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SPENDING TO SAVE: MODELING THE CLOSURE OF NAS MOFFETT FIELD

by

Neal J. Nelson

June 1989

Thesis Co-Advisors: Kenneth J. Euske
Lawrence R. Jones

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Spending to Save:
Modeling the Closure of NAS Moffett Field

by

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Submitted in partial fulfillment of the
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The closure and realignment of surplus military installations represents one method of saving defense dollars. This thesis examines the development of a cost model to define major cost categories and project an estimated payback period for closure and realignment. Costs of base closure, unit relocation, and subsequent return to full mission capability are estimated. Naval Air Station Moffett Field, California, is used as a case study. Data were compiled using local information sources. A comparison between the methodology developed in this study and the cost estimation model used by the Defense Secretary's Commission on Base Realignment and Closure is provided. Conclusions on base closure management issues and directions for future research are listed in the final chapter.

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I. INTRODUCTION

A. GENERAL BACKGROUND

During the last decade, peacetime defense spending has experienced significant growth. Shifting from a policy of Soviet-American detente in the 1970s, expanded military commitments began late in the Carter Administration [Ref. 1:p. 304]. Authors Posen and Van Evera suggest that throughout President Reagan's first term, an even larger strategic shift was in progress: namely, a change from the post-World War II defensive strategy of Soviet containment to one featuring more offensive American missions and tactics [Ref. 1:p. 102]. Citing a weak U.S. military faced with growing Russian dominance, President Reagan and Congress embarked on a military spending program unparalleled since the Korean War. Major programs included the Strategic Defense Initiative, a 600 ship Navy, increased protection of Persian Gulf oil and development of a stealth fighter and stealth bomber. Between 1981 and 1985 American defense spending grew from $199 billion to $264 billion (constant 1986 dollars), a 32 percent growth rate in real terms. In 1980 defense spending constituted 5.2 percent of the GNP; by 1985, it had become 6.6 percent of the GNP [Ref. 1:p. 75].

From the outset, the President vigorously pursued a policy of supply-side economics. Dubbed "Reaganomics," the policy was founded upon a four-pronged approach of tax reduction, tight money, a reduced rate of government spending and regulatory reform. In the beginning of his first term, the President and his advisors projected that the federal budget deficit inherited from the Carter Administration would slowly recede from $60 billion into obscurity by Fiscal Year (FY) 1984. Instead the opposite occurred. In FY 82 the deficit reached $110 billion and by FY 85 it had soared to $211 billion.

In 1986 Congressional leaders realized that growth in defense spending was contributing significantly to the mushrooming Federal budget deficit. While not responsible for the burgeoning national deficit, defense spending was perceived by some members of Congress as a major contributing factor and was subsequently targeted for increased efficiency and budget reduction. One Congressional cost-cutting measure was the enactment of Senate Bill S.2749 which mandated the closure or realignment of excess military installations.

The spending pendulum has swung from a period of intense buildup to one of steady-state or reduction. Against this backdrop of fiscal reduction, money saving through base closures has become a reality. In December of 1988, the Commission on Base Realignment and Closure proposed a list

of 145 bases deemed suitable for closure or realignment. Subsequently, the list was approved by the Secretary of Defense and Congress. From these actions, it was clear that the Reagan-era defense buildup was over and a new period of leaner defense budgets would predominate for the foreseeable future.

B. OBJECTIVE

The closure or realignment of unnecessary military installations mandated by Congress is a means of saving millions of defense dollars. The focus of this thesis is to develop a cost model to define major closure and realignment cost categories and to project an estimated payback period. Illustrative cost figures are provided using NAS Moffett Field as a case study.

C. THE RESEARCH QUESTION

The primary research question is: What are the savings and costs associated with the closure of a military installation? Subsidiary research questions are:

* What are the costs of relocating military activities to their new bases?
* Once relocated, what are the costs of restoring those activities to full mission capability?
* What is the estimated length of time before dollar savings begin?

D. SCOPE, LIMITATIONS AND ASSUMPTIONS

The main thrust of this study is to examine the total savings and costs associated with shutting down a Navy facility, using NAS Moffett Field as a case example. The author used the following categories as a logical starting point for exploration and development of potential cost categories:

* Administrative planning and preparation.
* Building and facility preservation.
* Equipment removal and relocation.
* PCS transfer of military personnel.
* Aircraft flyoff.
* Relocation of aircrew trainers.
* Civilian workforce dispersion.
* Cleanup of leftover toxic and waste materials.
* Residual security measures.

Cost figures relating to P-3 squadrons were taken from a 1988 Patrol Wing (PATWING) study. The following activities were not included in this study:

* NAS Moffett Field tenant activities.
* NASA Ames Research Center.
* California Air National Guard.

E. METHODOLOGY

This thesis is a case study. The primary data for analysis were collected from a 1988 relocation study performed by Commander Patrol Wings, U.S. Pacific Fleet at

the request of COMNAVAIRPAC. Additional data were obtained from budget, comptroller and public works personnel at NAS Moffett Field, and through other archival research. Data were obtained from the Commission on Base Realignment and Closure and the Office of the Secretary of Defense on base closure savings and cost estimates. Telephone and personal interviews were conducted addressing the research question and related issues.

F. ORGANIZATION OF THE STUDY

This thesis is divided into six chapters, beginning with this introduction. Chapter II deals with the annual costs of base operation. Chapter III addresses the considerations of closing a base and preparing it for use by other military and civilian agencies. Chapter IV traces the expenses of relocating personnel and equipment to another operating base. Start-up costs at the new base, including additional administrative requirements, aircraft and aircrew training facilities are examined. Chapter V describes the cost model used by the Commission on Base Realignment and Closure. Chapter VI summarizes the findings, draws cost comparisons, and offers projected savings. Conclusions and areas for further study follow.

II. THE COSTS OF ANNUAL OPERATION

A. GENERAL BASE DESCRIPTION

A brief look at the 56 year history of NAS Moffett Field is useful to establish the importance of this military installation today. Located south of San Francisco, NAS Moffett Field has served a variety of unique and important missions. Originally constructed as a dirigible base, today it has grown to become the largest maritime patrol base in the world.

In the post-World War I era, the United States and Germany were both pioneering the development and use of lighter-than-air craft. The U.S. Navy began with several small airships before building two much larger versions, the USS Akron and USS Macon. Unique bases were needed to meet their particular support requirements. The Akron was to be based at NAS Lakehurst, New Jersey. USS Macon, her sister ship, needed an operating base on the west coast. After much investigation, the government acquired 1000 acres of farmland in the Santa Clara valley for $476,165.90. In 1931 the land was deeded to the U.S. Navy. Buildings and facilities were constructed over the next two years at a cost of just under $5 million.

The new facility was commissioned NAS Sunnyvale in 1933. Arriving six months later, USS Macon set about her primary

duties conducting patrol and scouting missions. The era of rigid dirigibles lasted a scant 16 months, ending with Macon's crash at sea in February of 1935. With the loss of its only west coast dirigible, the Navy no longer needed the base. For the next seven years the base was used as an Army Air Corps training facility. In 1942 the Navy reacquired the base, using it once again as a training and support base for blimp operations.

Following the termination of blimp operations in 1947, NAS Moffett Field transitioned into the era of fixed wing flight operations. First came transport squadrons, later jet fighters of Korean War vintage. In 1962, NAS Lemoore was constructed in central California and jet aircraft operations were consolidated there. With the departure of the jets, NAS Moffett Field once again became a maritime patrol base. The latest aircraft to use the facility is the four-engined P-3 Orion. In 1964 NAS Moffett Field became Pacific Fleet Headquarters for all west coast long-range, land-based anti-submarine warfare operations, including training, administration and operations. Patrol areas exceed 93 million square miles of ocean.

Today, NAS Moffett Field is a bustling base of over 5000 active duty Navy personnel. Over 68,000 takeoffs and landings per year are flown from the airfield. In addition to supporting Pacific Fleet anti-submarine warfare operations, the runways serve the research and development

needs of NASA's Ames Research Center, as well as the logistical airlift requirements of nearby Lockheed Aerospace and Onizuka Air Force Base.

B. FISCAL YEAR OPERATING BUDGET

The purpose of this subsection is to describe the various funding inputs which make up the yearly costs for a representative military installation. NAS Moffett Field was chosen as a model; however, the discussion is sufficiently broad to retain applicability to other naval bases. Major funding categories, their sources and control are discussed before arriving at an average yearly cost figure. A separate discussion of funding categories is necessary because of the differences in origination and accountability. For clarity this discussion addresses monies by appropriation category rather than by individual project. A representative annual cost estimate will be developed which smoothes the fluctuations which frequently occur during the year.

The Comptroller is the Commanding Officer's primary fiscal management officer. The Public Works Officer administers a subordinate cost center. Together, they oversee the majority of the NAS Moffett Field yearly budget. Two major appropriations categories are controlled and administered by the station comptroller: Operations and Maintenance, Navy and Other Procurement, Navy. The Public Works Officer administers large and small funding sources

which pertain to a multitude of areas. His largest areas of responsibility include Maintenance of Real Property, Special Projects, Military Construction and Family Housing.

The largest appropriation the NAS Moffett Field Comptroller manages is Operations and Maintenance, Navy (O&MN). This provides for the daily expenses of running the air station. Under the cognizance of Commander Naval Air Forces Pacific, O&MN funding is further subdivided into Station Operating Funds, Aircraft Organizational Maintenance Funds and Aircraft Intermediate Maintenance Funds. Expenses covered by O&MN funds include:

* Civilian personnel labor costs (a large percentage of any station budget).
* Travel (official business, non-PCS).
* Utilities.
* Consumable material or equipment which is not subject to centralized management and which costs less than $15,000.
* Maintenance, repair or overhaul of investment items costing more than $15,000.
* Contract or commercial services whether received from civilian or government agencies.
* Rental payments on leased equipment.

Consumable materials procured under O&MN funds include:

* Repair parts, including those which cannot be repaired.
* Spare parts which may be repaired but are not centrally managed and are not designated as repairable.
* Food and clothing (which is not procured through a military pay appropriation), petroleum, oil and lubricants.

* Furniture and room decorations.
* PATWING aircraft maintenance.[1]
* Other consumable supplies and materials. [Ref. 2:pp. 2-2--2-3]

Table 1 shows how Fiscal Year 1988 NAS Moffett Field O&MN dollars were spent, broken down into categories of material, labor and travel [Ref. 3].

The second and smaller appropriation administered by the Comptroller is Other Procurement, Navy (OPN). This funding is expressly designated for the purchase of investment material or equipment. Such material has a life in excess of two years, costs more than $15,000 and is not considered consumable. Authorization is required at the COMNAVAIRPAC level or higher for each NAS Moffett Field OPN purchase. One use of OPN funding is the purchase of Class III Plant Property. Class III is Non-Industrial Plant Equipment and meets the following criteria:

* Has [a] unit cost of $5000 or more.
* Has an expected normal useful life of two years or more.
* Does not, by nature of its installation or utilization, form an integral part of a Plant Property Class II item and not part of another equipment item. [Ref. 4:p. D-44]

OPN funding may also be used to purchase Class IV Plant Property in excess of $15,000. Class IV Plant Property

---

[1]PATWING maintenance funding is specially designated for support of repairable equipment belonging to the resident P-3 squadrons. This money is shown in Table 1 as OFC.

TABLE 1

FY 1988 O&MN EXPENDITURES
($)

	AUTH LABOR	AUTH MATERIAL	AUTH TRAVEL
ADMIN	$ 870,000	$ 628,100	$10,800
CIVPERS	723,625	11,800	2,100
CO RESERVE	119,375	326,600	27,400
NASA CREDIT	0	(41,000)	0
COMPT DEPT	670,000	1,892,500	4,700
CO VP-31	0	18,600	0
ATSS	0	13,000	0
NAMTRADET	0	1,900	0
COMPT FRINGE	0	0	0
EMERG TRAVEL	0	0	3,700
CROW'S OPS	150,000	109,900	2,500
AIR OPS	800,000	123,000	17,100
SECURITY	75,000	61,500	800
PA ADMIN	2,400,000	885,300	7,400
PW TRANS	0	263,300	0
PW UTILITIES	0	2,112,600	0
PW TELEPHONE	0	433,000	0
PW LABOR ADJ	0	0	0
AIMD	510,000	30,200	14,000
REC SVCS	140,000	149,000	0
SUPPLY	2,730,000	965,200	8,500
WEAPONS	25,000	6,500	$ 2,000
TOTAL OPS	$9,213,000	$7,991,000	$101,000
PW MRP	$2,013,000	$1,558,000	$0
CROW'S MRP	64,000	62,000	0
CO RESERVE MRP	0	0	0
MRP LABOR ADJ	0	0	0
TOTAL MRP	$ 2,077,000	$1,620,000	$0
TOTAL O&MN	11,290,000	$9,611,000	$101,000
AIMD	$0	$2,000	$0
CPWP	0	4,000	0
C-12 OPS	0	51,000	0
C-12 AIMD	0	0	0
OFC 50	0	10,296,000	0
AVDLRS	$ 0	16,572,000	$0
TOTAL OFC	$ 0	$26,925,000	$0
GRAND TOTAL	$11,290,000	$36,536,000	$101,000

includes heavy machine tools such as welders, milling machines and foundry equipment. It is separately managed by the Defense Industrial Plant Equipment Center. Additionally, OPN is used to purchase other types of station equipment. Examples include office equipment, automatic data processing equipment, and food preparation equipment used in the station galley.

A third major appropriation is Military Personnel, Navy (MPN) funding, which is used to pay the approximately 5062 active duty U.S. Navy personnel attached to NAS Moffett Field. Military pay is managed and administered through an independent chain of command by the office of the Chief of Naval Operations. While MPN is not part of a station's budget, military personnel represent a significant cost in running any installation.

Reimbursable work constitutes a sizable input to the Comptroller's yearly operating funds. Reimbursable work is that work done by one agency for, and at the request of, another agency. Limited base O&MN funding requires that expenditures for such work be recouped from the requesting party. NAS Moffett Field performs reimbursable work for such groups as government agencies, private parties and Morale, Welfare and Recreation [Ref. 2:p. 7-1].

The station Publics Works Officer (PWO), although a subordinate cost center under the Comptroller, is the second major station fiscal administrator. The PWO administers

funding categories which include O&MN, Maintenance of Real Property (MRP), Special Projects, Military Construction (MILCON) and Family Housing, Navy.

O&MN money pays for such base services as utilities, transportation and janitorial contracts. Maintenance of Real Property funding is received annually as a subset of O&MN funding. Its use is restricted to the maintenance and upkeep of existing station buildings and grounds, and it cannot be used to make up shortfalls in other funding categories. Regardless of fluctuations in the rest of the station budget, Congress mandates that the government's investment in each military installation will be preserved and maintained.

Special Projects is the title for a broad range of repair or construction projects. Annually the PWO conducts an inspection of all the facilities of the air station. He documents those items (runways, streets, buildings, etc.) in need of repair and enters them on an Annual Inspection Summary. The cost and complexity of each project determines how it is funded and from whom approval is required. Projects classified as minor construction cost between $100,000 and $200,000; Repair Projects range from $200,000 to $3,000,000. Projects in excess of $500,000 but less than $1,000,000 require the approval of the Assistant Secretary of Defense for Shipbuilding and Logistics and Congressional notification. [Ref. 5:p. C-2]

Military Construction (MILCON) is the third fund the PWO administers. MILCON, handled separately by the PWO in his simultaneous capacity as Resident Officer in Charge of construction, refers to major construction projects which exceed $200,000 in cost [Ref. 5:p. C-3]. In contrast to MRP, MILCON funding is approved by Congress on a case by case basis. As fiscal constraints and national priorities shift, so does approval for MILCON projects; hence MILCON funding may be large one year and non-existent the next. New construction becomes an expense in the base's operating budget after it has been completed--only then does the installation pay for its utilities and maintenance.

Family Housing, Navy (FHN) is a separate fund used to provide fire protection, security, management, repair and upkeep of family housing units whether located on or off base.

C. ENVIRONMENTAL AWARENESS

The 1980s have ushered in a new age of concern for the environment. Decades of environmental ignorance have been replaced by the burgeoning awareness of a fragile planet. Although it may be difficult to conceive of toxic waste cleanup as an operating expense, it certainly is a consequential expense springing from years of indiscriminate waste disposal. Under impetus of federal and state laws and pressure from a concerned citizenry, the issue of toxic waste cleanup has captured the nation's attention. The

challenges are to: (1) map the extent of existing problems, (2) cleanup past pollutants, while (3) not allowing current waste production to compound an already serious situation.

Military installations are comparable to small industrial cities. Built to include self-sustaining capabilities, bases provide many of the same services found in any city. In varying sizes, they are composed of office buildings, residential areas, schools, grocery stores, drug stores, service stations, medical facilities, water wells and treatment plants, steam generation plants and sewage disposal operations. These facilities frequently support an airfield, seaport, or training facility. The pollutants and toxic waste present are similar to many 30 to 50 year old industrial complexes.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, otherwise known as Superfund legislation, is the law which provides regulations and guidelines regarding hazardous waste. Cleanup funding comes primarily from O&MN monies and the Defense Environmental Restoration Account (DERA). Additionally, certain projects may be categorized as Special Projects or MILCON projects depending on cost. NAS Moffett Field's formal environmental management program began in July 1988. Prior to that time, figures for the various expense categories were not separated from other station operating costs. In order to quantify past expenditures and project future expenses, the

NAS Moffett Field Environmental Division Director reconstructed the costs shown in Table 2. Based on those figures, projected FY 90 O&MN costs were developed as depicted in Table 3. Future O&MN budget requests are expected to increase as waste handling systems become more complex [Ref. 6].

TABLE 2

RECONSTRUCTED FY 87/88 ENVIRONMENTAL EXPENSES
($000)

Environmental Programs Mgt (O&MN)	
Manpower	$234.2
Operating expenses	156.0
Facility units	50.0
Permits	0.8
Litigation	1.0
Hazardous waste disposal	830.0
Training	8.5
Public Works contracts/other	170.0
Safety and indirect expenses	612.0
Solid waste disposal	408.0
Waste water treatment	$ 406.0
Total	$2,876.5
Installation and Restoration (DERA)	
Investigation and study	$5,900.0
Manpower	30.8
Permits	5.0
Litigation	13.8
Cleanup	20.0
Training	$ 2.5
Total	$5,972.1
GRAND TOTAL	$8,848.5

TABLE 3

PROJECTED FY 90 ENVIRONMENTAL EXPENSES
($000)

Contract services and permits	$390.0
Material and Supplies	67.0
Equipment	48.0
Travel and training	13.0
Labor	$200.0
TOTAL	$718.0

NAS Moffett Field is currently in the third of seven federally mandated cleanup phases. To date, one million dollars have been spent and another $5.9 million has been obligated toward characterizing the extent of toxic waste problem. Actual cleanup will not begin until the extent of the problem has been ascertained and cleanup goals have been agreed upon by federal, state and local officials. Cleanup cost estimates are difficult to project but could run as high as $100 million dollars. [Ref. 7] Due to the problematic magnitude of such costs, they have not been included in this analysis.

D. NON-APPROPRIATED MONETARY INFLOWS

Some station activities, such as the Navy Exchange and Welfare and Recreation Services, receive a mixture of appropriated and non-appropriated funding. Limited monies come from the station budget; however, a much larger portion of their operating funds come from the revenues generated at the sales counter. If NAS Moffett Field were to be

disestablished, these monies are not necessarily saved but would be available for redistribution elsewhere within the Navy. Movement of any facilities would affect these services as surely as the mission oriented commands.

E. TENANT COMMANDS

Tenant commands are those commands which are located aboard military complexes but which are controlled through separate chains of command. Medical, dental, weather and Naval Investigative Service offices are found on most naval installations. Among others, NAS Moffett Field also hosts the NASA Ames Research Center as well as tenants who provide telecommunications, aircraft maintenance and repair and combat search and rescue.

F. FIVE YEAR COST AVERAGE

Table 4 shows the NAS Moffett Field cost figures for Fiscal Year 1985 through Fiscal Year 1989 in each of the previously identified appropriations categories. A five year average is calculated to provide a representative yearly operating cost.

TABLE 4

NAS MOFFETT FIELD AVERAGE YEARLY OPERATING COSTS
($000,000)

	FY85	FY86	FY87	FY88	FY89
OPS	$16.700	$16.600	$15.700	$17.300	$17.100
OPN	.124	.069	.145	.057	.075
MPN	7.667	7.987	8.319	8.666	9.027
MRP	4.300	4.000	3.700	3.700	4.000
SP PROJ	1.000	2.000	.500	2.200	1.400
MILCON	0.000	0.000	0.000	0.000	0.000
FHN	1.900	2.400	2.300	2.400	2.400
LESS REIMB	4.400	5.000	6.300	6.700	7.000
TOTAL	$27.291	$28.056	$24.364	$27.623	$27.002
FIVE YEAR AVERAGE:	$26.867				

III. BASE CLOSURE COSTS

A. OVERVIEW

Closure costs vary because each military installation is unique. NAS Moffett Field was chosen as a model in order to develop a representative range of figures; however, it is only one example of base closure and realignment. Closure of each installation must be evaluated after weighing its own merits. In the following study, cost savings were considered true savings if they were eliminated from the Department of Defense budget. A cost transfer from the Navy to another military service is not a genuine savings for it represents an expenditure of taxpayer dollars from the overall defense budget. Dollar savings will not necessarily equate to smaller defense expenditures. Rather, appropriated funds may be spent more efficiently elsewhere as a consequence of realignment. This chapter begins with an examination of the methodology used by the Defense Secretary's Commission on Base Realignment and Closure. The remaining discussion explores major components which contribute to the ultimate cost of base closure. The final summary table shows a range of estimated closure costs pertaining to NAS Moffett Field.

B. BASE CLOSURE COMMISSION CONSIDERATIONS AND CRITERIA

Chartered by Secretary of Defense Carlucci and acting under public law, the 1988 Commission on Base Realignment and Closure proposed closing or realigning 145 military installations.

The Commission on Base Realignment and Closure, hereafter referred to as the Commission, used a two stage approach. Phase I ranked the military worth of more than 2300 installations using 21 mission-related attributes. A list of candidate bases was compiled from those complexes judged least able to meet mission requirements. Phase II then examined potential costs and savings of the candidate complexes. The method used by the Commission to estimate costs incorporated the following considerations:

* Cost factors unique to each of the three military services.
* Local cost factors.
* Construction.
* Personnel retirement, severance and relocation.
* Equipment transportation.
* Land purchases.
* Cost avoidances.
* Environmental mitigation.
* Housing allowances.
* Salary changes.
* Changes in base support and mission-related costs.

Specifically excluded from consideration were social program costs, such as food stamps, welfare and unemployment compensation. An additional noteworthy exclusion was the cost of hazardous waste cleanup. The Commission stated, "the cost of hazardous-waste cleanup was not included, since such cleanup is currently required by law regardless of the base-closure situation." [Ref. 8:p. 17]

All costs were stated in constant dollar terms, applying a three percent inflation rate and computing a net present value assuming a uniform ten percent discount rate. Additionally, "net present value is computed for a 20-year period, reflecting five transition years and 15 steady-state years." [Ref. 8:p. 51]

The focus of this thesis is necessarily narrower than that of the Commission. In developing a closure cost model, this study does not rank the bases as the Commission did in Phase I. Rather, it assesses the potential costs and savings as done in Phase II. No attempt is made to decide upon the military worth of any installation or which bases should undergo closure. Rather, the thrust is to generate a cost model that may be used once a closure site has been selected.

C. PLANNING AND PREPARATION

Administrative planning for closure tasks (timetable, unit transfers, etc.) are carried out by personnel presently assigned to the base. No costs are incurred at this stage

because the tasking is accomplished in addition to regularly assigned duties. Department heads and knowledgeable people are drawn from each major command component. Their deliberations are under the guidance and direction of the base commander. As a general rule, most functions may be accomplished at the local level without resort to external committees or experts [Ref. 9]. The closure of a military installation is normally carried out over the course of several years. In the case of the 86 installations recommended for closure, Public Law 100-526 states that closure may be initiated between January 1, 1990, and September 30, 1991, and is to be completed no later than September 30, 1995 [Ref. 8:p. 38]. Normal funding inputs will wane throughout the pre-closure phase. Personnel pay requirements will be reduced as workers transfer or retire without replacement, periodic repair such as replacement of carpets, windows and roofs will no longer be necessary and new construction money will be reprogrammed to other bases [Ref. 10].

D. CIVILIAN WORKFORCE REDUCTION

The closure of any military installation precipitates reductions in force (RIF) among the civil service personnel. Large bases routinely employ hundreds or thousands of such federal employees. For example, NAS Moffett Field employs 393, the Naval Postgraduate School 888, and NAS Alameda over

5500. As will be demonstrated, job termination constitutes a major closure expense.

Base closures result in the transfer, involuntary separation or retirement of government employees. Those willing to transfer to another installation may elect to have their names placed on a priority job placement list. The list is part of a nationwide program developed to give displaced employees priority for available openings with other Department of Defense agencies locally or throughout the United States. The closing activity bears all costs associated with employee transfers. Reimbursable expenses include:

* Per diem.
* Mileage.
* Travel for one round trip house hunting excursion for the employee and spouse.
* Temporary quarters subsistence.
* Broker's fees, real estate commissions and miscellaneous legal expenses for home sale and repurchase, up to a maximum of $25,766.
* Transportation and storage of household goods or a mobile home.
* Relocation income tax to compensate for differences in federal, state and local income taxes. [Ref. 11:pp. 103-104]

Employees unwilling to relocate to another federal position and declining placement on the priority list face involuntary job separation. Their only recourse is to seek other employment in the local area. Such personnel are

entitled to severance pay. The exact amount is determined by base pay at separation, age and years of government service, up to a maximum of one year's pay at the pre-separation rate [Ref. 11:pp. 112-113].

Older employees may elect retirement. Depending upon accumulated years of service, regular retirement may begin at ages 55, 60 or 62. With authorization from the U.S. Office of Personnel Management, retirement at age 50 may be granted for employees with 20 years or more of government service [Ref. 11:p. 110]. Retirements do not impose additional costs upon the closing installation.

E. EQUIPMENT REMOVAL

Attendant with closure of any installation is the removal of all portable equipment. Costs may be expected to vary widely due to a number of variables:

* The amount of material required at the next base.
* The condition of the equipment and its ability to be moved.
* Size, weight and quantity.
* Mode of transportation.
* Shipping distance.
* Amount of excess material to be routed to local bases.
* Amount of unusable equipment to be turned in to salvage.

Some portion of the office furniture, computers, supplies and parts, and vehicles will be needed at the new location. That equipment may be shipped via trailer truck or railway

freight. Remaining equipment is made available to nearby bases for reuse. Finally, equipment in the worst condition is released to salvage.

In the case of Public Works vehicles and rolling stock, redistribution will be made by higher authority to bases in the claimant's area. Fire trucks, vans and passenger vehicles may be driven to the receiving station. Items such as earth movers, street sweepers and lawn mowers require shipment via truck or rail.

F. TERMINATION OF BASE CONTRACTS AND AGREEMENTS

Military installations frequently have contracts with local companies who provide such diverse services as grounds maintenance, galley cooks and serving personnel, lease and repair of copying machines, and air conditioning and office equipment repair. At NAS Moffett Field, the majority of contracts run one year in length and are renewed in the first quarter of the Fiscal Year. Advance notice of closure allows an orderly withdrawal from contracts, without financial penalty. As the closure date approaches, contracts are allowed to expire. Other options include extending existing contracts, writing new ones for a shorter time or purchasing services only as needed. Conversely, short notice closure restricts planning, and penalty costs may be incurred if contracts must be terminated before expiration. [Ref. 12]

G. PRESERVATION OF BUILDINGS AND FACILITIES

The need for preservation of vacant buildings and facilities depends upon their utility to other branches of the armed services or to local communities. If an abandoned base is in a remote geographical location, preservation may be warranted. Modest expense would then be incurred to drain pipes, secure doors and windows and erect security fences. Many military installations, however, are located near large metropolitan areas. Some military reservations which were once located in farmland have since become prime real estate due to encroaching residential and commercial development. In some cases, not only do civilian developers covet the land and facilities, but so do other government or military agencies.

Rather than leaving a closed base vacant, a more likely scenario is ownership transfer for many facilities. Portions of the land and facilities would be acquired by either military or civilian neighbors. NAS Moffett Field is a prime example. NASA's Ames Research Center is a tenant activity which has an ongoing commitment in flight operations and aerodynamic research. Established in 1940, the Center has a sizable investment including 14 wind tunnels, 18 flight simulators and major facilities valued at over $2.5 billion. If the Navy were to vacate NAS Moffett Field, the 422 acres occupied by NASA would reasonably be expected to pass to that agency. NASA would also likely

retain use of the runway complex. Additional use might be made of the runways, parking ramps and hangars by light civilian aircraft in order to relieve congestion at local commercial airports. Nearby Onizuka AFB would likely take possession of the Navy commissary and exchange facilities, as well as the family housing units. Some facilities might also be sold to small businesses or developers; transferred buildings would not require preservation. [Ref. 3]

H. SECURITY REQUIREMENTS

Security requirements follow closely with the disposition of the base. Most abandoned bases do not appear to need a caretaker force. However, in the case of transfer of facilities, the next occupants must assume responsibility for security and the expense shifts accordingly.

I. LOCAL ECONOMIC IMPACT

Attendant with the closure of any military installation is the economic impact within the surrounding civilian community. While the full effect of base closure on the local community is beyond the scope of this thesis, some consideration must be given to the dollar losses experienced by local merchants. When a base closes, losses result from expired contracts, return of leased equipment, closure of fast food franchises on base and the fact that service members are no longer present to spend portions of their paychecks off base. If NAS Moffett Field were abandoned and

placed in a caretaker status the estimated loss in personnel pay alone would be $9 million per year.

As discussed, a reasonable projection is that responsibility for most facilities will be transferred to another military service or government agency. In that case, the need for goods and services from the local community would still exist. Although service contracts would require renegotiation with the new occupants, monetary flow to the community would continue. Personnel spending would depend upon changes in base activity and the number of new personnel stationed there.

The Commission identified several additional areas of expense concern. First, employees forced to move due to base closure may seek government assistance with the sale of their homes. The Homeowners Assistance Program (HAP), started under the auspices of the Demonstration Cities and Metropolitan Act of 1966, provides compensation to qualifying individuals. Benefits include government purchase of the home for 85 percent of its value prior to the base closure announcement, reimbursement of up to 95 percent of the sale difference if the home is sold at less than pre-closure value or foreclosure relief should that become necessary. Second, economic adjustment grants provide affected communities with funding to attract new businesses and make former military bases more usable. Third, the priority job placement program, discussed

previously, assists displaced government workers relocate to similar jobs at previous pay scales.

J. RECOUPING SOME OF THE COSTS

The Commission noted that certain monies may be recouped through the sale of government real estate located in desirable suburban areas. While local communities would prefer the land be returned free of charge, "there is a clear expectation that the Department of Defense will derive financial benefit from the sale of base closure real estate." [Ref. 8:p. 27]

K. COST SUMMARY

Table 5 summarizes the estimated costs for the categories previously described. The supporting computations and methodology are provided in Appendix A. Due to their unique history and differing missions, each installation requires individual assessment. Also, only when a base is subjected to the closure process will some hidden costs surface. Therefore, the long-term costs are subject to some predictable estimation errors.

TABLE 5

ESTIMATED CLOSURE COSTS PER BASE
($)

	Minimum	Maximum
Civil Service Workforce:		
Transfer	$4,934,570	$7,056,823
Severance pay	2,751,458	2,751,458
Community Readjustment:		
Homeowner Assistance Program	460,000	600,000
Economic Adjustment Grant	100,000	140,000
Costs	$8,246,028	$10,548,281
Less Facilities Sale	1,000,000	$ 1,000,000
Total Costs	$7,246,028	$ 9,548,281

Appendix A provides the sources, assumptions and computations supporting the cost estimations shown above.

IV. RELOCATION AND STARTUP

A. COST CONTINUATION

The costs of closing a military installation are only part of the redirection of military forces. Additional expenses arise from transporting displaced units to the next location and reestablishing their functional capability. Following closure, relocation and startup costs differ between units, primarily due to the standup requirements. The following discussion broadly distinguishes between personnel and equipment belonging to the military installation and those of mission specific units.[2] Relocation and startup costs are traced for two relocation options. A cost summary concludes the chapter.

Figure 1 divides transferring units into those attached to the base or the aircraft squadrons stationed at the base. In addition to originating activity, composition and anticipated facility requirements are considered. Both units are composed of personnel and materials. Facility requirements refer to construction required at the next installation.

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[2]Previous chapters dealt solely with base costs because mission-related flight operations were transparent to either operation or closure of the supporting installation. They are considered in this chapter due to the relocation expense involved.

Activity	Component to be Moved	Standup Requirements
Base Specific	Personnel	None
	Equipment:	
	Reusable	None
	Salvage	None
	Tenant commands	None
Mission Specific	Aircraft	Hangars
	Wing/squadron equipment	Ramp, parking, access
	Wing/squadron personnel	Administrative spaces
	Flight trainers	Command and control
		Intelligence
		Warehouse storage
		Flight trainers
		Fuel pits/trucks
		Maintenance training
		Intermediate maintenance

Note: No standup requirements are anticipated for base specific personnel and equipment. It is assumed the next base will have the capacity to absorb them.

Figure 1. Transferring Units

B. BASE PERSONNEL AND EQUIPMENT RELOCATION

On April 18, 1989, Congress approved the Commission's closure recommendations. With approval granted, the Secretary of Defense has five years to complete closure and realignment action [Ref. 8:p. 38]. This length of time allows a gradual reduction in base manning. Personnel, reassigned at the completion of normal duty rotation, require no abnormal Permanent Change of Station funding.

Shipping items such as heavy equipment and furniture are a major expense consideration. Office furnishings (i.e., desks, chairs, and cabinets) may be shipped in commercial moving vans. Large machinery, on the other hand, is under

custody of the Public Works Officer. NAS Moffett Field holds 321 pieces of Civil Engineer Support Equipment (CESE), ranging from fire trucks to lawn mowers. Allocation and distribution of CESE among Pacific commands is the responsibility of the Pacific Division of the Naval Facilities Engineering Command. Following an equipment inventory, servicable machinery would be redistributed to bases as needed throughout the claimancy. Unservicable equipment is turned in as salvage. [Ref. 13]

NAS Moffett Field has more than a dozen tenant activities located on base. During the closure process these activities would be shut down and moved by their respective commands. As described in Chapter I, such costs have not been included in this study.

C. MISSION UNIT RELOCATION AND STARTUP

Aircraft and squadrons are capable of rapid deployment to new operating bases. Operational funding covers such movement. Wing and squadron equipment may be trucked or airlifted with relative economy. The task of adapting the facilities at the new base to accommodate the incoming units, however, constitutes a larger expense. The 1988 Relocation study conducted by Commander, Patrol Wings, U.S. Pacific Fleet examined NAS Whidbey Island, Washington, NAS Lemoore, California, and NAS Alameda, California, as alternative basing sites. The Study evaluated the following facilities at each air station for adequacy:

* Hangar space.
* Ramp, parking and access.
* Administrative offices.
* Command and control.
* Intelligence.
* Warehouse storage.
* Flight trainers.
* Fuel pits/trucks.
* Maintenance training.
* Intermediate maintenance.

Each of the proposed relocation sites was examined for adequacy of hangars, apron/ramp area and administrative spaces. Vacant facilities were used when available. Construction of new spaces was generally required for maintenance training, command and control, intelligence, and fuel pits.

D. COST SUMMARY

Table 6 identifies military personnel and material originating either from NAS Moffett Field or from the Patrol Wing. It summarizes the costs of relocation to NAS Lemoore and NAS Whidbey Island. Closure costs relating to civilian relocation, severance, or retirement have been previously discussed in Chapter III and have not been included in the table.

While it may be logical to relocate the entire patrol community to another operating location, it would not be

TABLE 6

RELOCATION AND STARTUP COST SUMMARY
($000)

NAS Moffett Field	NAS Lemoore	NAS Whidbey Is.
PCS transfer	$7,900.0	$11,600.0
Commercial HHG van	125.5	160.8
Equipment:		
Reusable	16.1	79.0
Disposal	16.9	16.9
Total	$8,058.5	$11,856.7
Maritime Patrol Squadrons		
Personnel transfer (CONUS)	$21,500.0	$24,100.0
Squadron equipment airlift	90.0	145.2
Hangar	14,000.0	37,500.0
Ramp, parking, access	42,900.0	34,500.0
Administrative space	6,000.0	0.0
Command and control	3,600.0	3,400.0
Intelligence	1,600.0	1,600.0
Warehouse storage	8,400.0	4,000.0
Flight trainers	27,800.0	26,800.0
Fuel pits/trucks	400.0	1,500.0
Maintenance training	19,900.0	20,000.0
Intermediate maintenance	12,600.0	12,600.0
Personnel transfer (NAS Barbers Pt)	3,100.0	3,100.0
Total	$161,890.0	$169,245.2
Grand Total	$169,948.5	$181,101.9

Appendix B provides the sources, assumptions and computations supporting the cost estimations shown above.

necessary or practical to relocate NAS Moffett Field's personnel and equipment in the same manner. Most likely, they would be divided and relocated throughout the service as needed at the time of closure. However, in order to be

able to define a range of costs, it is assumed that they are relocated to the same locations used by the Patrol Wing.

The overall plan included relocating six squadrons to a west coast base, while relocating a seventh to NAS Barbers Point, Hawaii. For comparison, personnel and equipment from NAS Moffett Field are shown moving to the same destinations. Further explanation is offered in Appendix B.

Issues discussed thus far have included annual installation operating costs, closure costs, and the costs of relocating units to different operating bases. Expense categories and information sources were developed by the author. Chapter V describes the cost model used by the Base Closure and Realignment Commission, which differs from the approach used in the thesis to estimate closure costs for NAS Moffett. Chapter VI draws a comparison between the two models and offers conclusions.

V. THE BASE CLOSURE COMMISSION'S COST MODEL

A. OVERVIEW

This chapter describes the cost model used by the Defense Secretary's Commission on Base Realignment and Closure. After evaluating more than 2300 separate military installations, the Commissioners were able to prepare a list of candidate bases for realignment or closure. The Cost of Base Realignment Actions (COBRA) computer model was an important decision making tool in that process. COBRA enabled the Commissioners to compare the potential costs and savings of closure or realignment actions. While not intended for use in budget preparation, COBRA nonetheless provided a rank-order list of installations capable of producing potential savings.

B. TWO PHASE APPROACH

Under the charter issued by Secretary of Defense Frank Carlucci, the Commission was tasked to review the United States' (CONUS) military base structure and identify those military bases which could produce a cost savings through realignment or closure. Also identified were those bases not needed by the respective services. The Commission elected a two phase approach: first, bases were reviewed for military worth using 21 mission-related attributes; second, candidate bases identified in phase one were studied

for potential costs and savings. COBRA was used for phase two deliberations.

C. COST MODELING

COBRA models three scenarios: closures, deactivations, and realignments. Beginning with identification of a base to close, and up to six bases gaining personnel and material, "the model estimates the costs of the major actions associated with the transfer of activities between bases and, if appropriate, the disposition of assets at closed bases." [Ref. 14:p. 1-1] Its output summarizes the costs or savings in terms of a payback period and net present value calculated over a 20 year period. An interesting feature of the model is that it draws upon standard cost estimate tables, thus negating the need for extensive field surveys of the bases in question. The costs and savings considered were categorized as one-time or recurring. One-time costs included:

* Administrative planning and support costs.
* Personnel actions costs: severance pay, early retirement pay, new hiring costs.
* Moving costs: per diem allowances, househunting costs, house sales allowance.
* Transportation costs: air fares, automobile mileage allowances.
* Freight costs: household goods, heavy equipment, miscellaneous.
* Unique one-time costs: environmental mitigation, special equipment or transportation requirements.

* New construction costs: planning/designing, constructing, repairing.

* Shutdown costs.

One-time savings included:

* Procurement and construction costs avoided.

* Real property net proceeds.

Recurring costs and savings were composed of:

* Increased Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) costs.

* Caretaker costs at deactivated bases.

* Changes in housing costs.

* Salary savings after personnel reduction.

* Changes in base overhead costs for the moving facilities: RPMA, BOS, Family Housing.

* Changes in mission costs resulting from mission operating efficiencies. [Ref. 14:pp. 1-7--1-8]

The assumptions supporting the model were as follows. First, as previously mentioned, COBRA uses cost tables compiled from data provided by each uniformed service or from sources such as housing surveys, published pay tables, or Defense Logistics Agency Data. Additional assumptions included:

* Administrative planning and support...estimated at 10 percent of the losing base's current BOS costs in the first year, decreasing by 25 percent in each following year.

* Personnel actions...all relocating civilian employees have families. Eight percent of affected civilians select retirement in lieu of transfers; those persons are then paid a proportion of their retirement pay for the first three years of the model....The Priority Placement Program whereby civilians...are given top priority for new vacancies is 75 percent effective.

* Personnel relocation...of less than 50 miles from the original installation incur no personnel relocation costs.

* Freight. Each military and civilian employee is supported by a standard weight of administrative material (750 pounds).

* Construction. Unless an engineering estimate is available, construction needs are aggregated into a single dollar figure. That cost is then spread out over the transition period in proportion to the people moving from the losing to the gaining bases each year. The model does not attempt to break out which facilities must be completed first, except that all family quarters are assumed to be completed in the first moving year. A planning and design cost of ten percent of the total construction bill is levied in Year 1 of the model.

* Caretaker costs. A losing base in a realignment scenario is assessed no charges for caretaker maintenance or shutdown costs because [it is assumed] that the remaining activities will absorb excess space.

* Housing. Departing families occupied base family housing at the losing base in the same ratio as the overall base family population. When families depart, the on-base housing is filled by other off-base families. Thus, no housing savings are realized unless the base is completely closed. If the base is closed, housing savings begin in the year after the closing year and amount to the total housing budget. All bachelor officers live off base; all bachelor enlisted personnel live on base.

* Base overhead...each service...[provided its own] formulation for base overhead costs. [Ref. 14:pp. 1-9--1-10]

D. COBRA OUTPUTS

The cost model calculates its outputs using net cash flows. The output is a summarization of the discounted costs and savings derived from each closure or realignment scenario in terms of payback period and net present value. COBRA does not decide which bases to close or realign.

Rather, the model provides rank-order alternatives for further consideration by the Commissioners.

VI. SUMMARY AND CONCLUSIONS

A. OBJECTIVE

The objective of this thesis is to develop a model to define major cost categories and to project an estimated payback period for military installation closure. Closure, relocation and startup actions were considered using illustrative cost figures from a west coast Naval Air Station. This chapter summarizes these costs, compares continued operation and closure actions, and projects an estimated time before savings will be achieved. Although closure of each installation is unique, the model provides an indication of the costs, savings, and net financial results from base closure and realignment.

B. CAPTURING THE COST ELEMENTS

Annual operating expenses for NAS Moffett Field were presented and analyzed in Chapter II. Major Navy appropriations categories included Operations and Maintenance, Other Procurement, Maintenance of Real Property, Special Projects, Military Construction and Family Housing. This funding pays for yearly airfield operations, official business travel, housing, construction and renovation, and civilian personnel pay. The expense of services rendered by the air station on behalf of base tenants is recovered under the category of Reimbursables. A five year cost average was developed.

Chapter III considered the costs of base closure. Closure costs were primarily composed of the government's legal obligations when discharging a civilian workforce. Historical percentages were used to determine the number of civil servants expected to transfer, elect severance, or retire. Severance and retirement costs were added to two hypothetical transfer situations in order to develop a range of cost estimates.

Chapter IV presented costs associated with relocation of men and materials from the deactivated base. The air station and its assigned fleet units were addressed separately. The five years allotted in the Base Closure and Realignment Law to complete closure action allows base military personnel to be restationed at the completion of normal duty rotation. Removable equipment, which is part of the air station's plant property, must be inventoried to determine its status. Once this is accomplished, it will either be transported to another base in need of it or, if unserviceable, released to salvage. In order to build upon the range of cost estimates, serviceable equipment was shipped to locations coincident with Patrol Wing relocation options. Percentages of reusable and salvage equipment were taken from historical experience gained by the Pacific Fleet Transportation and Equipment Management Center, Hawaii. Mission units (i.e., the Patrol Wing and seven squadrons)

were relocated in accordance with options outlined in the 1988 Patrol Wing Relocation Study.

The study suggested five relocation strategies, two of which were selected for comparison in this thesis. One option sent the Patrol Wing to NAS Whidbey Island, Washington. A second, shorter, move repositioned the Wing to NAS Lemoore, California. These two options were selected to show contrasting expense and relocation considerations. Relocating to Whidbey Island requires moving men and materials over a greater distance. The physical space required for the P-3s under this particular option necessitated "bumping" the resident EA-6B electronic warfare community to NAS Lemoore--the cost of which was not addressed in the Patrol Wing study. The second option allows lower transportation costs due to closer geographical proximity to NAS Moffett Field. An important cost saving feature lies in the fact that NAS Lemoore has excess capacity and can accommodate the Patrol Wing without displacing the existing Light Attack community. Both options do, however, require facility construction at the new site to accommodate the larger P-3 aircraft. Cost estimates for these relocation options were taken from the Patrol Wing Study.

C. VALIDITY OF THE ESTIMATES

Components contributing to an installation's annual operating budget are relatively easy to compile due to the

on-going experience of base fiscal managers and the availability of local records. For these reasons the data on annual operating expenses are easily obtained.

Projecting closure and relocation costs, however, necessitated the adoption of several assumptions in order to develop a range of dollar cost estimations. Complicating factors included, but were not limited to:

* Dismissal of the civilian workforce. The percentage and paygrade of employees willing to relocate, retire, or accept severance is difficult to forecast. Costs of discharging the civilian workforce were calculated first to a location just beyond commuting distance, then to a relatively distant location.

* Disposal of base equipment throughout the claimancy depends upon the various needs of other installations at the time of closure. Here, excess base equipment was transported to only two destinations, rather than spread according to needs throughout local commands.

* Selection of the receiving site. If the next operating base lacks the capacity to absorb them, incoming mission units may displace units already present. Another important consideration is the proximity of the mission unit to training and operational areas. While other Patrol Wing Study options were available, the two chosen for analysis in this study were sufficient to generate a range of cost estimates.

These foregoing complications combined to make closure and relocation estimates less certain than annual operating costs.

D. COMPARISON OF COST MODELS

The cost and savings model developed in this thesis presents baseline data for the complex question of payback following base closure. The overall objective was to provide a set of major cost categories from which a set of

costs could be forecast. The cost figures shown herein are representative of, but not definitive for, one installation. Figures were obtained directly from local sources. The set of cost categories is not all inclusive.

The Base Closure Commission's cost model, described in Chapter V, is much more comprehensive by comparison. It incorporates data from a more detailed study of base closure. It is not intended for budget preparation. Rather, it rank orders bases for closure consideration. One advantage of this model is that it uses standard cost estimating tables, thereby negating the need for time intensive field surveys. Despite its detail, however, the Commission conceded, "there is no 'magic formula' that will yield precise results. The process enabled the Commissioners to focus on the best opportunities; it did not replace subjective judgment." [Ref. 8:p. 18]

E. SAVINGS PROJECTION

It is readily apparent that the cost of continued operation is initially dwarfed by the cost of closure and relocation. Closure costs are enormous and Department of Defense budget savings will not become visible for several years. As a result, for example, the FY 90-91 DoD budget request to Congress contains $500 million for each year to cover the cost of base closure and realignment of installations targeted by the Commission and approved by the Secretary of Defense and Congress in 1989.

Table 7 depicts the calculation of years before savings may be realized. The cost of continued operation of the air station is shown for comparison with closure and relocation costs. Relocation figures summarize the cost of moving NAS Moffett Field plant property to either NAS Whidbey Island or NAS Lemoore. Costs for moving the Patrol Wing are included. Finally, a projection of the period before savings occur is shown. Table 7 indicates a 6.6 to 7.1 year payback period for closure of NAS Moffett Field.

TABLE 7

CLOSURE COST RANGES
AND PROJECTED YEARS TO SAVINGS
($000,000)

	6.8	9.0
Closure of NAS Moffett Field		
Relocation and startup	170.0[1]	181.0[2]
Total	$176.8	$190.0
Continued Operation	$26.9 per year[3]	

$$\text{Years to realize savings} = \frac{\text{Closure + Relocation and Startup}}{\text{Continued Operation}}$$

$$= 6.6 \text{ to } 7.1 \text{ years}$$

[1]Relocation to NAS Lemoore
[2]Relocation to NAS Whidbey Island
[3]Projecting 5% inflation over seven years, annual operating costs increase to $37.9 million; however, whether the current budget climate will fund such growth is problematic.

F. CONCLUSIONS

The cost model developed in this thesis calculates baseline cost and payback applicable in the consideration of a single military installation. The model employs data readily available from local sources and is useful in the conduct of local feasibility studies.

The COBRA cost model developed for the Base Realignment and Closure Commission is better suited to the large-scale evaluation and rank-ordering of multiple military installations.

G. AREAS FOR ADDITIONAL RESEARCH

Development of the cost savings model suggested the following additional research tasks:

* Conduct a historical cost/benefit analysis of base closures. How effective have previous closures been as a cost-cutting measure?

* Evaluate the current Congressional decision to utilize base closures as a means of reducing the federal budget deficit.

* Study the additional complications arising when mission unit relocation options "bump" resident mission units. To what extent are expenses increased and how complicated does the movement scenario become?

* As the current round of base closures progresses, evaluate the COBRA model for the accuracy and adequacy of its projections. Evaluate the COBRA software and documentation relative to the adequacy of its assumptions.

* Assess transaction cost economics: What is the nature of the contractual interface between the Navy and the service or civilian agency who stands to gain the relinquished property How can the Navy economize in that interface so as to produce least-cost arrangements for realignment or closure?

* Analyze the magnitude of the environmental hazard and toxic waste problem on military installations. Will toxic waste cleanup grow as a major operating and base closure expense?

* Use personnel surveys to develop a forecasting model to show the percentage and paygrade of civilian employees willing to relocate, retire, or accept severance under a base closure scenario.

* Conduct further research on the willingness of civilian employees to relocate due to base closure. Include the cost consequences of hiring, rehiring, and training in closure cost analysis.

Finally, this thesis has led to the following additional conclusions on the politics of current base closure efforts:

* The Base Closure and Realignment Act stipulates that Congress accept or reject the Commission's realignment or closure recommendations without amendments. On April 18, 1989, Congress accepted that list. However, funding the realignments and closures is a separate matter. Although $500 million each year ($1 billion for two years) has been included in the FY 90-91 DoD budget request, Representative Les Aspin, D-Wis., chairman of the House Armed Services Committee, observed that base closure will continue to be an issue "as long as lawmakers opposed to shutting down bases in their districts...threaten to block...the appropriations process." [Ref. 15:p. 2] Congressional budget committees still hold the "power of the purse," and may yet attempt to modify the closure list in favor of their constituents. Such attempts could modify, reduce or eliminate the entire base closure plan.

* As discussed in Chapter II, military installation hazardous waste cleanup has become a major issue. Many military bases contain toxic wastes similar to those found in 30 to 50 year old industrial facilities. Accurately assessing the location and contents of dump sites requires years of effort. Subsequent cleanup will be laborious, expensive, and time consuming. One may expect this issue may become more prominent in future DoD budget considerations. Chapter III notes that the Commission chose to disregard environmental cleanup as a closure cost. However, such costs may be in the millions or billions of dollars. This problem will not disappear. Although precedent is lacking, accelerated cleanup may add significantly to closure costs, or may even prevent some closures altogether.

* Considering the enormous cost of closure and realignment, compensation to DoD and the military services for land and facilities lost may be justifiable and necessary. The Commission noted, "there is a clear expectation that the Department of Defense will derive financial benefit from the sale of base-closure real estate." [Ref. 8:p. 27] The issue may be raised whether facilities and prime real estate can or should be returned to local communities free of charge.

APPENDIX A

BASE CLOSURE COST ESTIMATIONS

This appendix provides the assumptions and computations supporting the cost estimations provided in Table 5.

A. CIVILIAN WORKFORCE

NAS Moffett Field is currently funded for 393 civil service positions. Using historical percentages, a reduction in force at NAS Moffett Field would split the workforce as follows:

	Percentage	Number
Transfers	41	161
Separations	41	161
Retirements	18	71
Total		393

Source: The number of civil service positions were obtained from the NAS Moffett Field Comptroller's office [Ref. 16]; historical reduction in force percentages were obtained from the NAS Moffett Field Civilian Personnel Office [Ref. 17].

B. TRANSFERS

Assumptions: Two examples of civilian transfers were constructed: (1) an 80 mile move from NAS Moffett Field to Vallejo, California; and (2) a 2400 mile move from NAS

Moffett Field to Washington, D.C. Each example is for a GS-11, step 4, with a spouse and two children. Source: expense categories and dollar amounts are taken from Joint Travel Regulations, Appendix G, Table 2.

NAS Moffett Field to Vallejo, California

Enroute travel expenses	$ 15.20
House hunting trip	13.60
Miscellaneous expenses	700.00
Household goods transportation	1,575.00
30 days temporary storage	558.00
30 days temporary quarters	4,499.70
Real estate expenses	$23,288.00
Total estimate	$30,649.50

161 personnel X $30,649.50 = $4,934,569.50

NAS Moffett Field to Washington, D.C.

Enroute travel expenses	$ 1,137.50
House hunting trip	1,316.00
Miscellaneous expenses	700.00
Household goods transportation	12,332.00
30 days temporary storage	558.00
30 days temporary quarters	4,499.70
Real estate expenses	$23,288.00
Total estimate	$43,831.20

161 personnel X $43,831.20 = $7,056,823.20

C. SEVERANCE PAY

Continuing the previous example, consider the separation of the same 44 year old GS-11, step 4, with 15 years of service, earning $31,738 per year. Computations are in accordance with Federal Personnel Manual pp. 550-30, 550-31.

Basic allowance:

$610.35 (weekly salary) X 10 (first 10 years) = $6103.50

$610.35 (weekly salary) X 2 X 5 (years service in excess of 10) = $6103.50

Age adjustment:

$12,207.00 (basic allowance) X 4 (years over 40) X 10% = $4,882.80

Individual severance pay:

Basic allowance	$12,207.00
Age adjustment	4,882.80
	$17,089.80

Severance pay for 161 GS-11s:

$17,089.80 X 161 = $2,751,457.80

D. COMMUNITY READJUSTMENT

Assumption: Twenty workers will require assistance from the Homeowner Assistance Program. Historical averages are approximately $23,000 per worker. However, the Commission speculated that this figure could run as high as $30,000. Source: Report of the Defense Secretary's Commission on Base Realignments and Closures, p. 29.

Assumption: The local community surrounding a military base undergoing closure will require an Economic Adjustment Grant from the Economic Development Administration. Twelve million dollars divided among 86 bases allows $139,534 each; because community needs may vary, a range from $100,000 to $140,000 was selected. Source: Report of the Defense

Secretary's Commission on Base Realignments and Closures, p. 28.

Assumption: Facilities will be sold to recoup sunk costs in plant and property. Proceeds were conservatively set at $1,000,000.

APPENDIX B

RELOCATION AND STARTUP COST ESTIMATIONS

This appendix provides the assumptions, rate sources and computations supporting the cost estimations shown in Table 6.

A. NAS MOFFETT FIELD

Assumption: PCS transfer for 843 officers, 4219 enlisted, and dependents. Member and dependent travel, temporary lodging, dislocation allowance and the average cost of household goods shipment are included. Source: Navy Family Allowance Activity, Cleveland, Ohio.

Assumption: Office furniture is shipped via commercial moving van; 12,000 lbs per truckload, 100 truckloads required. Source: Military Traffic Management Command, Oakland, California.

NAS Moffett Field to NAS Lemoore:

$1012 per load	100 X 1012	$101,200
$1.40 per 100 lbs.	1.40 X (12,000/100) X 100	16,800
$75.00 loading/unloading	75 X 100	7,500
Total		$125,500

NAS Moffett Field to NAS Whidbey Island:

$1.65 per mile; 902 miles	1.65 X 902 X 100	$148,830
$0.40 per 100 lbs	0.40 X (12,000/100) X 100	4,800
$0.60 per 100 lbs loading/unloading	0.60 X 12,000	7,200
Total		$160,830

Reusable equipment. Assumptions based upon recent experience with equipment removed from Diego Garcia, 65% of CESE units are reusable. Items such as fire trucks, fuel trucks, and motor pool vehicles may be driven to the new location. Other items such as lawn mowers, street sweepers, and ditch diggers require shipment by truck or rail. Shipping rates shown are per 40 measurement tons on flatbed trailer trucks. Source: Transportation and Equipment Management Center, Pacific Fleet, Pearl Harbor, Hawaii.

NAS Moffett Field to NAS Lemoore:

15 driven vehicles:		
$0.36 per mile roundtrip	0.36 X 140 X 2	$100.80
$25 per hour labor	25 X 3	75.00
Per Vehicle		$175.80
15 vehicles X $175.80		$2,637.00
193 vehicles shipped by truck:		
50 truckloads X $269		$13,450.00
Total		$16,087.00

NAS Moffett Field to NAS Whidbey Island:

15 driven vehicles:		
$0.36 per mile roundtrip	0.36 X 902 X 2	$649.44
$25 per hour labor	25 X 18	450.00
Per Vehicle		$1,099.44
15 vehicles X $1,099.44		$16,491.60
193 vehicles shipped by truck:		
50 truckloads X $1250		$62,500.00
Total		$78,991.60

Equipment for disposal. Assumption: based upon recent experience with equipment found unserviceable at Diego Garcia, 35% of CESE units require disposal. Source: Transportation and Equipment Management Center, Pacific Fleet, Pearl Harbor, Hawaii.

0.35 X 321 units X $150 per unit = $16,852.50

B. MARITIME PATROL SQUADRONS

Patrol squadron relocation options and cost approximations are taken from the NAS Moffett Field Relocation Study completed January 12, 1988 by Commander, Patrol Wings, U.S. Pacific Fleet [Ref. 18]. No fiscal adjustments have been made because such adjustments are slight considering the wide range of closure estimates being developed. As noted in the Relocation Study, the costs of moving the electronic warfare community from NAS Whidbey Island to NAS Lemoore are not included.

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