs in the subset are affected by interchangeable assignments.

Second, the utilization of NECs belonging to the FT, OS, and BT ratings is thought to be affected by mandatory advanced skill training of their 6YOs. A useful analysis would identify the 6YOs, separate them from the non-6YOs, and measure the relative utilization of each group.

3. Track the Utilization of a Cohort of Individuals

In the investigation, utilization was measured at discrete end-year points. This approach precludes a number of important utilization measures. First, "snap-shot" counts of utilization miss those personnel who have already used their most recent NEC and are now elsewhere. Instead, it would be useful to track the utilization of a cohort of individuals awarded an NEC in a given year.

By tracking individuals longitudinally, more qualifiers of utilization could be derived, including (1) the average time to utilization, or time between award of NEC and its use, (2) the average time in man-months that an NEC is utilized, and (3) the frequency with which an NEC is reutilized. Figure 10 shows how these measures could be estimated. Also, the average number of times an individual with a given NEC is trained could be computed.

Each of these tasks require a longitudinal (as opposed to "snap-shot") database. To derive any statistically meaningful conclusions, the file would need to track multiple cohorts over a significant historical period, say 10 years. Several Navy enlisted longitudinal files exist at NPRDC and CNA. The two at NPRDC are inadequate either because they lack the data fields necessary to monitor NEC award and utilization or because they have insufficient historical data. The CNA file should be examined thoroughly. If that file is also inadequate, a decision to build an acceptable longitudinal file must be made.

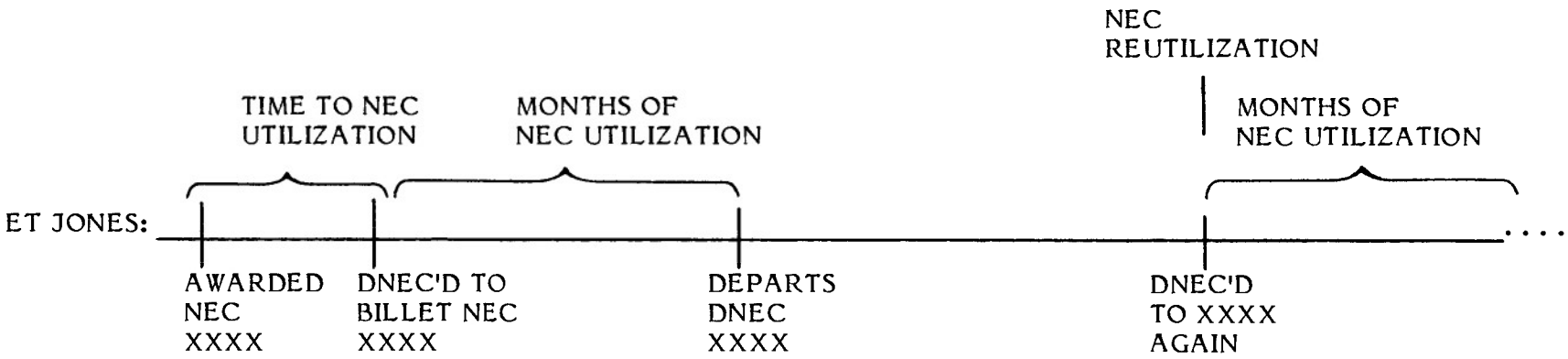

Figure 10. Measuring NEC utilization from a longitudinal file.

APPENDIX A

Subset of NECs Used in Utilization Investigation

NEC	Title
OS 0312	OJ-194 Console Operator
OS 0313	Air Intercept Controller
OS 0314	Supervisor Air Intercept Controller
OS 0317	NTDS-Input/Utilization Display Equipment Operator
OS 0318	NTDS Air Intercept Controller
OS 0319	Supervisory NTDS Air Intercept Controller
ST 0434	Underwater Fire Control MK 114 ASROC Technician
ST 0435	Underwater Fire Control MK 114 MOD 9/Terrier/ASROC Technician
ST 0452	Surface Sonar (SQS-26BX) (EDO) Technician
ST 0457	Surface Sonar (SQS-53) Technician
ST 0482	Surface Sonar/ASW Fire Control System MK 114/ASROC Technician
ST 0492	Surface Sonar/ASW Fire Control System MK 114 MOD 9 Terrier/ASROC (SQS-26BX) Technician
FT 1106	AEGIS Fire Control System MK 99/Operation Readiness Test System MK 1 Technician
FT 1107	AEGIS Radar System (SPY-1A) Technician
FT 1108	AEGIS Weapon System MK-7 Technician
FT 1114	AEGIS Combat System Computer System Maintenance Technician
FT 1115	AEGIS Combat System Display Maintenance Technician
ET 1420	Communications Equipment (URT-23 (V)) Technician
ET 1422	Communications Equipment (UCC-1) Technician
ET 1425	Communications Equipment (WSC-3) Technician
ET 1428	FFG-7 Class Communications Electronics Subsystem Technician
ET 1436	Communication Security Devices Equipment (KG-14, KW-37R) Technician
ET 1437	Communication Security Devices Equipment (KW-37R) Technician
ET 1438	Communication Security Devices Equipment (KW-7) Technician
ET 1453	FLTSATCOM (NAVMACS (V) 2) Shipboard Maintenance Technician
ET 1572	AIMS System Technician
ET 1588	Electronics Standards Specialist
DS 1615	Shipboard Tactical Data Systems Technician
RM 2313	Communications Systems Manager
RM 2318	Communications System Technical Control Operator
RM 2319	Communications System Technical Control Supervisor
RM 2342	Teletype Repairman (MOD 28, UGC-6 and UCS-20)
RM 2346	Low-Level Keying Teletype Repairman
SK 2818	Supply and Accounting (NSA Class 207) Analyst
*NU 3351	Submarine Nuclear Propulsion Plant Operator - Welder
*NU 3353	Submarine Nuclear Propulsion Plant Operator - Reactor Control
*NU 3355	Submarine Nuclear Propulsion Plant Operator - Mechanical
*NU 3363	Submarine Nuclear Propulsion Plant Supervisor - Reactor Control

*DI = diver
NU = nuclear (primary skill communities)

NEC	Title
*NU 3383	Surface Ship Nuclear Propulsion Plant Operator - Reactor Control
*NU 3385	Surface Ship Nuclear Propulsion Plant Operator - Mechanical
*NU 3393	Surface Ship Nuclear Propulsion Plant Supervisor - Reactor Control
MS 3524	Bachelor Quarters (BQ) Management Specialist
GS 4120	FFG-7 Class Gas Turbine Operator
GS 4121	FFG-7 Class Gas Turbine Mechanical Maintenance Technician
MM 4294	Refrigeration and Air Conditioning Mechanic
EN 4398	DD-963 Auxiliary Systems Technician
BT 4503	Main Propulsion Steam Generating Plant Inspector
BT 4512	Automatic Combustion Control (Hagen) Maintenanceman
BT 4531	Automatic Combustion Control Console Operator (Bailey)
BT 4532	Automatic Combustion Control Console Operator (Hagen)
BT 4533	Automatic Combustion Control Console Operator (General)
HT 4955	Nonnuclear Welder
*DI 5342	Diver First Class
*DI 5343	Diver Second Class
*DI 5345	Scuba Diver
AT 6605	Aircraft Radar Altimeter Equipment IMA Technician
AT 6606	Aircraft Doppler Radar Navigation IMA Technician
AT 6607	Digital Data Link Communications IMA Technician
AT 6609	Aircraft Electronic Identification (IFF) IMA Technician
AT 6611	Aircraft UHF Communications, Automatic Direction Finder (ADF), and Intercommunications Systems (ICS) Equipment IMA Technician
AT 6612	Aircraft TACAN/Radio Navigation Equipment IMA Technician
AT 6652	VAST (USM-247(V)) Operator
AT 6653	VAST (USM-247(V)) On-Line Maintenance Technician
AT 6659	VAST (USM-247(V)) Test Program Set Analyst
AT 6663	VAST (USM-247(V)) Off-line Maintenance Calibration
AT 6673	Field Calibration Activity Technician (Electrical/Electronic)
AT 6683	USM-429 CAT IIID Operator
AT 6686	USM-429 CAT IIID Maintenance Technician
HM 8425	Advanced Hospital Corpsman
HM 8451	Basic X-ray Technician
HM 8452	Advanced X-ray Technician

*DI = diver
NU = nuclear (primary skill communities)

APPENDIX B

FY81-84 NEC End Year Inventories

RATING/NEC	NEC INVENTORIES FY81	FY82	FY83	FY84
AT 6605	162	175	181	187
AT 6606	137	112	129	167
AT 6607	73	80	85	102
AT 6609	212	230	231	252
AT 6611	388	368	366	369
AT 6612	252	255	262	260
AT 6652	249	310	320	343
AT 6653	132	106	97	89
AT 6659	34	46	70	64
AT 6663	33	39	46	50
AT 6673	289	314	369	403
AT 6683	33	52	81	114
AT 6686	1	1	6	9
BT 4503	144	142	136	133
BT 4512	280	310	346	327
BT 4531	72	57	80	64
BT 4532	232	257	378	380
BT 4533	347	351	445	484
*DI 5342	329	320	336	279
*DI 5343	339	316	445	630
*DI 5345	304	350	351	309
DS 1615	67	71	76	69
EN 4398	24	51	72	104
ET 1420	168	97	197	230
ET 1422	181	205	204	231
ET 1425	126	242	236	321
ET 1428	2	14	63	71
ET 1436	396	340	372	310
ET 1437	155	134	96	89
ET 1438	509	510	518	505
ET 1453	278	235	243	256
ET 1572	204	251	389	511
ET 1588	590	649	781	870
FT 1106	4	17	29	33
FT 1107	8	24	37	51
FT 1108	8	8	12	15
FT 1114	1	18	25	27
FT 1115	1	5	14	18
GS 4120	92	179	191	275
GS 4121	65	109	184	232

*DI = diver
NU = nuclear (primary skill communities)

RATING/NEC	NEC INVENTORIES FY81	FY82	FY83	FY84
HM 8425	933	951	923	947
HM 8451	183	186	224	268
HM 8452	552	515	478	439
HT 4955	656	656	623	683
MM 4294	1694	1768	1679	1772
MS 3524	869	1035	1140	1338
*NU 3351	270	300	287	256
*NU 3353	959	1050	1110	1128
*NU 3355	1624	1728	1748	1698
*NU 3363	319	383	361	389
*NU 3383	468	470	486	582
*NU 3385	1023	1054	1092	1179
*NU 3393	53	63	68	69
OS 0312	271	340	351	493
OS 0313	152	180	195	277
OS 0314	7	6	4	3
OS 0317	1439	1626	1690	1835
OS 0318	222	259	262	210
OS 0319	51	75	106	110
RM 2313	1065	1034	1007	1072
RM 2318	738	757	809	871
RM 2319	197	184	206	181
RM 2342	802	792	817	793
RM 2346	532	605	690	679
SK 2818	459	456	447	477
ST 0434	222	211	213	221
ST 0435	7	7	7	9
ST 0452	47	48	41	36
ST 0457	174	155	174	146
ST 0482	6	5	5	4
ST 0492	5	3	2	5
TOTAL	22917	24351	25744	27403

*DI = diver
NU = nuclear (primary skill communities)

APPENDIX C

Utilization Rates by NEC by Fiscal Year

RATING/NEC	UTILIZATION RATE FY81	FY82	FY83	FY84
AT 6605	.4691	.5200	.5414	.5615
AT 6606	.4015	.4107	.4651	.4491
AT 6607	.3836	.3375	.4588	.6078
AT 6609	.4528	.5043	.5368	.5516
AT 6611	.4691	.4783	.5301	.5528
AT 6612	.5357	.5804	.6336	.6154
AT 6652	.6787	.6387	.5875	.7143
AT 6653	.5758	.5000	.5052	.5056
AT 6659	.1471	.3261	.5714	.6250
AT 6663	.3333	.2821	.4783	.5600
AT 6673	.4740	.4713	.5203	.5509
AT 6683	.2727	.3462	.5679	.5965
AT 6686	.0000	.0000	.0000	.0000
BT 4503	.3611	.4014	.4485	.4436
BT 4512	.2286	.1935	.1763	.1254
BT 4531	.1389	.0877	.1125	.0625
BT 4532	.2457	.1673	.1931	.1605
BT 4533	.1239	.1595	.1820	.1446
*DI 5342	.6839	.7531	.8393	.8602
*DI 5343	.7316	.6804	.6360	.6238
*DI 5345	.0329	.0314	.0655	.0809
DS 1615	.6269	.6479	.4868	.4348
EN 4398	.5833	.5882	.6806	.6058
ET 1420	.0714	.5155	.3959	.5478
ET 1422	.4972	.4927	.4951	.5584
ET 1425	.1270	.2438	.4746	.6324
ET 1428	.0000	.7143	.7619	.7746
ET 1436	.6061	.6235	.7285	.7226
ET 1437	.1355	.1269	.1042	.1685
ET 1438	.5422	.5667	.6583	.7089
ET 1453	.6331	.6255	.7366	.7578
ET 1572	.7108	.7689	.8329	.8063
ET 1588	.7847	.7304	.7836	.8126
FT 1106	.0000	.2941	.5517	.7879
FT 1107	.2500	.4167	.4324	.5686
FT 1108	.1250	.6250	.6667	.6667
FT 1114	.0000	.1667	.4400	.6296
FT 1115	.0000	.4000	.4286	.5000
GS 4120	.0543	.2123	.3403	.6218
GS 4121	.7077	.6697	.7174	.8707

*DI = diver
NU = nuclear (primary skill communities)

RATING/NEC	UTILIZATION RATE FY81	FY82	FY83	FY84
HM 8425	.7867	.8254	.8364	.8332
HM 8451	.8306	.6720	.6205	.7985
HM 8452	.9112	.9204	.9163	.9271
HT 4955	.7317	.7256	.7528	.7423
MM 4294	.5283	.4525	.4610	.4549
MS 3524	.2739	.3420	.4061	.4223
*NU 3351	.8741	.8900	.8955	.8945
*NU 3353	.8697	.8771	.8613	.8582
*NU 3355	.8411	.8038	.7489	.7244
*NU 3363	.8589	.8329	.8560	.6838
*NU 3383	.9124	.9106	.9424	.8763
*NU 3385	.9101	.9032	.9148	.8719
*NU 3393	.7736	.7937	.8088	.7391
OS 0312	.4908	.4676	.5043	.5822
OS 0313	.3750	.3556	.3231	.2888
OS 0314	.7143	.6667	.2500	.3333
OS 0317	.4976	.4637	.5006	.5510
OS 0318	.4865	.4440	.4427	.5619
OS 0319	.5686	.4133	.4811	.6455
RM 2313	.6704	.6847	.6773	.6828
RM 2318	.7249	.7186	.7515	.7819
RM 2319	.5888	.6467	.6311	.7293
RM 2342	.5898	.5985	.6010	.6419
RM 2346	.6917	.6942	.7116	.6672
SK 2818	.2179	.1886	.2013	.1782
ST 0434	.8063	.7630	.7230	.7330
ST 0435	.7143	.5714	.5714	.6667
ST 0452	.8723	.8750	.8537	.8056
ST 0457	.7989	.8129	.7586	.6849
ST 0482	.3333	.6000	.4000	.5000
ST 0492	.4000	.3333	.5000	.6000
TOTAL	.6140	.6018	.6207	.6312

*DI = diver
NU = nuclear (primary skill communities)

APPENDIX D

FY84 NEC Utilization or Non-Utilization

RATING/NEC	FY84 DISTRIBUTION % TPSD	% DNEC=0	% USING PREV NEC	% DNEC ≠ NEC	% UTILIZED
AT 6605	.0802	.1604	.0481	.1497	.5615
AT 6606	.0479	.2275	.0778	.1976	.4491
AT 6607	.0294	.1275	.1471	.0882	.6078
AT 6609	.0437	.2103	.0556	.1389	.5516
AT 6611	.0678	.1545	.0542	.1707	.5528
AT 6612	.0577	.1423	.0385	.1462	.6154
AT 6652	.0466	.0700	.0029	.1662	.7143
AT 6653	.0449	.1685	.0787	.2022	.5056
AT 6659	.0313	.0156	.0469	.2813	.6250
AT 6663	.1000	.0400	.1000	.2000	.5600
AT 6673	.0645	.2357	.0521	.0968	.5509
AT 6683	.0877	.1228	.0351	.1579	.5965
AT 6686	.1111	.2222	.1111	.5556	.0000
BT 4503	.0301	.3684	.0526	.1053	.4436
BT 4512	.0703	.5321	.1468	.1254	.1254
BT 4531	.0781	.7344	.0313	.0938	.0625
BT 4532	.0947	.6289	.0079	.1079	.1605
BT 4533	.0888	.6777	.0062	.0826	.1446
*DI 5342	.0681	.0036	.0000	.0681	.8602
*DI 5343	.2222	.0286	.0048	.1206	.6238
*DI 5345	.1748	.2201	.1262	.3981	.0809
DS 1615	.0290	.1159	.0000	.4203	.4348
EN 4398	.0288	.3173	.0288	.0192	.6058
ET 1420	.1174	.1000	.1217	.1130	.5478
ET 1422	.1169	.0996	.0952	.1299	.5584
ET 1425	.0966	.0779	.0748	.1184	.6324
ET 1428	.0282	.0141	.0423	.1408	.7746
ET 1436	.0548	.1258	.0129	.0839	.7226
ET 1437	.4607	.1011	.0225	.2472	.1685
ET 1438	.0772	.0812	.0238	.1089	.7089
ET 1453	.0742	.0781	.0391	.0508	.7578
ET 1572	.0802	.0646	.0078	.0411	.8063
ET 1588	.0471	.0954	.0069	.0379	.8126
FT 1106	.0606	.0909	.0000	.0606	.7879
FT 1107	.1765	.1373	.0392	.0784	.5686
FT 1108	.0667	.1333	.0667	.0667	.6667
FT 1114	.1111	.1111	.0000	.1481	.6296
FT 1115	.0556	.3333	.0000	.1111	.5000

*DI = diver
NU = nuclear (primary skill communities)

RATING/NEC	FY84 DISTRIBUTION % TPSD	% DNEC=0	% USING PREV NEC	% DNEC ≠ NEC	% UTILIZED
GS 4120	.2036	.0473	.0000	.1273	.6218
GS 4121	.0560	.0603	.0000	.0129	.8707
HM 8425	.0560	.0422	.0000	.0686	.8332
HM 8451	.0970	.0037	.0000	.1007	.7985
HM 8452	.0296	.0296	.0023	.0114	.9271
HT 4955	.0776	.0425	.0000	.1376	.7423
MM 4294	.0468	.4041	.0243	.0700	.4549
MS 3524	.0239	.4238	.0000	.1300	.4223
*NU 3351	.0625	.0039	.0000	.0391	.8945
*NU 3353	.0878	.0053	.0000	.0488	.8582
*NU 3355	.1620	.0047	.0000	.1090	.7244
*NU 3363	.0540	.0000	.0000	.2622	.6838
*NU 3383	.0739	.0069	.0000	.0430	.8763
*NU 3385	.0687	.0025	.0000	.0568	.8719
*NU 3393	.0435	.0000	.0000	.2174	.7391
OS 0312	.0953	.2353	.0162	.0710	.5822
OS 0313	.0505	.3646	.0939	.2022	.2888
OS 0314	.0000	.0000	.0000	.6667	.3333
OS 0317	.0725	.2959	.0027	.0779	.5510
OS 0318	.0476	.1333	.0000	.2571	.5619
OS 0319	.0182	.0545	.0000	.2818	.6455
RM 2313	.0709	.1362	.0401	.0700	.6828
RM 2318	.0230	.1045	.0425	.0482	.7819
RM 2319	.0331	.0608	.0552	.1215	.7293
RM 2342	.0719	.1488	.0391	.0984	.6419
RM 2346	.0427	.0854	.0633	.1487	.6672
SK 2818	.0252	.7212	.0000	.0755	.1782
ST 0434	.0905	.0498	.0045	.1222	.7330
ST 0435	.1111	.0000	.0000	.2222	.6667
ST 0452	.0556	.0000	.0000	.1389	.8056
ST 0457	.1575	.0616	.0000	.0959	.6849
ST 0482	.0000	.0000	.0000	.5000	.5000
ST 0492	.0000	.0000	.0000	.4000	.6000

*DI = diver
NU = nuclear (primary skill communities)

APPENDIX E

Personnel Interviewed

RATING/COMMUNITY	INDIVIDUAL INTERVIEWED	ORGANIZATION
AT	LT T. Vecchiolla	NMPC-404C
BT	BTCM Frykman	NMPC-402C2
	BTC Ward	NMPC-402C24
DS	DSCS O'Brien	NMPC-406D
EN	ENCM Burcroff	NMPC-402D4
ET	LT Jaszkowski	NMPC-406D
	ETCS Walker	NMPC-406D
FT	FTCM(SW) Jackson	NMPC-406D
GS	GSCM Danforth	NMPC-402D5
HM	HMCS Chernak	NMPC-407C
MM	ENCM Burcroff	NMPC-402D4
MS	MSCM Espinosa	NMPC-405D
OS	OSCM Fischer	NMPC-406C
RM	LT Jaszkowski	NMPC-405D
SK	SK1 Walsh	NMPC-405D
ST	STCM Reed	NMPC-406C
DIVER	HTCM Coneen	NMPC-401DB
NUCLEAR	MM1 Lowe	NMPC-403C7
	YNC(SS) Frigo	NMPC-403C4

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