Commander Navy Region, Mid-Atlantic

Small Arms Training Ranges

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Executive Summary

This study presents the results of a comprehensive effort to produce a plan to assist the Navy in maximizing the use of their small arms training ranges in the Mid-Atlantic region. It identifies range users' needs, defines range capabilities, and explores opportunities to better meet the growing requirements of CNRMA customers. This Executive Summary presents a synopsis of the significant data/findings and recommendations in the Small Arms Training Ranges Study.

Small arms training ranges are currently being utilized by a wide array of users including security forces, TYCOMs, schools, and specialty units. Since there is an overall qualification standard for all users (OPNAVINST 3591.1C), basic qualification firing was the only standard utilized in this study. The range time associated with this qualification firing is a portion of the overall range time utilized by the Fleet.

The Study evaluated indoor, outdoor and mobile ranges located throughout the Mid-Atlantic Region. Data was collected at each range to determine capacities, capabilities, scheduling requirements, and maintenance concerns. Several privately owned ranges and non-Navy DoD ranges were also evaluated as part of this study.

The first step of the process was to determine if the Navy currently has sufficient ranges to meet their users requirements. A comparison of user-required lane hours to available lane capacities was completed. In the Mid-Atlantic Region, users required 433,615 lane hours to qualify on pistol, 216,492 lane hours to qualify on rifle, and 54,780 lane hours to qualify on crew-served weapons. Assuming 100% availability of current lanes, the Region has 376,104 available lane hours for pistol, 125,190 lane hours for rifle, and no capacity for crew-served weapons. Therefore, there is a significant shortage of ranges for user qualification.

The next step of the process was to explore opportunities for CNRMA to better meet the growing requirements of their customers. One such opportunity is to regionalize the small arms training ranges under a central program manager. The overall objective of this would be to provide better customer service by establishing a single point of contact. The program manager would be responsible for the scheduling, staffing, and all operational aspects of the small arms ranges. One aspect would be the implementation of a centralized scheduling system. This system would be designed to assist range personnel in managing training resources and provide customers with a user-friendly interface for requesting and scheduling training resources. It would also serve as a database to track usage and maintenance downtime.

Next, an economic analysis was generated to compare various scenarios against the existing small arms management system to determine the most cost effective and beneficial scenario. Two scenarios were evaluated, maximum capitol investment and a minimum capitol investment. The maximum capitol investment scenario looked at the construction of a new 32-lane indoor range and expanding the NSA Northwest IAMS range SDZ to rifle capable. The minimum capitol investment scenario utilized existing ranges and increased the usage of private ranges and simulators. The net present value of the scenarios is approximately $16M and $14M respectively.

Based on the data collected from the field visits and the results of the economic analysis, additional range capacity is required to meet the small arms training requirements of the Mid-Atlantic Region. Cost, efficiency, safety, and customer focus were the deciding factors for choosing the best options for the small arms training ranges. These options are a starting point for developing an overarching framework to manage and meet the Fleet's small arms training requirements in the Mid-Atlantic. It is recommended that the following actions be implemented:

- Implementation of a Small Arms Training Range Regional Program.
- Construction of a 32-lane indoor rifle range at NAVSTA.

- Expansion of IAMs Range at NSA Northwest to 4,800 meters to accommodate up to and including 7.62 rifle capabilities.
- Installation of a radar system to monitor the SDZ area at Cheatham Annex (CAX), NAB Little Creek and Dam Neck Annex.
- Phase out the 5 existing mobile ranges over the next three years.
- Implementation of maintenance contracts at existing ranges.
- Continue to utilize non-Navy DoD facilities to train on crew-served weapons.
- Expansion of Blue Range at NSA Northwest to 1,840 meters to accommodate 9mm pistol capabilities.

Implementation of these actions would result in an increase of lane hours that would be the first step in meeting the small arms training requirement of the Fleet in the Mid-Atlantic Region. The transition to a Regional small arms program will provide the framework necessary to collect and study range data to further define the future needs of the Mid-Atlantic Region.

List of Acronyms and Abbreviations

AIRLANT	Naval Air Force Atlantic Fleet
Baker	Michael Baker Jr., Inc.
CAX	Cheatham Annex
CNRMA	Commander, Naval Region Mid-Atlantic
EA	Environmental Assessment
EICO	Engineering Innovation and Criteria Office
EOD	Explosive Ordnance Disposal
EWTGLANT	Expeditionary Warfare Training Group, Atlantic
HEPA	High Efficiency Particulate Air
MCSFBn	Marine Corp Security Force Battalion
MOA	Memorandum of Agreement
NAVFACENGCOM	Naval Facilities Engineering Command
NCEA	Non-Combat Expenditure Allowance
NCIS	Naval Criminal Investigative Service
NCWG2	Naval Coastal Warfare Group 2
NNSY	Norfolk Naval Shipyard
NPV	Net Present Value
NOSSA	Naval Ordnance Safety and Security Activity
NSWDG	Naval Special Warfare Development Group
RFMSS	Range Facility Management Support System
ROLMS	Retail Ordnance Logistics Management System
SDZ	Surface Danger Zone
SOP	Standard Operating Procedure
SPECWAR	Special Warfare
SUBLANT	Submarine Force, Atlantic Fleet
SURFLANT	Naval Surface Force Atlantic
TYCOM	Type Command
UFC	Unified Facilities Criteria
USCG	United States Coast Guard

1.0 Introduction

"Security of Navy ships, aircraft, facilities, and materials, as well as security and safety of personnel depends, in part upon small arms proficiency of Navy personnel" (OPNAVINST 3591.1C, *Small Arms Training and Qualification*). As such, the Atlantic Division, Naval Facilities Engineering Command (LANTDIV) contracted Michael Baker Jr., Inc. (Baker) to perform a study of the small arms training ranges in the Navy's Mid-Atlantic Region. The objective of the Study is to produce a comprehensive plan to assist the Navy in maximizing the use of their small arms training ranges in the Mid-Atlantic Region, identify needs, and explore opportunities to better meet the growing requirements of CNRMA customers. This study evaluates current ranges for capacities, capabilities, and certifications. Range users were defined as those individuals required to meet the standards as specified in OPNVAINST 3591.1C and included CNRMA Shore Activities, TYCOMs, security units, schools, Marine Security Battalions, and SPECWAR.

Ranges are being utilized by a wide array of users and for various small arms training covering qualification/sustainment to specialty courses. The standards for qualification firing are defined in OPNAVINST 3591.1C. Users are required to qualify initially and semi-annually thereafter. Since an overall standard for sustainment firing could not be defined, basic qualification firing was the only standard utilized in this study. It is important to remember that this will represent only a portion of the range time required for the Mid-Atlantic Region.

For the purpose of this study, the following definitions are applicable as defined in UFC 4-160-01, *Unified Facilities Criteria, Draft Design and Maintenance: Small Arms Range Facilities*, March 15, 2002.

- "Certification" is defined as a tasking by NAVFAC that the range in it current operating mode, meets the minimum requirements of the applicable federal laws and regulations and conforms to explosive safety guidelines and instructions.
- "Range" is defined as areas designated for weapons firing for personnel training and weapons training.
- "Small Arms" are defined as handguns, riot guns (12 gauge shotguns), rifles, and machine guns to 7.62 mm and 50 cal.
- "Surface Danger Zone" (SDZ) is any area that may reasonably expect projectile impact resulting from direct fire, including misdirected and accidental discharges, and ricochets.

2.0 Regulations

In order to assess the requirements and capacities of the Mid-Atlantic Region with respect to small arms training, a complete understanding of the governing regulations and instructions is necessary. The applicable guidance documents and instructions are outlined below.

2.1 OPNAVINST 3591.1C

One objective of the Study is to evaluate the availability of existing ranges for meeting the requirements for qualification firing. The qualification standard used for this study is OPNAVINST 3591.1C. The purpose of OPNAVINST 3591.1C is to establish Navy Policy and prescribe minimum requirements for small arms training and qualification. OPNAVINST 3591.1C applies to all active and reserve Navy Personnel, all Navy law enforcement and security personnel, including Navy Absentee Collection Units, military and civilian, and ashore and afloat (per OPNAVINST 5530.14B, 5580.1, and C8126.1 (NOTAL)), and to all personnel whose duties require them to be armed in accordance to OPNAVINST 5500.32B. This instruction does not apply to Navy Special Warfare personnel. Table 1 illustrates the maximum number of rounds expended per qualification course of fire.

2.2 Design and Maintenance

All new Navy ranges must be designed and maintained to meet the requirements of *Draft* Unified Facilities Criteria (UFC) 4-160-01 Design and Maintenance: Small Arms Range Facilities. These criteria also apply to repairs and rehabilitation of existing ranges. The UFC references NAVFAC INST 11014.53, which establishes a Center of Expertise for ranges, whose participation in the construction of new ranges and repair of existing ranges is mandatory.

Table 1: Maximum Rounds Expended per Qualification Course of Fire

Weapon	Caliber	Rounds per Course of Fire	Course of Fire	Max. Rounds Expended for Qualification Courses
Handgun	.38/9mm/.45	48	3	144
Handgun Nightfire	.38/9mm/.45	18	2	36
MP-5	9mm	83	2	166
Shotgun	12 gauge	10	2	20
M-4/16 & M-14	5.56mm/7.62mm	40	3	123[1]
M-239[2]	5.56mm	144 (fully transit)	-	144
M-60	7.62	100	2	200
M-240G[2]	7.62	156	-	156[3]

[1] - includes 3 spotter rounds
[2] - obtained from Marine quals
[3] - includes 6 spotter rounds

This document defines and establishes the minimum SDZ for each ammunition type utilized on small arms ranges. Table 2 outlines the distances required for each type of weapon.

Table 2: Surface Danger Zones (SDZs)

Caliber	Max. Range (meters)
.38 cal	1,900
.45 cal	1,500
9mm	1,840
12 ga	600
5.56 mm	3,400
7.62 mm	4,800
.50 cal	6,500

[1] Source - UFC 4-160-01

2.3 Certification

NAVFAC Instruction 11014.53A provides guidance on the role of the Naval Facilities Engineering Command Specialized Expertise Program. The program was established to provide worldwide technical support through the establishment of the following components; Mandatory Center of Expertise, Technical Center of Expertise, and Technical Consultants. The Technical Center of Expertise for Small Arms Ranges may provide planning, design, construction, and operational services. Part of the services that are provided by the Technical Center of Expertise, is the certification of small arms ranges. Currently, the Technical Center of Expertise is certifying ranges every two years.

The certification process entails the following data to be submitted the NAVFAC Center of Expertise:

- SDZ Map (Outdoor)
- Air Flow Data (Indoor)
- SOP's
- Construction Type
- Intended Use (Weapons)

A subsequent field visit will be scheduled to confirm data. Once all information has been confirmed, a certification letter will be sent that states that the certification is contingent on maintaining the stated use, construction and SOP's.

The criteria for indoor and outdoor ranges are outlined in Chapter 2 and 3, respectively, in the UFC 4-160-01.

Table 3 summarizes the current certification status of the small arms training ranges evaluated in this study.

2.4 Recycling

According to DoD Instruction 4715.4, "All DoD installations must implement policy, assign responsibility, and prescribe procedures for the implementation of pollution prevention programs throughout the Department of Defense". This instruction applies to all DoD operations, activities, and installations within in the United States and territories.

In accordance with DoD Instruction 4715.4, the Navy has established a Qualified Recycling Program (QRP) as a component of its pollution prevention program. The QRP has been established for the following purposes:

- To avoid excessive costs for disposal of solid waste by other means.
- To reduce the volume of wastes disposed in landfills.
- To improve operational efficiency by the reuse of readily available resources.
- To comply with Navy and Marine Corps instructions.
- To comply with federal, state, and local environmental laws and regulations.
- To obtain proceeds from the sale of recyclable materials.

Table 3: Range Capabilities/Certification Status - Navy & Non-Navy Small Arms Range (Mid-Atlantic Region)

	Number of Lanes		Handguns		Sub-machine Gun	Shotgun	5.56 mm			7.62 mm			.50 cal
	Total No.	No. Oper.	9mm	.38 cal	MP5 (9mm)	12 gauge	M-4	M-16	M-249	M-14	M-60	M-240G	M-2
NAB - Mobile Range	3	3											
NAB - Rodriguez Indoor Pistol	15	15											
NAB - Rodriguez Outdoor Pistol Range	10	8											
NAB - Rodriguez Indoor Rifle Range	16	16											
NAB - Rodriguez Outdoor Rifle Range	10	10											
Naval Station - Mobile Range 1	3	3											
Naval Station - Mobile Range 2	3	3											
Naval Station - Mobile Range 3	3	3											
Cheatham Annex - Outdoor Pistol/Rifle Range	8	8											
Norfolk Shipyard - Indoor Pistol	10	7											
Oceana - Mobile Range	3	2											
Yorktown - Outdoor Pistol/Rifle Range	18	18					w/.22 conv kit	w/.22 conv kit					
Camp Pendleton - Rifle Range	30 on 25 yds 10 on 300yds	30 on 25 yds 10 on 300yds											
Dam Neck - Rifle Range	38	38											
Dam Neck - Pistol Range	22	22											
Northwest - IAMS Cell	116	116											
Northwest - Red Range (Non-Lethal Only)	not available	not available				Non-Lethal Only							
Northwest - Blue Range	3	3											
Ft. Eustis - Outdoor Pistol	25	25											
Ft. Eustis - Outdoor Rifle Range	33	33											
USCG Yorktown Outdoor Range	14	14											
Lynnhaven (indoor)	18	18											
Blackwater	unlimited	unlimited											
Bob's Gun & Tackle (indoor)	6	6											

Navy certified range
non certified Navy range

Expended brass cartridge casings and mixed metals collected from ranges are the two most common types of range residual materials associated with small arms ranges. Recyclable assets associated with small arms ranges must be certified safe and not require further demilitarization before they can be sold through a QRP.

Mixed metals (lead from bullet fragments) collected from small arms ranges are generally collected in a form unrecognizable from their original configuration and therefore do not require further demilitarization. Not all lead collected from ranges is acceptable for recycling; the QRP shall make the final determination. Lead that is considered unsuitable for recycling is separated from lead suitable for recycling, and then disposed of as a hazardous waste. Once a suitable amount of recyclable lead is collected it is then put up for sale to the general public.

Expended brass cartridge casings from ammunition associated with small arms are defined as expended brass of any caliber and material without the primer, propellant and projectile. Expended brass cartridge casings must be certified as demilitarized prior to being acceptable for sale to the general public. The Generator is responsible for inspecting expended brass casings. The Generator must verify their inspection with the following statement:

> "This certifies and verifies that the AEDA residue, range residue and/or explosive contaminated property listed has been 100 percent properly inspected, and to the best of our knowledge and belief, are inert and/or free of explosives or related materials."

After the QRP accepts the range scrap, the brass and mixed metals shall be separated accordingly. DRMO will accept custody of recyclable materials from small arms ranges only after it is certified as safe and is properly segregated.

The ranges are responsible for segregating and safeguarding range residue, inspecting and certifying the materials safe or inert, and ensuring that the material has been demilitarized. DRMO is responsible for sales, providing technical assistance in identifying property needing demilitarization, and reviewing the adequacy of demilitarization actions.

The Navy's Mid-Atlantic Region Recycling Center at NAB Little Creek is responsible for the demilitarization of expended brass cartridge casing and mixed metals collected from small arms ranges. According to Executive Order 13101, September 14, 1998, states that proceeds generated from the sale of demilitarized brass cartridge casings and mixed metals must go back into the operational budget of the Qualified Recycling Program. Once the costs of the QRP are covered, remaining funds (up to 50 percent of net proceeds) may be used for pollution abatement, pollution prevention, composting, alternative fuel vehicle infrastructure support and vehicle conservation, energy conservation, or occupational safety and health projects, with first consideration given to projects included in the installation's pollution prevention plans. Any remaining proceeds may be transferred to the non-appropriated moral, welfare, and recreation account for any approved program costs.

3.0 Data Collection

In February 2002, Baker conducted field visits and interviews to collect data from ranges and users located in the Mid-Atlantic Region. Prior to the field visit, each range received a data questionnaire. A sample data questionnaire is located in Appendix A. Several follow-up visits and meetings were held as additional users were identified by the Navy. Outlined below is the data collected from these visits.

3.1 Range Types

The first component to evaluating small arms utilization is understanding the types and capacities of small arms ranges in the Mid-Atlantic Region. During the field visits, ranges were reviewed and range masters interviewed to collect information on capacities, capabilities, certification, and maintenance requirements. A photographic log of the field visits are contained in Appendix B. Summaries of the information collected during the field visits are contained in Tables 4 – 7. A location map of current Navy assets is provided as Figure 1.

3.1.1 Indoor Ranges

Two indoor ranges were evaluated during the initial field visit, NAB Little Creek and Norfolk Naval Shipyard. The primary advantage of indoor ranges is that they can be located in highly populated areas and do not require surface danger zones (SDZ).

The indoor range complex at NAB Little Creek is comprised of a pistol range and a rifle-capable range. Both ranges use the wet snail bullet stop system for their backstop. The NAB Little Creek indoor pistol and rifle ranges can accommodate weapons up to and including 7.62 mm. The primary users of the NAB Little Creek indoor ranges are SPECWAR and EWTGLANT. Currently, this range is not certified.

The indoor pistol range at the Norfolk Naval Shipyard has a granular rubber backstop and can accommodate .38/9 mm/.45 caliber handguns, as well as 12-gauge shotgun (00 buck ammunition). The primary users of the Shipyard range are the security personnel.

Table 4: Range Summary - Navy Indoor Ranges

	NAB - Mobile	NAB - Rodriguez Indoor Pistol	NAB - Rodriguez Indoor Rifle	Naval Station - Mobile Ranges (3 units total)	NNSY - Indoor Pistol	Oceana - Mobile Range
Number of Lanes	3	15	16	9 total (3 lanes per unit)	10	3
Number of Operational Lanes	3	15	16	9 total (3 lanes per unit)	7	3
Lane Distances	10 m	25 m	25 m	10 m	25 m	10 m
Type of Weapons Allowed	handguns (.38/9mm/.45) 12 gauge possible	handguns (.38/9mm/.45) & Rifles (5.56/7.62)	handguns (.38/9mm/.45) & Rifles (5.56/7.62)	handguns (.38/9mm/.45) 12 gauge possible	handguns (.38/9mm/.45) 12 gauge	handguns (.38/9mm/.45) 12 gauge possible
Targets System	non-turning trolley wire	hand operated trolley wire targets system	hand operated trolley wire targets system	non-turning trolley wire	turning monorail target system	non-turning trolley wire
Backstop	single row lamella	wet snail bullet stop	wet snail bullet stop	single row lamella	granular rubber trap	single row lamella
Hours of Operation	0700-1530 M-F	0700-1530 M-F	0700-1530 M-F	0700-1700 M-F	0600-1800 M-F	0700-1530 M-F

Figure 1: Location of Mid-Atlantic Region Small Arms Training Ranges

NOT TO SCALE

3.1.2 Mobile Ranges

There are five mobile ranges located in the Mid-Atlantic region distributed throughout three bases, NAS Oceana, Naval Station Norfolk, and NAB Little Creek. The mobile ranges are maintained and operated by the security departments for each base. As such, the funding of maintenance comes directly from the security department's limited operating budgets.

The mobile ranges are built by two different companies, but the design platform is essentially the same. Each mobile range is built in the confines of a standard tractor-trailer. Each trailer has 3 lanes with a firing distance of 10 meters. The backstop material is either a single or double row of lamella. According to the manufacturer, a maintained mobile range has a life-span of greater than 25 years.

The primary advantage of the mobile ranges is their portability. The ranges can be transported and parked at almost any location, saving time by not having to transport sailors to ranges. Currently, none of the five mobile ranges located in the Mid-Atlantic region are operated as mobile. Each range can be run off a generator when a land connection is not available.

The disadvantage of the mobile ranges is their limited capacity and capabilities. At capacity, each mobile range can accommodate three shooters firing handguns or shotguns with a firing distance of 10 meters. The other disadvantage is the high maintenance costs associated with the mobile ranges. The lamella must be replaced routinely and disposed of as hazardous waste.

3.1.3 Outdoor Ranges

Seven outdoor ranges were evaluated during the initial field visit at NAB Little Creek, NAS Oceana, Dam Neck Annex, NWS Yorktown, NWS Yorktown Cheatham Annex, and NSA Northwest.

There are two outdoor ranges located at NAB Little Creek, an outdoor pistol and an outdoor rifle range. Both ranges have their SDZ located across the waters of the Chesapeake Bay. The use of the outdoor ranges at NAB Little Creek has limitations during the summer months due to the issue of maintaining a clear SDZ. Enforcement of the SDZ in the summer becomes more difficult due to an increase of boat traffic and recreational beach usage. The outdoor pistol range can accommodate .38/9 mm/.45 caliber handguns as well as 12-gauge shotguns (00 buck ammunition). The outdoor rifle range has the capability to handle 5.56 mm rifles. SPECWAR and EWTGLANT have been the primary users of the ranges. These ranges are not currently certified.

Table 5: Range Summary - Navy Outdoor Ranges

	NAB - Outdoor Pistol	NAB - Outdoor Rifle	CAX - Outdoor Pistol/Rifle	Yorktown - Outdoor Pistol/Rifle	Dam Neck - Pistol	Dam Neck - Rifle	Northwest IAMS	Northwest IAMS Blue Range	Northwest IAMS Red Range
Number of Lanes	10	10	8	18	22	38	116	3	not available
Number of Operational Lanes	8	10	8	18	22	38	116	3	not available
Lane Distances	10 m	25 m	25 m	10 m	50m	50m	10 m	10 m	10 m
Type of Weapons Allowed	handguns (.38/9mm/.45) 12 gauge	handguns (.38/9mm/.45) 12 gauge & Rifles (5.56/7.62)	handguns (.38/9mm/.45) 12 gauge & Rifles (5.56/7.62)	handguns (.38/9mm/.45) 12 gauge, M-4/16 w/ .22 conversion kit	handguns (.38/9mm/.45) 12 gauge	handguns (.38/9mm/.45) 12 gauge & Rifles (5.56/7.62)	handguns (.38/9mm/.45) 12 gauge	12 gauge	Non-Lethal Ammunition Only
Targets System	wood posts/paper targets	wood posts/paper targets	wood posts/paper targets	reactive steel/turning targets	wood posts/paper targets reactive steel	manual lifter target	reactive steel		
Backstop	earthen/sand berm	earthen/sand berm	earthen berm	earthen berm	earthen berm	earthen berm	tires on earthen berm	earthen berm	earthen berm
Hours of Operation	summer 0730-1530 M-Tu summer 0730 1130 W-F fall/winter 0700-1530 M-F	summer 0730-1530 M-Tu summer 0730 1130 W-F fall/winter 0700-1530 M-F	0700-1630 M-F	to be determined	24 hr	24 hr	0700-1630 M-F	0700-1630 M-F	0700-1630 M-F

There are two outdoor ranges located at Dam Neck Annex, an outdoor pistol and rifle range. The SDZ of both ranges extends over the Atlantic Ocean in Virginia Beach, just north of Sandbridge. The outdoor pistol range SDZ can accommodate .38/9 mm/.45 caliber handguns as well as 12-gauge shotguns (00 buck ammunition). The outdoor rifle range SDZ has the capability to handle rifles up to 7.62 mm. Range time may be affected at times by the transit of commercial and recreational boat traffic passing through the SDZ. Additionally, because of the unique requirements due to command mission, Naval Special Warfare Development Group (NSWDG) has security concerns with the flow of uncleared personnel to and from the rifle range. The primary user of the Dam Neck Annex ranges has been the Marine Corp Security Force Battalion (MCSFBn) and NSWDG. Through a Memorandum of Agreement (MOA) with NAS Oceana, NSWDG has exclusive use of the ranges during certain times of the week.

The outdoor range at NWS Yorktown Cheatham Annex (CAX) is capable of handling all pistols, shotguns, and rifles up to and including 7.62 mm. The SDZ of the outdoor range extends over portions of the York River. Utilization of the range may be affected at times due the transit of boats through the SDZ. An increase of boat traffic occurs mainly during the summer months and through the commercial fishing season. The primary users of the CAX outdoor range are the security personnel from NWS Yorktown.

The range at NWS Yorktown is an outdoor pistol range, which has recently been refurbished and is awaiting approval for use. The SDZ in place is capable of accommodating .38/9 mm/.45 caliber handguns, 12-gauge shotguns (00 buck ammunition), and M-16/4 with .22 caliber conversion kits. The anticipated primary users of this range will be the MCSFBn.

The IAMs Range is located at NSA Northwest and contains eight (8) cells with SDZs capable of handling .38/9 mm/.45 caliber handguns as well as 12-gauge shotguns (00 buck ammunition). The berms at the IAMs cell are earthen with tires placed on the top and sides of the berms. The primary users of the facility are the Marines.

Two additional ranges, Red and Blue, are located at NSA Northwest. The Blue Range is a 3-lane range, which can accommodate 12-gauge shotguns only. The Red Range can handle weapons firing non-lethal ammunition only.

3.1.4 Private Ranges

Several privately owned ranges in the Mid-Atlantic Region are routinely used for qualification firing. The ranges include Lynnhaven Shooting Range, Bob's Gun Shop, Virginia Beach Outdoor Shooting Range, and Blackwater. These ranges are utilized when time cannot be reserved on a Navy range or if Navy ranges do not have the capability. These ranges are currently not certified for Navy use.

Bob's Gun Shop is located in downtown Norfolk. It is an indoor pistol range with an armor plate backstop capable of handling .38/9 mm/.45 caliber handguns. At times, ships may use Bob's for qualification firing due to its close proximity to Naval Station Norfolk.

Lynnhaven Shooting Range is an indoor range located by the Lynnhaven Mall in Virginia Beach. It is an indoor range with an armor plate backstop capable of handing all handguns and rifles up to 7.62 mm. The facility is used primarily for qualification firing.

Virginia Beach Outdoor Shooting Range is an outdoor facility located in Virginia Beach near the North Carolina border. It is a pistol and rifle-capable outdoor range primarily used by SPECWAR. This outdoor range is occasionally used by ships and other units for qualification firing when Navy facilities are unavailable.

Blackwater is an outdoor shooting complex with various types of small arms ranges capable of handing small arms up to .50 caliber. It is located just across the North Carolina border in Moyock. The primary Navy user of this facility is SPECWAR at Blackwater's 1,200-yard sniper range.

Table 6: Range Summary - Private Ranges

	Lynnhaven Shooting Range - A & P Arms	Bob's Gun Shop	Virginia Beach Outdoor Shooting Range	Blackwater
Type of Range	Indoor	Indoor	Outdoor	Outdoor
Number of Lanes	18	6	52	One & two story kill houses, (20) in, 1,200 yd, 25,000 sq ft urban training area, various pistol/rifle ranges w/various target systems
Number of Operational Lanes	18	6	51	
Lane Distances	25 yds	10 yds	(16)-25 yds./(14) 50 yds. (15) 100 yds./(6) 200 yds.	(16)-25 yds./(14) 50 yds. (15) 100 yds./(6) 200 yds.
Type of Weapons Allowed	handguns (.38/9mm/.45) 12 gauge & rifles (5.56/7.62)	handguns (.38/9mm/.45)	handguns (.38/9mm/.45) 12 gauge, rifles (5.56-.50) & machineguns (5.56/7.62)	handguns (.38/9mm/.45) 12 gauge, rifles (5.56-.50) & machineguns (5.56-.50)
Targets System	motorized trolley wire targets	motorized trolley wire targets	wood stands/paper targets	wood stands/paper targets
Backstop	armor plate	steel backstop (LE2200)	earthen berm	earthen berm/steel/none
SDZ	n/a	n/a	4,800 yds.	5,200 acre impact area/federal easement
Hours of Operation	7am to 10 pm	9am - 10am (M-Sat)	SPECWAR 10am-12pm (M-F) - 12pm to 6pm (M-Sat)/1pm to 6pm (Sun)	Daylight as well as night training
Costs	$75 bay/hr	$50 (6) in/hr - $100/day per in	SPECWAR Contract $25K/yr. All other units $10/day	GSA schedule

3.1.5 Non-Navy DoD Ranges

Camp Pendleton is a Virginia Army National Guard Installation. It is an outdoor range capable of handling all handguns, 12-gauge shotguns, and 5.56 mm rifles. The installation is located in Virginia Beach just north of the Dam Neck Annex and directly south of an upper middle class community. The SDZ of the Camp Pendleton range extends over the Atlantic Ocean. Range time may be limited due to commercial and recreational boat traffic in transit through the SDZ. The number of lanes available for use are limited when firing at the 300-meter line due to safety concerns. During the summer months (Memorial Day through Labor Day) the parking facilities located adjacent to the range are leased to the City of Virginia Beach and the range cannot be utilized. This range is not currently certified for Navy use.

Ft. Eustis, located in Newport News, has outdoor range facilities with SDZs capable of handing all types of handguns as well as 5.56 mm rifles. The Navy uses the facilities at for ship qualification firing when Navy range facilities are unavailable. This range is currently not certified.

Fort AP Hill and Fort Pickett are used for crew served weapons qualification and training.

Table 7: Range Summary - Non-Navy DoD Ranges

	USCG Yorktown	Ft. Eustis - Outdoor Pistol	Ft. Eustis - Outdoor Rifle	Camp Pendleton
Type of Range	Outdoor	Outdoor	Outdoor	Outdoor
Number of Lanes	14	25	33	30
Number of Operational Lanes	14	25	33	30 at 25 m 10 at 300 m
Lane Distances	25 yds	25 m	25 m	25 m - 300 m
Type of Weapons Allowed	handguns (.38/9mm/.45) 12 gauge & rifles (5.56/7.62)	handguns (.38/9mm/.45) 12 gauge, rifles (5.56)	handguns (.38/9mm/.45) 12 gauge, rifles (5.56)	handguns (.38/9mm/.45) 12 gauge, rifles (5.56)
Targets System		manual stake target	manual stake target	manual target lifters
Backstop	armor plate	earthen berm	earthen berm	earthen berm
Hours of Operation	0700-1530 M-F	0700-2200 M-Su	0700-2200 M-Su	0700-2200 M-Su Closed Memorial Day thru Labor Day

Table 8: User Requirements - Total Personnel

WEAPONS	TYCOM				SECURITY					
	AIRLANT		SURFLANT	SUBLANT	Oceana Security	Naval Station Security	Yorktown Security	Little Creek Security	NNSY Security	Northwest Security
	WING	CVN								
Handguns										
9mm	600	10,800	9,959	420	446	440	180	1,860	230	25
9mm nightfire					446	440	180	1,860	230	25
.38 cal										
Shotgun										
12 gauge		10,800	7,556	420	406		180	1,480	150	25
5.56 mm										
M-4										
M-16		1,200	6,373	300	56	440	180	600	150	
M-249										
7.62 mm										
M-14		1,200	6,373							
M-60		150	1,638	300		440	180			
M-240G		150								
.50 cal										
M-2			2,457							

[1] NSWDG- numbers not available
UNITS - persons per year

3.2 User Requirements

The second component to evaluating small arms utilization is understanding the requirements of the users. The users were interviewed to determine range usage, frequency of use and numbers of personnel requiring range time on an annual basis. The users were placed into one of four categories: school, TYCOMs, security, and other. EWTGLANT and MCSFBn were placed in the school category. TYCOM's included AIRLANT, SURFLANT, and SUBLANT. The Security category included the security departments from NAS Oceana, Naval Station Norfolk, NWS Yorktown, NAB Little Creek, and NSA Northwest. Other users that were included in the evaluation were SPECWAR, reserve units, EOD, FAST Co., and NCIS.

Each identified small arms user was interviewed to determine:

- Total number of persons requiring range time for small arms qualification.
- Types of weapons used for qualification.
- Ranges utilized in the last year.
- Scheduling conflicts/difficulties.

After the field visit, the user data was sorted by weapon type and command and placed in Table 8. Raw data pertaining to personnel requiring qualification training has been complied in Appendix C.

3.3 Scheduling

The third component to evaluating small arms utilization is understanding the current scheduling systems for each of the ranges. Each range is responsible for the coordination of the scheduling

Table 8 (continued)

OTHER COMMANDS									Totals
SPECWAR[1]	EWTGLANT	NCWG2	EOD MU2	EOD MU10	NCIS	MCSFBn		USCG	
						FAST Co.	course		
1,659	5,078	204	230	75	105	2,096	4,300	100	38,807
									3,181
					105				105
1,631	4,826	204	230		105	1,305	1,800	100	31,218
1,659									1,659
	4,826	204	230	75		2,273	1,380	100	18,387
						1,305			1,305
	4,826					1,305	240		13,944
1,659		90	230						4,687
						1,305			1,455
		90				1,305			3,852

of their facility and establishing a single point of contact. For most ranges interviewed, there are primary users that reserve range time up to one year in advance, if a schedule is known. The remaining available time is opened on the first day of each month, on a first-call basis. Users must call or fax each individual range to determine availability for the next 30 days. If time is unavailable, the user will continue to call each range until a time can be reserved. Presently, there is no database that centrally tracks range utilization information.

3.4 Ammunition

The final component to evaluating small arms utilization is understanding the current system for ammunition allocation and associated costs. Tracking of small arms non-combat expenditure allowance (NCEA) ammunition is performed in the same manner as all other Navy ordnance. All ordnance is managed and monitored using the Retail Ordnance Logistics Management System (ROLMS). User/units are required to maintain and track ordnance and report when and to whom the ordnance is transferred. NCEA expenditures are closely monitored and controlled. NCEA Requirements and Allocation Management policies are further outlined in CINCLANTFLTINST 8010.12.

A portion of the NCEA ammunition is used for qualification training. The ammunition costs associated with qualifying the small arms users in the Mid-Atlantic Region were calculated as well as the cost per person. These calculations are included in Appendix D. The total ammunition cost for qualification firing for the Mid-Atlantic Small Arms users is approximately $8 million.

4.0 Process - Calculations

The first step in determining if the Navy has sufficient ranges to meet their users requirements is to determine and quantify range capacities and the time users need to complete qualification course of fire specified in OPNAVINST 3591.1C .

4.1 Range Capacities

To quantify the range capacities, ranges were first segregated by type, pistol or rifle, and the numbers of operational lanes were determined for each range. The numbers of operational lanes were multiplied by operating hours to provide total lane hours available per day at each range. To determine the total lane hours available per year, the daily lane hours were multiplied by 225 days for indoor ranges and 238 days for outdoor ranges. The days per year were based on 50 weeks per year and five days a week available for firing. To account for maintenance down-time, four hours a week were removed from the available hours for indoor ranges and two hours per week were removed from the available lane hours for outdoor ranges. Additionally, consideration was given to actual lane utilization that could vary between 60% and 100% based on:

- Smaller Units reserving entire range (vacant lanes)
- Inefficient scheduling

Table 9 provides the total available lane hours per year for Small Arms Ranges in the Mid-Atlantic Region.

Table 9: Current Navy Assets Range Capacities (Lane Hours per year)

Installation/Range	Number of Lanes		Normal Hours Avail. Per Day	Total Lane Hours		Number Days Per Year	Utilization Per Year (hours)			
	Total No.	No. Operational		Pistol	Rifle		100%	80%	75%	60%
PISTOL/SHOTGUN INDOOR										
NAB - Mobile Range	3	3	8	24		225	5,400	4,320	4,050	3,240
NAB - Rodriguez Indoor Pistol	15	15	8	120		225	27,000	21,600	20,250	16,200
Naval Station - Mobile Range 1	3	3	8	24		225	5,400	4,320	4,050	3,240
Naval Station - Mobile Range 2	3	3	8	24		225	5,400	4,320	4,050	3,240
Naval Station - Mobile Range 3	3	3	8	24		225	5,400	4,320	4,050	3,240
Norfolk Shipyard - Indoor Pistol	10	7	8	56		225	12,600	10,080	9,450	7,560
Oceana - Mobile Range	3	2	8	16		225	3,600	2,880	2,700	2,160
PISTOL/SHOTGUN OUTDOOR										
NAB - Outdoor Pistol Range	10	8	7.5	60		238	14,280	11,424	10,710	8,568
Yorktown - Outdoor Range	18	18	8	144		238	34,272	27,418	25,704	20,563
Dam Neck - Pistol Range	22	22	8	176		238	41,888	33,510	31,416	25,133
Northwest - IAMS Cell	116	116	8	928		238	220,864	176,691	165,648	132,518
Northwest - IAMS Blue Range	3	3	8	24		238	5,712	4,570	4,284	3,427
Northwest - IAMS Red Range (Non-Lethal Only)										
TOTAL HOURS - PISTOL/12 ga							**381,816**	**305,453**	**286,362**	**229,090**
RIFLE INDOOR										
NAB - Rodriguez Indoor Rifle Range	16	16	8		128	225	28,800	23,040	21,600	17,280
RIFLE OUTDOOR										
NAB - Outdoor Rifle Range	10	10	7.5		75	238	17,850	14,280	13,388	10,710
CAX - Outdoor Pistol/Rifle Range	8	8	8		64	238	15,232	12,186	11,424	9,139
Dam Neck - Rifle Range	38	38	7		266	238	63,308	50,646	47,481	37,985
TOTAL HOURS - RIFLE							**125,190**	**100,152**	**93,893**	**75,114**

4.2 User Requirements

The next step of the process is to quantify the lane hours required for a small arms user to complete the qualification courses specified in OPNAVINST 3591.1C. To calculate the lane hours, personnel numbers specified in Table 8 were multiplied by the time each qualification course of fire requires to complete. A standard time of four hours for initial qualification and two hours for semi-annual qualification was assumed for this study based on data collected from range operator and users. This time reflects the average total time a unit needs to be on the range for safety instruction, qualification firing, as well as time to clear the range. Table 10 provides the total lane hour requirements for small arms qualification by command type.

4.3 Evaluation

The next step in determining if the Navy has sufficient ranges to meet the users qualification requirements is to compare range capacities to user requirements. Table 11 compares the available lane hours to qualification requirements of the small arms range user in the Mid-Atlantic Region.

Table 10: User Requirements - Total Lane Hours per Year

WEAPONS	TYCOM				SECURITY					
	AIRLANT		SURFLANT	SUBLANT	Oceana Security	Naval Station Security	Yorktown Security	Little Creek Security	NNSY Security	Northwest Security
	WING	CVN								
Handguns										
9mm	1,800	64,800	59,754	2,520	2,676	3,840	1,080	11,160	1,380	250
9mm nightfire					892	1,280	360	3,720	460	50
.38 cal										
Shotgun										
12 gauge		64,800	45,336	2,520	2,436		1,080	8,880	900	250
5.56 mm										
M-4										
M-16		7,200	38,238	1,800	336	2,640	1,080	3,600	900	
M-249										
7.62 mm										
M-14		7,200	38,238							
M-60		900	1,800	1,800		2,640	1,080			
M-240G		900								
.50 cal										
M-2			9,828							
TOTAL	**1,800**	**145,800**	**193,194**	**8,640**	**6,340**	**10,400**	**4,680**	**27,360**	**3,640**	**550**

[1] NSWDG - numbers not available

Table 11: Requirements vs. Assets

Weapon Type	Required Lane Hours Per Year	Assets (Lane Hours/Year)				Deficit (Lane Hours/Year)			
		100%	80%	75%	60%	100%	80%	75%	60%
Pistol & Shotgun	433,615	381,816	305,453	286,362	229,089	-51,799	-128,162	-147,253	-204,526
Rifle 5.56/7.62	216,492	125,190	100,152	93,893	75,114	-91,302	-116,340	-122,599	-141,378
Crew Served/Machine Gun	54,780	0	0	0	0	-54,646	-54,646	-54,646	-54,646

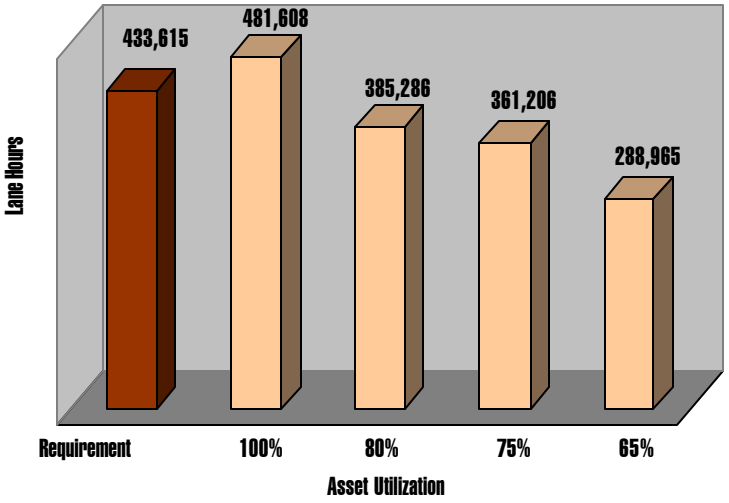
Table 10: (continued)

OTHER COMMANDS									Totals
SPECWAR[1]	EWTGLANT	NCWG2	EOD MU2	EOD MU10	NCIS	MCSFBn		USCG	
						FAST Co.	course		
9,954	20,312	1,224	1,380	405	1,050	10,994	61,488	600	256,667
									6,762
					1,050				1,050
9,786	19,304	1,224	1,380		1,050	7,830	1,760	600	169,136
9,954									9,954
	19,304	1,224	1,380	450		11,742	25,232	600	115,726
						7,830			7,830
	19,304					7,830	18,240		90,812
9,954		504	1,380						20,058
						7,830			8,730
		504				7,830			18,162
39,648	**78,224**	**4,680**	**5,520**	**855**	**3,150**	**61,886**	**106,720**	**1,800**	

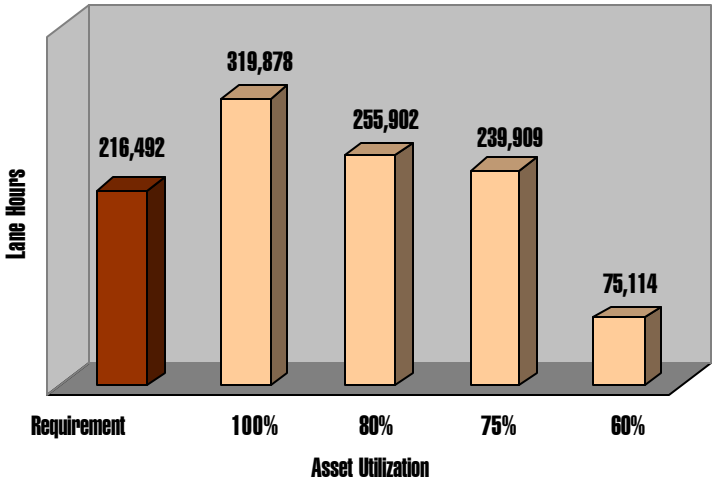
5.0 Findings

Based on the current small arms ranges in the Mid-Atlantic Region, there is a significant deficit of available lane hours to meet the qualification requirements of the small arms user. For pistols and shotguns, there is a deficit of between 48,329 and 144,650 lane hours (Graph 1). For rifles, the lane hour deficit is 24,565 lane hours (Graph 2). Currently in the Mid-Atlantic Region, the Navy does not own ranges on which users can qualify on crew-served weapons. The deficit for crew-served is 54,780 lane hours.

Graph 1: Current Pistol/Shotgun Requirements vs. Assets



Graph 2: Current Rifle Requirements vs. Assets



6.0 Business Plan

A Conceptual Business Plan was developed to assist in visualizing the goal of centralizing the management of the small arms training ranges. The Plan was based on a "Balanced Scorecard" approach to help guide the implementation of a regional program by providing targets and measured goals (Figure 2). The "Balanced Scorecard" focused on monitoring four key factors:

- Financial – Planning, Programming, and Forecasting of Funding
- Customer – Providing Web-Based Scheduling
- Process – Building and Maintaining Small Arms Ranges
- Workforce – Instilling Ownership

A full copy of the Business Plan is contained in Appendix E.

6.1 Storefront Management

The overall objective is to centralize the management of small arms ranges into a program that provides better customer service by establishing a single point of contact. The Program Manager

Figure 2: Balanced Scorecard

would be responsible for the scheduling, staffing, and all operational aspects of the small arms ranges.

6.2 Scheduling

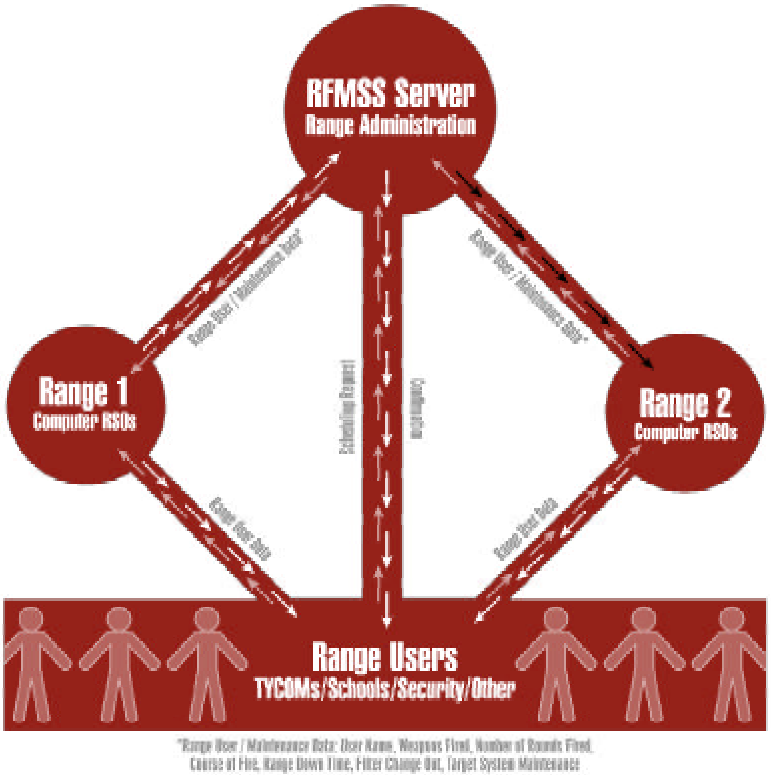
To provide better range scheduling, a scheduling software that provides a platform for scheduling and data collection (database) should be implemented. One solution is a DoD contractor software package, Range Facility Management Support System (RFMSS). RFMSS is a versatile, state-of-the-art application designed to assist range personnel in managing training resources. This application provides the customer with a user-friendly interface for requesting and scheduling training resources. It is also intended to track usage and maintenance downtime.

RFMSS provides a standard, integrated system that would assist the storefront in providing training support for units and schools to manage valuable range lane hours. RFMSS also supports all major range management processes, including; range and training area scheduling, unit and range control of approval processes, automation of range firing desk operations, creation and management of surface danger zones (SDZ), and maintenance.

RFMSS is a client-server system with system requirements differing for the client and the server. All range control functions are accessed through a single database and a single executable program managed by the program manager. Range data stored in the RFMSS database is entered into the system from each of the ranges. This data could include training unit, total personnel trained, qualification course; number of rounds expended, and total hours and lanes utilized (Figure 3).

The scheduling capabilities of RFMSS provide the ability for units that use training facilities on an installation to determine the availability of the facilities, submit requests for

Figure 3: RFMSS



the facilities, and determine the status of their submitted requests. Remote access to RFMSS permits users to identify available resources and submit schedule requests. In order to access RFMSS via remote access through the Internet users must have a user ID and password. User IDs and passwords would be issued by the program manager. The program manager will prioritize users for each range. Each range will maintain a "storefront" that is operated by either the primary user or the operator. The following are the proposed storefronts:

- NSA Northwest IAMS – Marines
- NAB Little Creek Indoor/Outdoor Ranges – NAB Little Creek
- NAB Little Creek Mobile Range – NAB Little Creek Security
- NWS Yorktown – FAST Company
- Cheatham Annex – NWS Yorktown Security
- Naval Station Norfolk – Naval Station Norfolk Security
- NAS Oceana – NAS Oceana Security
- Norfolk Naval Shipyard – Norfolk Naval Shipyard Security
- Dam Neck Annex – Marines (currently), NSWDG (future)

RFMSS scheduling features also enable range administrators to initiate and process requests for RFMSS managed facilities and to publish the range bulletin listing the planned training on the facilities for a defined period of time. This would allow ranges to prioritize their users and reserve time for primary users.

6.3 Maintenance

In order to achieve maximum use and life-span from all small arms ranges, regular on-going maintenance will be required. Maintenance schedules should be established for each range and executed by the program manager. Standard operating procedures (SOP) should be developed as part of the maintenance program. Yearly maintenance contracts are available through the NAVFAC Engineering Innovation and Criteria Office (EICO).

For indoor ranges, routine maintenance should include preventive maintenance for the ventilation system. A ventilation maintenance contract is currently available through NAVFAC EICO. According to UFC 4-160-01, a ventilation maintenance contract will be required for recertification.

For outdoor ranges, berms must be pH tested every two years. The pH levels must remain neutral between six and eight. Contaminant monitoring is required for lead and nitrates based on range usage. Lead must be removed, through sifting, from the berm when accumulation becomes a ricochet hazard.

SDZ areas must be monitored and maintained on a routine basis. SDZ that overlay water bodies must be marked with buoys at the outer limits, when applicable. The US Army Corp of Engineers and the Coast Guard must be informed of any changes for SDZ's overlying water bodies so that notifications can be made to mariner traffic.

7.0 Scenario Evaluation

An economic analysis was generated to compare various scenarios against the existing small arms management system to determine the most cost effective and beneficial scenario. Each scenario utilized in the economic analysis would meet the small arms training requirements for the Mid-Atlantic Region. A baseline scenario was developed for comparison purposes only. It is important to note that the baseline, although less costly, represents a range structure that does not provide sufficient training ability.

Under both scenarios, the ranges in the Mid-Atlantic Region would be centrally managed under a storefront/program manager philosophy. Also, existing ranges would be improved for safety, capacity, or certification reasons. Both scenarios also assumed that the proposed Marine MCCS Range at Camp Allen and one additional EWTGLANT cell at NSA Northwest would be complete. The costs associated with implementing a program manager, improving existing ranges, and expanding the range inventory were evaluated under both scenarios. Changes in civilian and military manpower were not considered as part of this analysis.

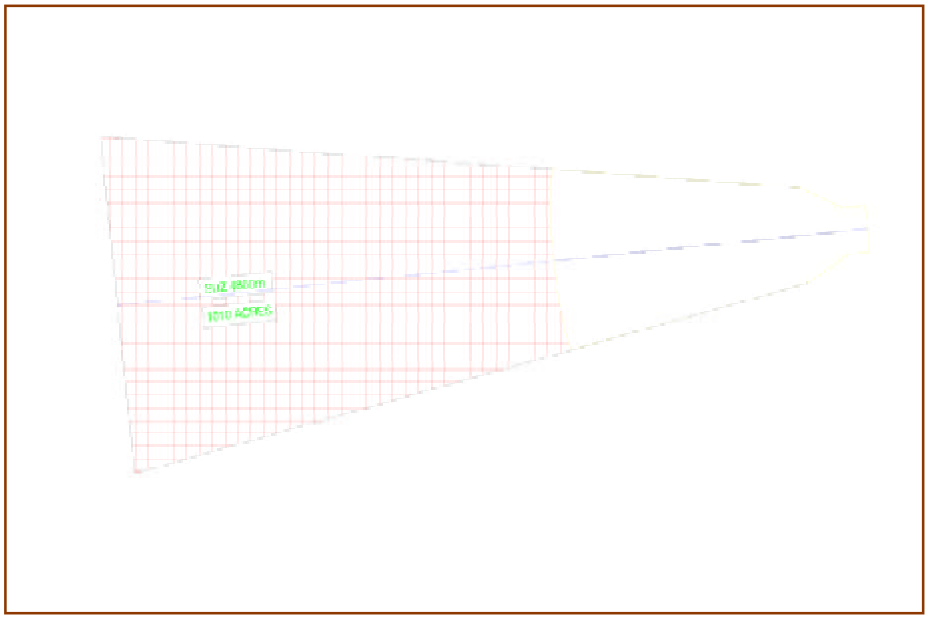
A complete copy of the economic analysis and input parameters is located in Appendix F.

Scenario A – Maximum Capitol Investment

Under this scenario, several factors were evaluated:

- A new indoor range with 32 operational lanes will be constructed to the standards set forth in UFC 4-160-01 to accommodate up to and including a 7.62 mm rifle. The indoor range would be constructed at or near Naval Station Norfolk on existing Navy property. The new range would maintain an annual ventilation maintenance contract.
- The existing SDZ at the NSA Northwest IAMs Range would be expanded to 4,800 meters, approximately 1,000 acres, to accommodate up to and including 7.62 mm rifle (Figure 4). To expand to 4,800 meters, 1,000 additional acres of land would need to be purchased by the Navy and an environmental assessment would need to be performed.

Figure 4: Northwest SDZ Expansion (7.62mm rifle capable)



- All mobile ranges would be removed and phased out of service. The mobile ranges would be cleaned of all lead and brass casings prior to disposal.
- Existing Navy-owned simulators would continue to be utilized in the same manner as currently utilized.
- The use of all private ranges for qualification firing would be suspended. Use of non-Navy DoD ranges would continue for all qualification firing not available in the Mid-Atlantic Region.

Scenario B – Minimal Capitol Investment

- All existing mobile ranges would remain in service for an additional 20 years. Routine maintenance would be required under this scenario.
- There would be an increased usage of private ranges in the Hampton Roads area for qualification firing.
- Two additional laser simulators would be purchased to enhance training prior to qualification firing, reducing range hours.

7.1 Economic Analysis – Summary

Based on the input parameters (Appendix F) for the scenarios and baseline, the net present value (NPV) is outlined below:

Scenario A	$16.4 M
Scenario B	$14.9 M
Baseline	$9.5 M

The calculations, assumptions, and basis for the economic analysis are provided in Appendix F. Scenario B is the less costly alternative. While having the lower capitol investment, it provides the minimum training and range space required (through simulation), but incurs higher outyear costs associated with private and mobile ranges. Scenario A has the highest life cycle costs. This is due to the high cost ($4 M) for construction of a new 32 lane indoor range. This scenario represents a more realistic training requirement. The baseline scenario was run for comparison purposes only. It is important to note that the baseline, although less costly, represents a range structure that does not provide sufficient qualification training ability.

8.0 Recommendations

Based on the data collected from the field visits and the results of the economic analysis, additional range capacity is required to meet the small arms training requirements of the Mid-Atlantic Region. Cost, efficiency, safety, and customer focus were the deciding factors for choosing the best options for the small arms training ranges. These options are a starting point for developing an overarching framework to manage and meet the Fleet's small arms training requirements in the Mid-Atlantic. It is recommended that the following options be implemented:

- A Small Arms Training Range Regional Program should be implemented that would be responsible for all aspects of scheduling, maintenance, and funding of the ranges in the Mid-Atlantic. The program manager shall institute a centralized scheduling system to provide easier and more efficient scheduling of the ranges for all the users. This system would also serve as a means to obtain data on usage rates, users, and maintenance requirements. This data would allow the program manager to develop long-range requirements and future funding needs.

- An indoor rifle range should be constructed at or near the Naval Station Norfolk with a minimum of 32 operational lanes. The range construction will meet the standards specified in UFC 4-160-01 and have an expected lifespan of 50 years. The range would be rifle capable up to and including 5.56 mm. The primary users are expected to be TYCOMs and Naval Station Norfolk Security due to the new range's close proximity to the piers and ships. The anticipated construction cost is $4M.

- The surface danger zone for the IAMs Range at NSA Northwest shall be expanded to 4,800 meters to accommodate 7.62 rifle capabilities. To expand to 4,800 meters, approximately 1,000 additional acres would need to be purchased from the existing landowners. As of this report, a portion of the land is on the market. Based on use, the current land price is $2K - $3.5K per acre. The approximate cost to purchase the additional land to expand the SDZ is $3.5M. As part of the expansion, new target systems would need to be purchased for an approximate $1M.

- The outdoor ranges at Dam Neck Annex, Cheatham Annex and NAB Little Creek surface danger zones cover navigable waterways. As such, firing must cease when a boat enters and traverses the SDZ. Currently, two individuals stand watch during firing to ensure the SDZ remains clear. To further enhance safety, a radar system should be installed at each of these ranges. The radar system would enable range users to monitor the SDZ from television screens mounted in the Range Masters booth at each range. The expected cost for purchase and installation is $10K per range.

- The surface danger zone for the Blue Range at NSA Northwest shall be expanded 1,840 meters to accommodate all caliber handguns (.38/9 mm/.45). To expand to 1,840 meters a minimal acquisition of land may need to be purchased from the existing landowner.

- Phase out the five existing mobile ranges over the next three years after the new 32 lane indoor range at NAVSTA is completed. The UFC 4-160-01 states that commands utilizing mobile ranges must ensure adequate financial support is available because of the difficultly and expense associated with maintenance. The average cost of maintaining one mobile range per year is approximately $80K. Due to their limited capacities (three lanes) and high maintenance costs, it would be beneficial to begin a phase-out of the mobile ranges.

- According to UFC 4-160-01 Section 2-2, on-going maintenance by a qualified ventilation contractor is essential to maintaining an indoor range. A ventilation maintenance contract is required for a facility to maintain certification. As such, the NAB Little Creek Rodriquez Range will require a retrofitted ventilation system. The new ventilation system is expected to cost $600K with an annual maintenance contract of $10K.

- To maintain safe and efficient ranges, on-going maintenance will be required at each facility. The program manager should implement maintenance contracts (when applicable), refurbish backstops/berms, and ensure all ranges have a contaminant monitoring program. For example, the berm at the IAMs Range is faced with used tires. These tires should be removed and replaced with a loam material that is easier to maintain and will not require ultimate disposal as a hazardous waste. The cost to remove the tires and resurface the berm is approximately $300K.

- Due to land constraints on Navy bases, the costs associated with obtaining and maintaining an SDZ for crew-served weapons is impractical. The Navy should continue to utilize non-Navy DoD facilities to train users on crew-served weapons.

Table 12 illustrates the available lane hours if the options outlined above are implemented in the Mid-Atlantic Region. There would be an increase of 90,272 pistol lane hours and 194,688 rifle lane hours available to the users. Table 13 compares these available lane hours to qualification requirements of the small arms user in the Mid-Atlantic Region.

Implementation of the options would result in an increase of lane hours that would be the first step in meeting the small arms training requirement of the Fleet in the Mid-Atlantic Region. The transition to a Regional Small Arms Program will provide the framework necessary to collect and study range data to further define the future needs of the Mid-Atlantic Region.

Table 12: Navy Assets Lane Hours (Scenario A)

Installation/Range	Number of Lanes		Normal Hours Available Per Day	Total Lane Hours		Number Days Per Year	Utilization Per Year (hours)			
	Total No.	No. Oper.		Pistol	Rifle		100%	80%	75%	60%
PISTOL/SHOTGUN INDOOR										
NAB - Rodriguez Indoor Pistol	15	15	16	240		225	54,000	43,200	40,500	32,400
Naval Station - New Indoor	32	32	12	384		225	86,400	69,120	64,800	51,840
Norfolk Shipyard - Indoor Pistol	10	7	16	112		225	25,200	20,160	18,900	15,120
Marine MCCS - New Indoor	18	14	16	224		225	50,400	40,320	37,800	30,240
PISTOL/SHOTGUN OUTDOOR										
NAB - Outdoor Pistol Range	10	8	7.5	60		238	14,280	11,424	10,710	8,568
Yorktown - Outdoor Range	18	18	8	144		238	34,272	27,418	25,704	20,563
Dam Neck - Pistol Range	22	22	8	176		238	41,888	33,510	31,416	25,133
CAX - Outdoor Range	8	8	4	32		238	7,616	6,093	5,712	4,570
Northwest - IAMS (new EWTGLANT cells)[1]	20	20	8	160		238	38,080	30,464	28,560	22,848
Northwest - IAMS (original cells-pistol)[2]	40	40	8	480		238	114,240	91,392	85,680	68,544
Northwest - IAMS Blue Range	8	8	8	64		238	15,232	12,186	11,424	9,139
Northwest - IAMS Red Range (Non-Lethal Only)	(not available)	(not Available)				238				
TOTAL HOURS - PISTOL/12 ga							**481,608**	**385,286**	**361,206**	**288,965**
RIFLE INDOOR										
NAB - Rodriguez Indoor Rifle Range	16	16	16		256	225	57,600	46,080	43,200	34,560
Naval Base - New Indoor	32	32	4		128	225	28,800	23,040	21,600	17,280
RIFLE OUTDOOR										
NAB- Outdoor Range	10	10	7.5		75	238	17,850	14,280	13,388	10,710
CAX - Outdoor Range	8	8	4		32	238	7,616	6,093	5,712	4,570
Dam Neck - Rifle Range	38	38	7		266	238	63,308	50,646	47,481	37,985
Northwest - IAMS (rifle capable expansion)[3]	76	76	8		608	238	144,704	115,763	108,528	86,822
TOTAL HOURS - RIFLE							**319,878**	**255,902**	**239,909**	**191,927**

[1] - 2 cells/10 firing positions per cell
[2] - 2 cells/20 firing positions per cell
[3] - 3 cells/20 firing positions per cell
1 cell/10 firing positions
1 cell/ 6 firing positions

Table 13: Requirements vs. Assets (Considering Navy Assets under Scenario A)

Weapon Type	Required Lane Hours Per Year	Assets (Lane Hours/Year)				Surplus/Deficit (Lane Hours/Year)			
		100%	80%	75%	60%	100%	80%	75%	60%
Pistol & Shotgun	433,615	481,608	385,286	361,206	288,965	47,993	-48,329	-72,409	-144,650
Rifle - 5.56/7.62	216,492	319,878	255,902	239,909	191,927	103,386	39,410	23,417	-24,565
Crew Served/Machine Gun	54,780	0	0	0	0	-54,780	-54,780	-54,780	-54,780

Appendix A
Site Questionnaire

CNRMA Small Arms Training Ranges Study Data Needs

BACKGROUND INFORMATION

1. Official range name or designation?
2. Location (road name)?
3. Primary point of contact?
4. Active/inactive?

RANGE STAFFING

1. Range master?
2. Activity responsible for staffing?
3. Number of staff & designation or rank?

RANGE MAINTENANCE

1. Activity responsible for maintenance?
2. Refurbishment schedule?
3. Maintenance needs?

RANGE CONSTRUCTION

1. Year constructed?
2. Backstop material/type?
3. Number of lanes vs. lanes operational?
4. Assets/buildings associated with range?

RANGE OPERATION

1. Activity responsible for operating?
2. Hours of operation?
3. Restrictions on use?
4. Users provide own weapons, ammunition?
5. Armory, ready service locker available?
6. Classroom space? Weapons cleaning area?

RANGE SCHEDULING

1. Person and activity responsible for schedule?
2. Method used for scheduling. Computer Internet access available?
3. Primary users of range (Shore-side Security, Marines, Reservists, Afloat Commands, Local Law enforcement, etc.)?
4. One-time users in last 12 months?
5. Users turned away to private ranges (off-base) utilization, costs/user?
6. Utilization percentage (last 12 months), projected increases?
7. Cyclic peaks in utilization?

RANGE ENVIRONMENTAL CONCERNS

1. EA restrictions?
2. Erosion problems?
3. Spent shell disposal method?
4. Water bodies within safety arcs?

RANGE WEAPONS

1. Approved weapons for range?
2. Approved ammunition for range?

RANGE USER REQUIREMENTS

1. Total number of personnel requiring range time (past 12 months), projected increases?
2. Types of weapons/ammunition?
3. Average range time/user?

4. Private range (off-base) utilization, associated costs/user?

5. Cyclic peaks in training requirements due to deployments or other factors?

6. Special training requirements (night training, shoot houses, etc)?

Materials Needed for Review

1. Standard operating procedures

2. GIS map of range/arcs

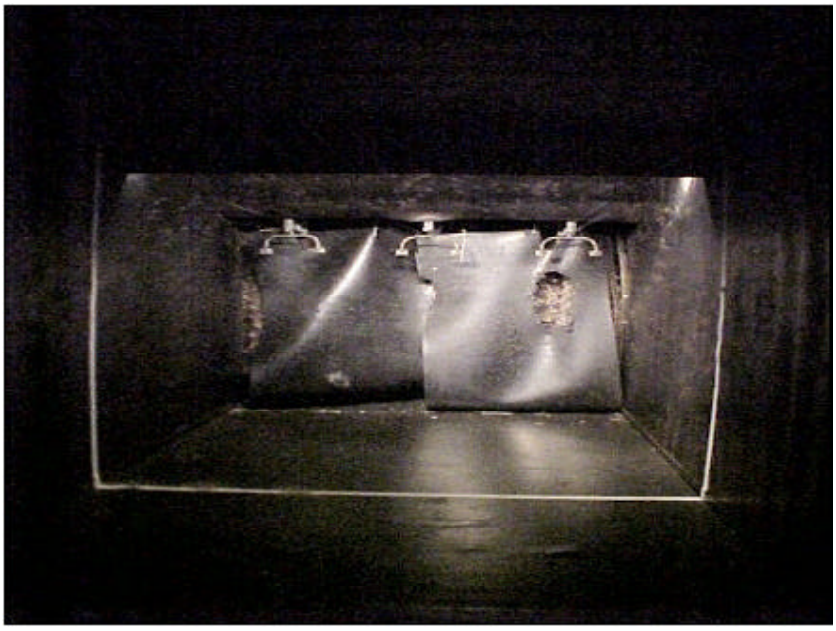
3. Proposed project documentation

4. Historical maintenance records ($ spent)

Appendix B
Range Photographs

NAS Oceana-Mobile

Naval Station Norfolk-Mobile



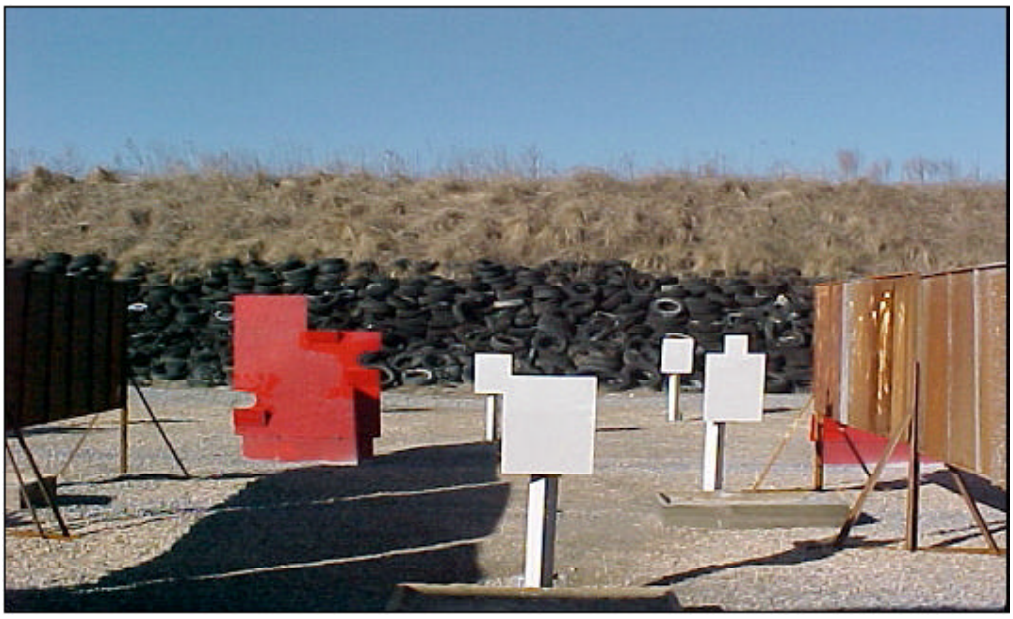
Norfolk Naval Shipyard-Indoor

Little Creek Rodriguez - Indoor

Little Creek-Outdoor

Yorktown-Pistol

Northwest-IAMS



Dam Neck-Rifle/Pistol

Cheatham Annex-Rifle/Pistol

Camp Pendleton-Rifle

Ft. Eustis-Range Complex

Blackwater-Private

Appendix C
Calculations

Calculations - Other Users

SPECWAR[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	1,659	Semi-Annual	9,954
12 ga	1,631	Semi-Annual	9,786
M-4	1,659	Semi-Annual	9,954
M-60	1,659	Semi-Annual	9,954

EOD MU2[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	230	Semi-Annual	1,380
12 ga	230	Semi-Annual	1,380
M-16	230	Semi-Annual	1,380
M-60	230	Semi-Annual	1,380

EOD MU10[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	75	Semi-Annual	450
M-16	75	Semi-Annual	450

NCWG2[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	204	Semi-Annual	1,224
12 ga	204	Semi-Annual	1,224
M-16	204	Semi-Annual	1,224
M-60	90	Semi-Annual	540
M-2	90	Semi-Annual	540

NCIS[2]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	105	Quarterly	1,050
.38 cal	105	Quarterly	1,050
12 ga	105	Quarterly	1,050

MCSFBn - FAST Co.[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	2,096	Semi-Annual	12,576
12 ga	1,305	Semi-Annual	7,830
M-16	2,273	Semi-Annual	13,638
M-249	1,305	Semi-Annual	7,830
M-240G	1,305	Semi-Annual	7,830
M-2	1,305	Semi-Annual	7,830

USCG[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	100	Semi-Annual	600
12 ga	100	Semi-Annual	600
M-16	100	Semi-Annual	600

Assumptions

[1] Semi-annual qualification assume 4 hrs. for initial qualification, 2 hrs. for semi-annual qualification.

[2] Quarterly qualification assume 4 hrs. for initial qualification, 2 hrs. for every quarter after initial qualification.

Calculations - Security

Oceana Security[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	446	Semi-Annual	2,676
9 mm Nightfire[3]	446	Annual	892
12 ga	406	Semi-Annual	2,436
M-16	56	Semi-Annual	336

Norfolk Naval Base Security[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	640	Semi-Annual	3,840
9 mm Nightfire[3]	640	Annual	1,280
M-16	440	Semi-Annual	2,640
M-60	440	Semi-Annual	2,640

Yorktown Security[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	180	Semi-Annual	1,080
9 mm Nightfire[3]	180	Annual	360
12 ga	180	Semi-Annual	1,080
M-16	180	Semi-Annual	1,080
M-60	180	Semi-Annual	1,080

Little Creek Security[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	1,860	Semi-Annual	11,160
9 mm Nightfire[3]	1,860	Annual	3,720
12 ga	1,480	Semi-Annual	8,880
M-16	600	Semi-Annual	3,600

NNSY Security[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	230	Semi-Annual	1,380
9 mm Nightfire[3]	230	Annual	460
12 ga	150	Semi-Annual	900
M-16	150	Semi-Annual	900

Northwest Security[2]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	25	Semi-Annual	250
9 mm Nightfire[3]	25	Annual	50
12 ga	25	Semi-Annual	250

Assumptions

[1] Semi-annual qualification assume 4 hrs. for initial qualification, 2 hrs. for semi-annual qualification.

[2] Quarterly qualification assume 4 hrs. for initial qualification, 2 hrs. for every quarter after initial qualification.

[3] Assume 2 hrs. for nightfire qualification.

Calculations - TYCOM

SURFLANT[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	9,959	Semi-Annual	59,754
12 ga	7,556	Semi-Annual	45,336
M-16	6,373	Semi-Annual	38,238
M-14	6,373	Semi-Annual	38,238
M-60	1,638	Semi-Annual	9,828
M-2	2,457	Semi-Annual	14,742

SUBLANT[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	420	Semi-Annual	2,520
12 ga	420	Semi-Annual	2,520
M-16	300	Semi-Annual	1,800
M-60	300	Semi-Annual	1,800

AIRLANT (CVN)[1]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	10,800	Semi-Annual	64,800
12 ga	10,800	Semi-Annual	64,800
M-16	1,200	Semi-Annual	7,200
M-14	1,200	Semi-Annual	7,200
M-60	150	Semi-Annual	900
M-240G	150	Semi-Annual	900

AIRLANT (WING)[2]

WEAPON	PERSONS	FREQUENCY	LANE HOURS
9 mm	600	18 month interval	1,800

Assumptions

[1] Semi-annual qualification assume 4 hrs. for initial qualification, 2 hrs. for semi-annual qualification.

[2] 4 hrs. to qualify every 18 months.

Calculations - Schools

EWTGLANT

9 mm	
SCHOOL	NO. PERSONS
ASC	2,592
SSEW	2,054
MCJROTC	252
SAMI	180
Total	**5,078**

12 gauge/M-14/M-16	
SCHOOL	NO. PERSONS
ASC	2,592
SSEW	2,054
SAMI	180
Total	**4,646**

USMC SCHOOLS

9 mm	
SCHOOL	NO. PERSONS
Reserve	480
9 mm Qual.	780
Coach	120
BSGC - NW	1,800
Reserve - NW	480
CADRE	320
Adv. Marksman	240
MC Pistol Qual.	80
Total	**4,300**

12 ga	
SCHOOL	NO. PERSONS
BSGC - NW	1,800
Total	**1,800**

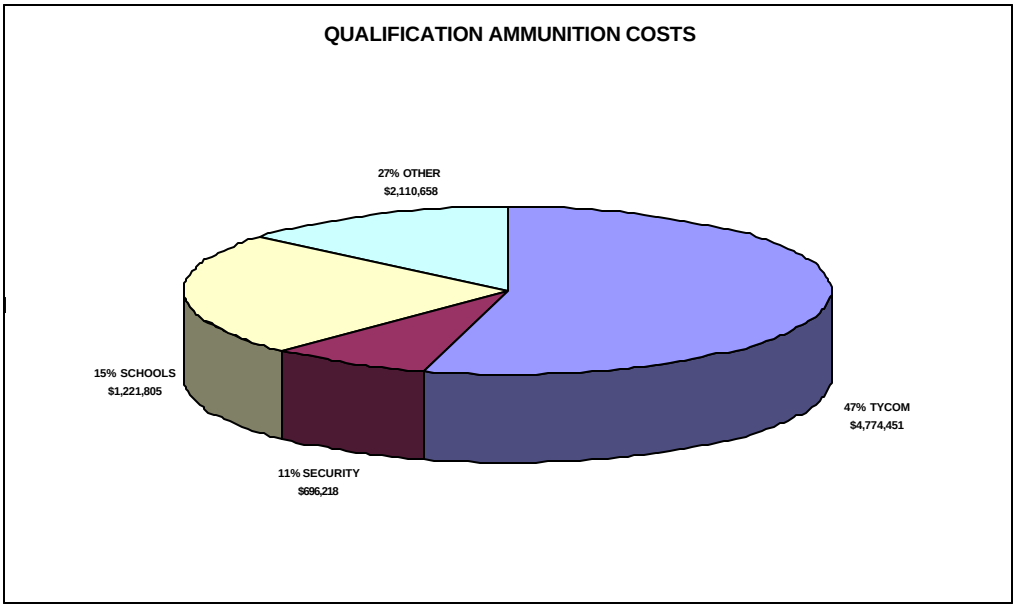
M-14	
SCHOOL	NO. PERSONS
Designated Marksman	240
Total	**240**

M-16	
SCHOOL	NO. PERSONS
MC Rifle Qual.	780
Coach	120
MC Reserve	480
Total	**1,380**

Appendix D
Ammunition Costs

Caliber	NALC	Cost per Round[1]	Description
9 mm	A059	$0.37	FMJ (outdoor only)
9 mm	A0363	$0.12	FMJ (indoor/outdoor)
12 gauge	A011	$0.50	00 Buck
5.56 mm	A071	$0.28	Ball Ammunition
5.56 mm	A064	$0.51	Linked, 4/1 Tracer
7.62 mm	A130	$0.50	Ball Ammunition
7.62 mm	A131	$0.57	Linked, 4/1 Tracer
.50 cal	A554	$0.30	Linked, Ball Ammunition

[1] - Costs provided by EWTGLANT



Qualification Ammunition Costs

WEAPONS	TYCOM				SECURITY					
	AIRLANT		SURFLANT	SUBLANT	Oceana Security	Naval Base Security	Yorktown Security	Little Creek Security	NNSY Security	Northwest Security
	WING	CVN								
Handguns										
9 mm	$63,936	$1,150,848	$1,061,231	$44,755	$47,526	$49,018	$19,181	$198,202	$24,509	$5,328
9 mm nightfire					$8,911	$12,787	$3,596	$37,163	$4,595	$500
.38 cal										
Submachine Gun										
MP5 (9 mm)										
Shotgun										
12 gauge		$216,000	$151,120	$8,400	$8,120		$3,600	$29,600	$3,000	$1,000
5.56 mm										
M-4										
M-16		$82,656	$438,972	$20,664	$3,857	$30,307	$12,398	$41,328	$10,332	
M-249										
7.62 mm										
M-14		$147,600	$783,879							
M-60		$34,200	$373,464	$68,400		$100,320	$41,040			
M-240G		$13,338								
.50 cal										
M-2			$114,988							
TOTAL COSTS	$63,936	$1,644,642	$2,923,654	$142,219	$68,414	$192,432	$79,816	$306,292	$42,436	$6,828

[1] NSWDG - information not available

OTHER COMMANDS									Totals
SPECWAR[1]	EWTGLANT	NCWG2	EOD MU2	EOD MU10	NCIS	MCSFBn		USCG	
						FAST CO.	Course		
$176,783	$270,556	$21,738	$66,410	$47,952	$22,378	$223,350	$229,104	$10,656	$3,733,459
									$67,552
					$22,378				$22,378
									0
$32,620	$48,260	$4,080	$4,600		$4,200	$26,100	$18,000	$2,000	$560,700
$114,272									$114,272
	$296,799	$14,052	$15,842	$30,996		$156,564	$47,527	$6,888	$1,209,183
						$191,678			$191,678
	$296,799					$166,542	$14,760		$1,409,580
$378,252		$20,520	$52,440						$1,068,636
						$232,081			$245,419
		$4,212				$61,074			$180,274
$701,927	$912,414	$64,602	$139,293	$78,948	$48,955	$1,057,390	$309,391	$19,544	
								Total Cost	**$8,803,132**

Appendix E
Strategic Business Plan

Small Arms Training Ranges

This strategic business plan is designed to assist CNRMA in implementing a business case for centralized management of small arms ranges in the Mid-Atlantic Region.

A balanced scorecard approach has been utilized to help guide the process by providing targets and measured goals. The benefit of a balanced scorecard concept is that it will support strategic planning and implementation by bringing individuals and organizations to a common goal. This approach will allow the users to learn from the process and develop lessons learned.

The Strategic Business Plan is a framework to focus for long-term planning and is only the first step in the overall process. From this plan, CNRMA can develop and evaluate a series of business plans to execute the resources required to implement a regional program management concept.

MISSION

Promote mission readiness by providing high quality small arms training ranges that accommodate the training needs of the Fleet in the Mid-Atlantic Region.

VISION

The small arms range storefront vision is to create an organizational structure that can provide safe and cost effective small arms ranges that meet the growing requirements of our customers.

We will achieve our vision through the establishment of a regional program that will manage all aspects of maintenance, staffing, and funding to more efficiently and effectively support the growing range requirements of the Fleet within the Mid-Atlantic Region.

STRATEGIES/GOALS

Customer

Provide an adequate number of safe, high quality ranges that are easily accessible and managed through a centralized regional scheduling system.

Critical Success Factors:

- Maintain an inventory of ranges (type and capacity) that meet mission readiness standards.
- Implementation of Web-based scheduling software (i.e. RFMSS) that can be viewed by stakeholders and managed by the storefront.
- Utilization of scheduling software as a database to track and collect usage data.

Measures:

- Ratio of accepted to decline range time reservations (availability)
- Number of lane hours reserved at private or other DoD ranges
- Ratio of utilized to vacant lane hours (efficiency)

Financial

Plan, program, and budget the resources required to staff a regional program for effective and efficient management of small arms ranges.

Critical Success Factors:

- Implement a management tool that utilizes data captured in the scheduling software to

forecast funding and maintenance requirements.

- Develop and implement a requirements-based determination model which considers:
  - Future training needs
  - Future maintenance requirements
  - Standardized costing schedule
- Prioritize requirements and project over 5-yr. periods.

Measures:

- Overall regional program budget
- Maintenance budget

Process:

Building new ranges while maintaining/refurbishing existing ranges to meet safety and certification requirements.

Critical Success Factors:

- Design ranges that provide both qualification and practical training facilities.
- New ranges will be built using smart technology and "Great Lakes" standards.
- Maintain annual service contracts for ventilation systems at all indoor ranges.
- Develop and implement standard operating procedures for maintenance of all ranges.
- Develop certification packages for each range.
- Establish a baseline for existing ranges and refurbish as necessary to meet the standards.

Measures:

- % Of Navy ranges with certification
- % Of maintenance down time
- Requirements vs. assets (lane hours)

Workforce

Develop a highly trained and diverse staff that takes pride and ownership of the ranges and that are responsive to the changing small arms training requirements.

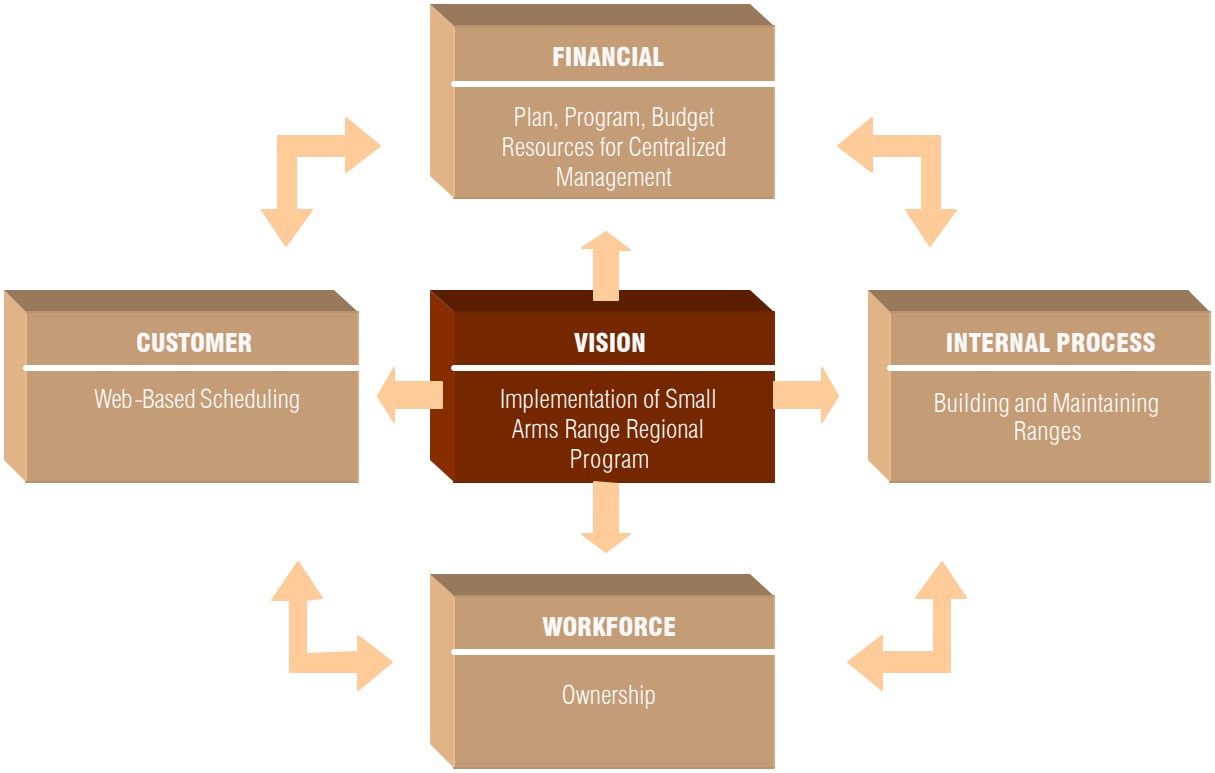
Critical Success Factors:

- Develop integrated staffing plans, both military and civilian, to meet requirements and respond to changing requirements.
- Open channels of communication between the end-users and the regional program to improve accessibility and utilization of the ranges.
- Provide the right tools to empower staff to implement the regional programs mission.

Measures:

- Staff turnover
- Ratio of accepted to decline range time reservations
- % of maintenance down time

THE BALANCED SCORECARD



Appendix F
Economic Analysis

SCENARIO A1 - Back Up Costs

ITEM	COST	OCCURRENCE	LIFE CYCLE	COMMENTS
STOREFRONT CONCEPT				
RFMSS Scheduling Software	$170,000	One time Cost	10 yrs	Assume computer software/hardware obsolete in 10 years and replace w/ new system.
Initial Training	$50,000	One time Cost	10 yrs	Initial training required to start RFMSS system.
Annual Training	$10,000	Annual	10 yrs	Annual training for new staff.
Computer Hardware	$50,000	One time Cost	10 yrs	Initial cost for 7 computers plus 1 server.
Computer Hardware Upgrade	$10,000	Annual	10 yrs	Annual computer hardware upgrades.
MAINTENANCE				
Filters (Indoor Range)	$5,725	Annual	50 yrs	90 filters for 5 indoor ranges.
Indoor Range Ventilation System Maintenance Contract	$40,000	Annual	50 yrs	4 contracts - NAB, NNSY, New Indoor Range, Marine MWR range.
Outdoor Range Targets/Wood	$22,800	Annual	100 yrs	CAX and Little Creek NAB wood ($18K)/ all ranges targets ($4,800).
Outdoor Range Backstop Refurbishment	$6,500	Per 10 Years	100 yrs	All Outdoor Ranges.
NEW INDOOR RANGE (16 Lane)				
Construction Cost	$2,000,000	One time Cost	n/a	New indoor range.
Indoor Range EA	$200,000	One time Cost	n/a	EA required to build new range.
Granular Rubber Backstop Replacement	$18,500	Annual	49	Annual maintenance for when granular rubber backstop is installed.
NEW MARINE MCCS RANGE				
Cost To Use Range	$84,000	Annual	49	Cost to use new Marine MCCS range (4hrs./day).
RANGE CLOSURES				
Mobile Range Close Out	$100,000	One time Cost	n/a	Phase out all mobile ranges.
IMPROVE EXISTING CNRMA RANGES				
LITTLE CREEK NAB				
Little Creek NAB Indoor Ranges Ventilation (Retrofit)	$600,000	One time Cost	n/a	Retrofit ventilation system at NAB indoor ranges to meet Navy range certification standards.
Wet Snail Lubricant Maintenance	$9,600	Annual	5 yrs	Continued use for next five years, then will be replaced w/granular rubber backstop.
Install New Granular Rubber Backstop	$580,000	One time Cost	n/a	Will replace wet snail system after 5 years.
Granular Rubber Backstop Replacement	$18,500	Annual	44	Annual maintenance for when granular rubber backstop is installed.
Radar Systems (Furuno or Raytheon) For SDZ monitoring - Outdoor Ranges	$10,000	Every 5 yrs	50 yrs	Radar system to help maintain a safe SDZ at Little Creek outdoor ranges.
NNSY INDOOR RANGE				
NNSY Indoor Range Target System Replacement	$60,000	One time Cost	n/a	Replace existing target system with turning monorail target system.
NNSY Indoor Range Granular Rubber	$18,500	Annual	50 yrs	Annual granular rubber backstop replacement.
DAM NECK				
Radar System (Furuno or Raytheon) For SDZ monitoring	$10,000	Every 5 yrs	50	Radar system to help maintain a safe SDZ at Dam Neck outdoor ranges.
CAX				
Radar System (Furuno or Raytheon) For SDZ monitoring	$10,000	Every 5 yrs	50	Radar system to help maintain a safe SDZ at CAX outdoor ranges.
NORTHWEST IAMS RANGE				
Tire Berm Removal	$300,000	One time Cost	n/a	Haz waste disposal of existing tire berm at NW.
SDZ extension EA	$150,000	One time Cost	n/a	EA required to extend SDZ.
SDZ extension (7.62 mm Capable)	$3,500,000	One time Cost	n/a	Land acquisition costs.
Target System	$1,000,000	One time Cost	25	Install battery powered target system at (2) 20 in cells (100, 200, 300 yds.).
Target System Maintenance	$2,000	Annual	25	Annual maintenance cost.

SCENARIO A2 - Back Up Costs

ITEM	COST	OCCURRENCE	LIFE CYCLE	COMMENTS
STOREFRONT CONCEPT				
RFMSS Scheduling Software	$170,000	One time Cost	10 yrs.	Assume Computer Software/Hardware Obsolete in 10 years and replace w/ new system.
Initial Training	$50,000	One time Cost	10 yrs.	Initial training required to start RFMSS System.
Annual Training	$10,000	Annual	10 yrs.	Annual training for new staff.
Computer Hardware	$50,000	One time Cost	10 yrs.	Initial cost for 7 computers plus 1 server.
Computer Hardware Upgrade	$10,000	Annual	10 yrs.	Annual computer hardware upgrades.
RANGE MAINTENANCE				
Filters (Indoor Range)	$6,870	Annual	50 yrs.	90 filters for 5 indoor ranges.
Indoor Range Ventilation System Maintenance Contract	$50,000	Annual	50 yrs.	4 contracts - NAB, NNSY, New Indoor Range, Marine MWR range.
Outdoor Range Targets/Wood	$22,800	Annual	100 yrs.	CAX and Little Creek NAB wood ($18K)/all ranges targets ($4,800).
Outdoor Range Backstop Refurbishment	$6,500	Per 10 Years	100 yrs.	All Outdoor Ranges.
NEW INDOOR RANGE (32 Lane)				
Construction Cost	$4,000,000	One time Cost	n/a	New Indoor Range.
Indoor Range EA	$200,000	One time Cost	n/a	EA required to build new range.
Granular Rubber Backstop Replacement	$18,500	Annual	49 yrs.	Annual maintenance for when granular rubber backstop is installed.
NEW MARINE MCCS RANGE				
Cost to use range	$84,000	Annual	49 yrs.	Cost to use new Marine MCCS range (4hrs./day).
RANGE CLOSURES				
Mobile Range Close Out	$100,000	One time Cost	n/a	Phase out all mobile ranges.
IMPROVE EXISTING CNRMA RANGES				
LITTLE CREEK NAB				
Little Creek NAB Indoor Ranges Ventilation (retrofit)	$600,000	One time Cost	n/a	Retrofit ventilation system at NAB indoor ranges to meet Navy Range Certification Standards.
Wet Snail Lubricant Maintenance	$9,600	Annual	5 yrs.	Continued use for next five years, then will be replaced w/granular rubber backstop.
Install New Granular Rubber Backstop	$580,000	One time Cost	n/a	Continued use for next five years, then will be replaced w/granular rubber backstop.
Granular Rubber Backstop Replacement	$18,500	Annual	44 yrs.	Annual maintenance for when granular rubber backstop is installed.
Radar System (Furuno or Raytheon) for SDZ monitoring	$10,000	Every 5 yrs	50 yrs.	Radar System to help maintain a safe SDZ at Little Creek Outdoor Ranges.
DAM NECK				
Radar System (Furuno or Raytheon) for SDZ monitoring	$10,000	Every 5 yrs	50 yrs.	Radar System to help maintain a safe SDZ at Dam Neck outdoor ranges.
CAX				
Radar System (Furuno or Raytheon) for SDZ monitoring	$10,000	Every 5 yrs	50 yrs.	Radar System to help maintain a safe SDZ at CAX outdoor ranges.
NNSY INDOOR RANGE				
NNSY Indoor Range Target System Replacement	$60,000	One time Cost	n/a	Replace existing target system with turning monorail target system.
NNSY Indoor Range Granular Rubber Backstop Replacement	$18,500	Annual	50 yrs.	Annual granular rubber backstop replacement.
NORTHWEST IAMS RANGE				
Tire Berm Removal	$300,000	One time Cost	n/a	Haz waste disposal of existing tire berm at NW.
SDZ extension EA	$150,000	One time Cost	n/a	EA required to extend SDZ.
SDZ extension (7.62mm capable)	$3,500,000	One time Cost	n/a	Land acquisition costs.
Target System	$1,000,000	One time Cost	25 yrs.	Install battery powered target system at (2) 20 in. cells (100, 200, 300 yds.).
Target System Maintenance	$2,000	Annual	25 yrs.	Annual maintenance cost.

SCENARIO B - Back Up Costs

ITEM	COST	OCCURRENCE	LIFE CYCLE	COMMENTS
STOREFRONT CONCEPT				
RFMSS Scheduling Software	$170,000	One time Cost	10 yrs.	Assume Computer Software/Hardware Obsolete in 10 years and replace w/new system.
Initial Training	$50,000	One time Cost	10 yrs.	Initial training required to start RFMSS System.
Annual Training	$10,000	Annual	10 yrs.	Annual training for new staff.
Computer Hardware	$50,000	One time Cost	10 yrs.	Initial cost for 7 computers plus 1 server.
Computer Hardware Upgrade	$10,000	Annual	10 yrs.	Annual computer hardware upgrades.
RANGE MAINTENANCE				
Filters (Indoor Range)	$4,565	Annual	50 yrs.	
Indoor Range Ventilation System Maintenance Contract	$32,000	Annual	50 yrs.	3 contracts - NAB, NNSY, Marine MWR range.
Outdoor Range Targets/Wood	$31,800	Annual	100 yrs.	CAX and Little Creek NAB wood ($18K)/all ranges targets ($4,800).
Outdoor Range Backstop Refurbishment	$6,500	Per 10 Years	100 yrs.	All Outdoor Ranges.
MOBILE RANGE MAINTENANCE (5 total)				
Lammella Change Out	$200,000	Annual	20 yrs.	Accounts for quarterly lamella change out for 5 mobile ranges.
Wall Maintenance	$50,000	Annual	20 yrs.	Annual wall maintenance for 5 mobile ranges.
HEPA Filter	$30,000	Annual	20 yrs.	Accounts for monthly HEPA change outs for 5 mobile ranges.
Target System Repair Maintenance	$35,000	Annual	20 yrs.	Annual target maintenance costs for 5 mobile ranges.
Targets	$5,000	Annual	20 yrs.	Annual target costs for 5 mobile ranges.
Safety Equipment (tyvek, gloves, etc)	$16,900	Annual	20 yrs.	Annual safety equipment/supplies for all mobile ranges.
RANGE CLOSURES				
Mobile Range Close Out	$100,000	One time Cost	at year 20	Phase out all mobile ranges at year 20.
NEW MARINE MCCS RANGE				
Cost to use range	$84,000	Annual	49 yrs.	Cost to use new Marine MCCS range (4hrs./day).
IMPROVE EXISTING CNRMA RANGES				
LITTLE CREEK NAB				
Little Creek NAB Indoor Ranges Ventilation (retrofit)	$600,000	One time Cost	n/a	Retrofit ventilation system at NAB indoor ranges to meet Navy Range Certification Standards.
Wet Snail Lubricant Maintenance	$9,600	Annual	5 yrs.	First five years, then will be replaced w/granular rubber backstop.
Install New Granular Rubber Backstop	$580,000	One time Cost	n/a	Will replace wet snail system after 5 years.
Granular Rubber Backstop Replacement	$18,500	Annual	44 yrs.	Annual maintenance for when granular rubber backstop is installed.
Radar System (Furuno or Raytheon) for SDZ monitoring	$10,000	Every 5 yrs	50 yrs.	Radar System to help maintain a safe SDZ at Little Creek outdoor ranges.
NNSY INDOOR RANGE				
NNSY Indoor Range Target System Replacement	$60,000	One time Cost	n/a	Replace existing target system with turning monorail target system.
NNSY Indoor Range Granular Rubber Backstop Replacement	$18,500	Annual	50 yrs.	Annual granular rubber backstop replacement.
NORTHWEST IAMS RANGE				
Tire Berm Removal	$300,000	One time Cost	n/a	Haz waste disposal of existing tire berm at NW.
DAM NECK				
Radar System (Furuno or Raytheon) for SDZ monitoring	$10,000	Every 5 yrs	50 yrs.	Radar System to help maintain a safe SDZ at Dam Neck outdoor ranges.
CAX				
Radar System (Furuno or Raytheon) for SDZ monitoring	$10,000	Every 5 yrs	50 yrs.	Radar System to help maintain a safe SDZ at CAX outdoor ranges.
USE OF PRIVATE RANGES				
Blackwater	$70,000	Annual	50 yrs.	Cost to use private range.
SPECWAR Virginia Beach Outdoor Shooting Range Contract	$25,000	Annual	50 yrs.	Cost to use private range.
Non-SPECWAR Virginia Beach Outdoor Shooting Range	$20,000	Annual	50 yrs.	Cost to use private range.
Other Facilities	$10,000	Annual	50 yrs.	Cost to use private range.
MAXIMUM USE OF SIMULATORS				
Laser Simulator Purchase (2)	$220,000	One time Cost	10 yrs.	Price for 2 simulators.
Training	$8,000	Annual	10 yrs.	Annual training costs for simulator operation staff.
Software Upgrades	$3,000	Annual	10 yrs.	Annual software upgrades.

BASELINE - Back Up Costs

ITEM	COST	OCCURRENCE	LIFE CYCLE	COMMENTS
MOBILE RANGE MAINTENANCE (5				
Lammella Change Out	$200,000	Annual	20 yrs.	
Wall Maintenance	$50,000	Annual	20 yrs.	
HEPA Filter	$30,000	Annual	20 yrs.	
Target System Repair Maintenance	$35,000	Annual	20 yrs.	
Targets	$5,000	Annual	20 yrs.	
Safety Equipment (tyvek, gloves, etc)	$16,900	Annual	20 yrs.	
LITTLE CREEK NAB - RODRIQUEZ INDOOR RIFLE/PISTOL	$49,000	Annual	50 yrs.	
LITTLE CREEK NAB - OUTDOOR RIFLE/PISTOL*	$5,000	Annual	100 yrs.	
NNSY INDOOR RANGE*	$5,000	Annual	50 yrs.	
CAX OUTDOOR RANGE	$5,000	Annual	100 yrs.	
YORKTOWN OUTDOOR RANGE*	$5,000	Annual	100 yrs.	
DAM NECK RIFLE RANGE*	$5,000	Annual	100 yrs.	
DAM NECK PISTOL RANGE*	$5,000	Annual	100 yrs.	
NORTHWEST - IAMS RANGE*	$5,000	Annual	100 yrs.	
USE OF PRIVATE RANGES				
Blackwater	$70,000	Annual	50 yrs.	
SPECWAR Virginia Beach Outdoor Shooting Range Contract	$25,000	Annual	50 yrs.	
Non-SPECWAR Virginia Beach Outdoor Shooting Range	$20,000	Annual	50 yrs.	
Other Facilities	$10,000	Annual	50 yrs.	

* - $5000 used for all ranges not providing operational costs

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EA for Navy Small Arms Ranges F
ECONOMIC ANALYSIS

EXECUTIVE SUMMARY REPORT

PROJECT TITLE : Upgrade Navy Small Arms Ranges
DISCOUNT RATE : 3.9%
PERIOD OF ANALYSIS : 50 Years
START YEAR : 2004
BASE YEAR : 2004
REPORT OUTPUT : Constant Dollars

PROJECT OBJECTIVE : To provide the most economical and effective training ranges for Navy personnel

ALTERNATIVES CONSIDERED FOR THIS ANALYSIS:

A. Background
==========

The Navy is required to provide adequate facilities in which to train and qualify sailors on small arms and associated weaponry. The current range system is overtaxed and does not support mission requirements. This condition leads to inefficient operations and high operations and maintenance costs for the ranges.

B. Objective
==========

Provide adequate range capacity to train and certify sailors on small arms weaponry.

C. Description of Alternatives
==========

Under Scenarios A-1, A-2 and B, the ranges in the Mid-Atlantic region would be centrally managed under a storefront philosophy. The storefront would be responsible for the scheduling, staffing, and maintenance of the ranges. Existing ranges could be improved if required for safety or capacity reasons.

1. Under Scenario A-1, a new 16-lane indoor range would be built to accommodate up to a 5.56 mm rifle. The existing Surface Danger Zone (SDZ) at Northwest would be expanded by 1010 acres to accommodate 7.62 mm rifle firing. All mobile ranges would be taken out of service. There would be no use of simulators in this scenerio. The use of all private ranges for qualification firing would be suspended,with the exception of the Marine MCCS range. Existing outdoor ranges would be retrofitted for SDZ monitoring.

2. Under Scenario A-2, a new 32-lane indoor range would be built to accommodate up to a 5.56 mm rifle. The existing Surface Danger Zone (SDZ) at Northwest would be expanded by 1010 acres to accommodate 7.62 mm rifle firing. All mobile ranges would be taken out of service. There would be no use of simulators in this scenerio. The use of all private ranges for qualification firing would be suspended, with the exception of the Marine MCCS range. Existing outdoor ranges would be retrofitted for SDZ monitoring.

3. Under Scenario B, all existing mobile ranges would remain in service for an additional 20 years. The Little Creek Outdoor Range would remain open. There would

be increased use of non-Navy DoD ranges to provide the additional training capacity. This scenario assumes the use of private local ranges for qualification firing. Two additional laser simulators would be purchased to enhance training prior to qualification firing, reducing range hours.

4. Status Quo (Baseline)

A Baseline Scenario has been completed for comparison purposes only. It is important to note that the Baseline, although less costly, represents a range structure that does not provide sufficient qualification training ability. This alternative was not considered in the analysis.

ASSUMPTIONS OF THE ANALYSIS:

A. Time-Value of Money:
==========

1. The discount rate used in this analysis is 3.9%. This rate was obtained from Appendix C of OMB Circular A-94 (dated February 2002).

2. The base year will be Fiscal Year 2004. Costs were escalated from FY02 to FY04 using escalation rates provided by the Naval Center for Cost Analysis. The rate can be found on their web site, www.ncca.navy.mil.

3. A project life of 50 years will be used.

4. An end-of-year cost convention will be used.

B. Construction/Design Criteria:
==========

Under Scenarios A-1, A-2 and B, the ranges in the Mid-Atlantic region would be centrally managed under a storefront philosophy. The storefront would be responsible for the scheduling, staffing, and maintenance of the ranges. Existing ranges could be improved if required for safety or capacity reasons.

1. Under Scenario A-1, a new 16-lane indoor range would be built to accommodate up to a 5.56 mm rifle. The existing Surface Danger Zone (SDZ) at Northwest would be expanded by 1010 acres to accommodate 7.62 mm rifle firing. All mobile ranges would be taken out of service. There would be no use of simulators in this scenario. The use of all private ranges for qualification firing would be suspended, with the exception of the Marine MCCS range. Existing outdoor ranges would be retrofitted for SDZ monitoring.

2. Under Scenario A-2, a new 32 lane indoor range would be built to accommodate up to a 5.56 mm rifle. The existing Surface Danger Zone (SDZ) at Northwest would be expanded by 1010 acres to accommodate 7.62 mm rifle firing. All mobile ranges would be taken out of service. There would be no use of simulators in this scenerio. The use of all private ranges for qualification firing would be suspended, with the exception of the Marine MCCS range. Existing outdoor ranges would be retrofitted for SDZ monitoring.

3. Under Scenario B, all existing mobile ranges would remain in service for an additional 20 years. The Little Creek Outdoor Range would remain open. There would be increased use of non-Navy DoD ranges to provide the additional training capacity. This scenario assumes the use of private local ranges for qualification firing. Two additional laser simulators would be purchased to enhance training prior to qualification firing, reducing range hours.

C. Cost Related:
==========

1. Construction and equipment costs will be normalized with an area cost factor (ACF) of 0.92 for the Norfolk, Virginia area.

2. Land value on the installation will not be considered.

3. For new construction, the terminal value will be prorated, based on straight line depreciation of 50 years. The terminal value at 50 years is zero. The terminal value for renovated facilities will be zero since the building structure will be past its physical life of 50 years. The mechanical, electrical and other system components will also need replacement.

4. Changes in civilian and military manpower were not considered in the analysis.

5. Under Scenario A-1 and A-2, no other Department of Defense installation is available in the local area for training purposes.

D. Economic Life:
==========

The Economic Life of training range facilities is estimated to be 50 years.

ECONOMIC INDICATORS:

	ALTERNATIVE NAME	NPV
1	Scenario A-1	$14,181,145
2	Scenario A-2	$16,415,145
3	Scenario B	$14,891,052
4	Baseline	$9,510,716

NON-MONETARY COSTS AND BENEFITS:

This Category Not Used In Analysis

RESULTS AND RECOMMENDATIONS:

A. Discussion of Alternatives
==========

Scenario A-1 is the least cost alternative. Although having the lower capital investment, it provides the necessary training and range space required. Its life cycle cost is $14.18M net present value (NPV). Scenario B is the next expensive, with a life cycle cost of $14.89M (NPV). Scenario B is higher, due to outyear operations costs associated with private and portable ranges. Scenerio A-2 has the highest life cycle cost of 16.42M (NPV). This is due to the high cost for the new indoor range.

B. Discussion of Cost Sensitivity Analysis
==========

A cost sensitivity analysis compares two alternatives relative to changes in cost of an expense item. This expense item is one that is thought to be the most variable over time. In determining which expense item should be used for a cost sensitivity analysis, a preliminary report of the life cycle cost for each alternative was viewed to find the expense items with the greatest potential for variance. These are expense items that make up the largest percentage of the Net Present Value (NPV) or can fluctuate based upon local conditions or uncertainty.

A cost sensitivity analysis compared the costs of mobile ranges and range improvements in the scenario's. These costs are considered to be the most likely expense items to vary over the life of the ranges.

The selected expense items were allowed to vary from a value of 100% less to 100% more than their estimated value. The mobile ranges and range improvement costs were allowed to vary because of possible variance in their estimated costs.

For the first sensitivity analysis, the data shows that for Scenario B to become the least cost alternative, mobile range costs would have to decrease by 14.92%, which is possible under current conditions.

For the second sensitivity analysis, the data shows that for Scenario A-2 to become the least cost alternative, range improvement costs would have to decrease by 32.18%, which is not probable under current conditions.

C. Discussion of Discount Rate Sensitivity Analysis

The discount rate sensitivity analysis was allowed to vary according to the default ECONPACK settings. This resulted in an analysis range from a low of 1.10% to a high of 6.10%. An analysis discount rate of 3.9% was prescribed by OMB Circular A-94. The results showed that the ranking changed when the discount rate is reduced to 2.3 or increased to 4.9. The possibility of reduction to that level is remote. Although an increase to 4.9, which is possible, could make Scenario B the preferred alternative.

D. Savings Investment Ratio/Discounted Payback Period

There were no Savings to Investment Ratio (SIR) nor a discount payback period considered in this analysis. This was due to the status quo not being considered as a viable alternative.

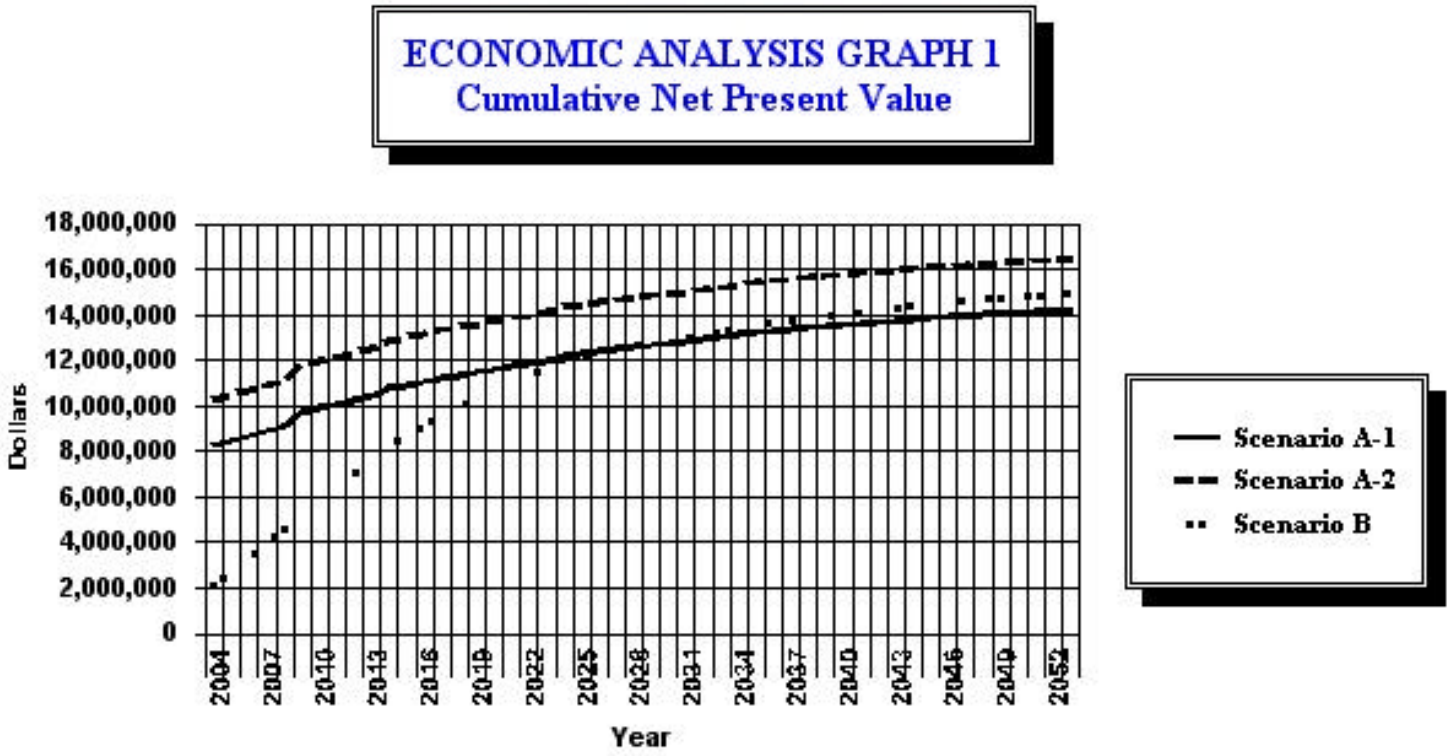
E. Non-Monetary Benefits for Various Alternatives

In this analysis, the non-quantifiable benefits were judged to not have had an impact on the selection of the preferred alternative.

F. Recommendation

The results of this analysis indicate that Scenario A-1 is the preferred alternative, which will provide the lowest cost over the life of the range facility, and meet mission requirements.

ACTION OFFICER: Sherri Eng (804) 282-1821
ORGANIZATION : Baker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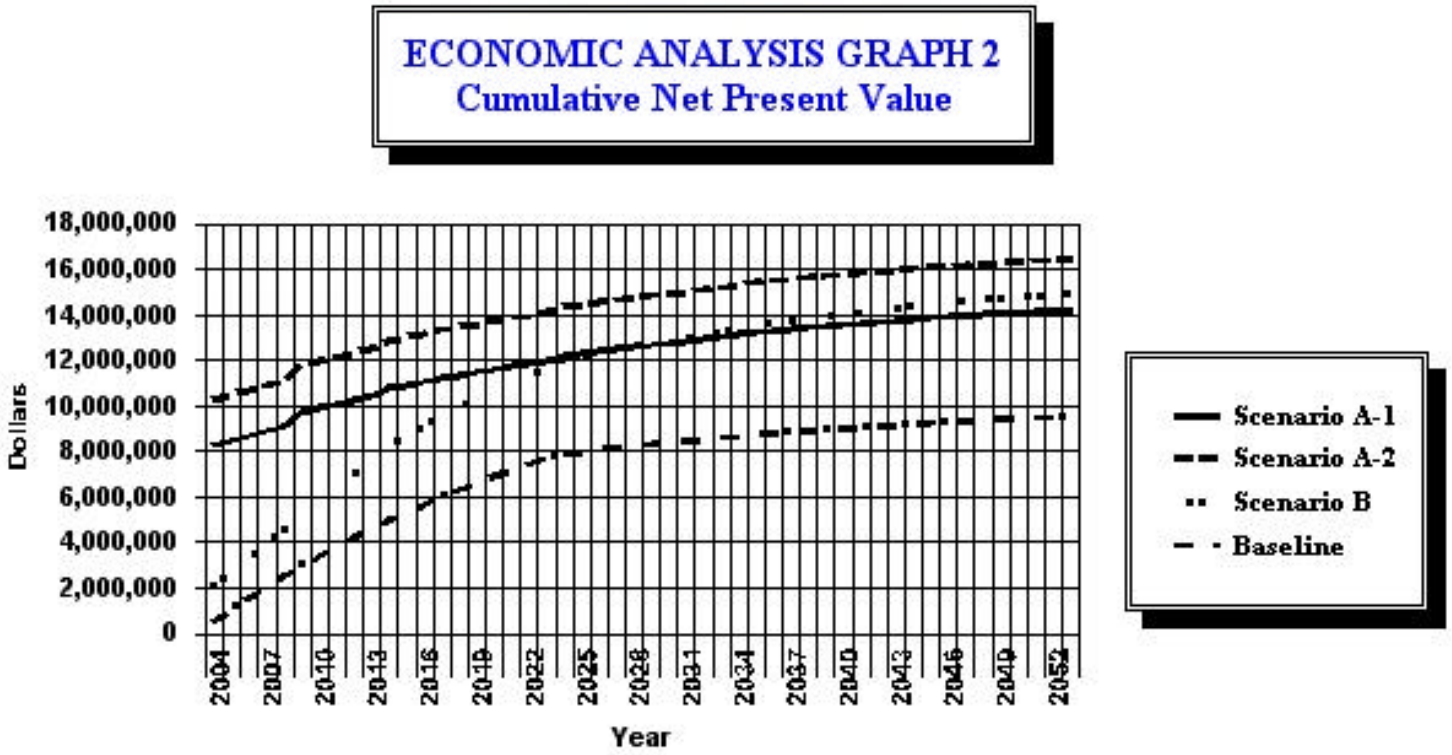
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Dollars
2004
2007
2010
2013
2016
2019
2022
2025
2028
2031
2034
2037
2040
2043
2046
2049
2052
Year
Scenario A-1
Scenario A-2
Scenario B


ECONOMIC ANALYSIS GRAPH 2
Cumulative Net Present Value
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14,000,000
12,000,000
10,000,000
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6,000,000
4,000,000
2,000,000
0
Dollars
2004
2007
2010
2013
2016
2019
2022
2025
2028
2031
2034
2037
2040
2043
2046
2049
2052
Year
Scenario A-1
Scenario A-2
Scenario B
Baseline

LIFE CYCLE COST REPORT

1 Scenario A-1

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2004	$278,154	$70,594	$0	$2,266,440	$86,537
2005	$20,604	$70,594	$0	$19,059	$86,537
2006	$20,604	$70,594	$0	$19,059	$86,537
2007	$20,604	$70,594	$0	$19,059	$86,537
2008	$20,604	$70,594	$0	$19,059	$86,537
2009	$20,604	$70,594	$0	$19,059	$86,537
2010	$20,604	$70,594	$0	$19,059	$86,537
2011	$20,604	$70,594	$0	$19,059	$86,537
2012	$20,604	$70,594	$0	$19,059	$86,537
2013	$20,604	$77,291	$0	$19,059	$86,537
2014	$278,154	$70,594	$0	$19,059	$86,537
2015	$20,604	$70,594	$0	$19,059	$86,537
2016	$20,604	$70,594	$0	$19,059	$86,537
2017	$20,604	$70,594	$0	$19,059	$86,537
2018	$20,604	$70,594	$0	$19,059	$86,537
2019	$20,604	$70,594	$0	$19,059	$86,537
2020	$20,604	$70,594	$0	$19,059	$86,537
2021	$20,604	$70,594	$0	$19,059	$86,537
2022	$20,604	$70,594	$0	$19,059	$86,537
2023	$20,604	$77,291	$0	$19,059	$86,537
2024	$278,154	$70,594	$0	$19,059	$86,537
2025	$20,604	$70,594	$0	$19,059	$86,537
2026	$20,604	$70,594	$0	$19,059	$86,537
2027	$20,604	$70,594	$0	$19,059	$86,537
2028	$20,604	$70,594	$0	$19,059	$86,537
2029	$20,604	$70,594	$0	$19,059	$86,537
2030	$20,604	$70,594	$0	$19,059	$86,537
2031	$20,604	$70,594	$0	$19,059	$86,537
2032	$20,604	$70,594	$0	$19,059	$86,537
2033	$20,604	$77,291	$0	$19,059	$86,537
2034	$278,154	$70,594	$0	$19,059	$86,537
2035	$20,604	$70,594	$0	$19,059	$86,537
2036	$20,604	$70,594	$0	$19,059	$86,537
2037	$20,604	$70,594	$0	$19,059	$86,537
2038	$20,604	$70,594	$0	$19,059	$86,537
2039	$20,604	$70,594	$0	$19,059	$86,537
2040	$20,604	$70,594	$0	$19,059	$86,537
2041	$20,604	$70,594	$0	$19,059	$86,537
2042	$20,604	$70,594	$0	$19,059	$86,537
2043	$20,604	$77,291	$0	$19,059	$86,537
2044	$278,154	$70,594	$0	$19,059	$86,537
2045	$20,604	$70,594	$0	$19,059	$86,537
2046	$20,604	$70,594	$0	$19,059	$86,537
2047	$20,604	$70,594	$0	$19,059	$86,537
2048	$20,604	$70,594	$0	$19,059	$86,537
2049	$20,604	$70,594	$0	$19,059	$86,537
2050	$20,604	$70,594	$0	$19,059	$86,537
2051	$20,604	$70,594	$0	$19,059	$86,537

LIFE CYCLE COST REPORT

1 Scenario A-1

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2052	$20,604	$70,594	$0	$19,059	$86,537
2053	$20,604	$77,291	$0	$19,059	$86,537
%NPV	7.86	10.97	0.00	18.19	13.34
	$1,114,916	$1,555,095	$0	$2,579,562	$1,891,285
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	E-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation

LIFE CYCLE COST REPORT

1 Scenario A-1

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2004	$103,020	$5,789,312	$0	$0	$8,594,057
2005	$0	$31,009	$0	$0	$227,803
2006	$0	$31,009	$0	$0	$227,803
2007	$0	$31,009	$0	$0	$227,803
2008	$0	$51,613	$0	$0	$248,407
2009	$0	$618,635	$0	$0	$815,429
2010	$0	$40,178	$0	$0	$236,972
2011	$0	$40,178	$0	$0	$236,972
2012	$0	$40,178	$0	$0	$236,972
2013	$0	$60,782	$0	$0	$264,273
2014	$0	$50,480	$0	$0	$504,824
2015	$0	$40,178	$0	$0	$236,972
2016	$0	$40,178	$0	$0	$236,972
2017	$0	$40,178	$0	$0	$236,972
2018	$0	$60,782	$0	$0	$257,576
2019	$0	$50,480	$0	$0	$247,274
2020	$0	$40,178	$0	$0	$236,972
2021	$0	$40,178	$0	$0	$236,972
2022	$0	$40,178	$0	$0	$236,972
2023	$0	$60,782	$0	$0	$264,273
2024	$0	$50,480	$0	$0	$504,824
2025	$0	$40,178	$0	$0	$236,972
2026	$0	$40,178	$0	$0	$236,972
2027	$0	$40,178	$0	$0	$236,972
2028	$0	$60,782	$0	$0	$257,576
2029	$0	$50,480	$0	$0	$247,274
2030	$0	$38,117	$0	$0	$234,911
2031	$0	$38,117	$0	$0	$234,911
2032	$0	$38,117	$0	$0	$234,911
2033	$0	$58,721	$0	$0	$262,212
2034	$0	$48,419	$0	$0	$502,763
2035	$0	$38,117	$0	$0	$234,911
2036	$0	$38,117	$0	$0	$234,911
2037	$0	$38,117	$0	$0	$234,911
2038	$0	$58,721	$0	$0	$255,515
2039	$0	$48,419	$0	$0	$245,213
2040	$0	$38,117	$0	$0	$234,911
2041	$0	$38,117	$0	$0	$234,911
2042	$0	$38,117	$0	$0	$234,911
2043	$0	$58,721	$0	$0	$262,212
2044	$0	$48,419	$0	$0	$502,763
2045	$0	$38,117	$0	$0	$234,911
2046	$0	$38,117	$0	$0	$234,911
2047	$0	$38,117	$0	$0	$234,911
2048	$0	$58,721	$0	$0	$255,515
2049	$0	$48,419	$0	$0	$245,213
2050	$0	$38,117	$0	$0	$234,911
2051	$0	$38,117	$0	$0	$234,911

LIFE CYCLE COST REPORT

1 Scenario A-1

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2052	$0	$38,117	$0	$0	$234,911
2053	$0	$58,721	$0	$0	$262,212
%NPV	0.70	48.95	0.00	0.00	
	$99,153	$6,941,133	$0	$0	
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	

3.9% DISCOUNT RATE, 50 YEARS

LIFE CYCLE COST REPORT

1 Scenario A-1

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2004	0.962	$8,271,470	$8,271,470
2005	0.926	$211,022	$8,482,492
2006	0.892	$203,101	$8,685,593
2007	0.858	$195,478	$8,881,071
2008	0.826	$205,157	$9,086,228
2009	0.795	$648,176	$9,734,404
2010	0.765	$181,296	$9,915,700
2011	0.736	$174,491	$10,090,191
2012	0.709	$167,941	$10,258,132
2013	0.682	$180,259	$10,438,391
2014	0.656	$331,413	$10,769,803
2015	0.632	$149,731	$10,919,534
2016	0.608	$144,110	$11,063,644
2017	0.585	$138,701	$11,202,345
2018	0.563	$145,102	$11,347,447
2019	0.542	$134,069	$11,481,516
2020	0.522	$123,661	$11,605,177
2021	0.502	$119,019	$11,724,196
2022	0.483	$114,552	$11,838,748
2023	0.465	$122,954	$11,961,702
2024	0.448	$226,055	$12,187,757
2025	0.431	$102,130	$12,289,887
2026	0.415	$98,297	$12,388,184
2027	0.399	$94,607	$12,482,791
2028	0.384	$98,973	$12,581,764
2029	0.370	$91,448	$12,673,212
2030	0.356	$83,615	$12,756,827
2031	0.343	$80,476	$12,837,303
2032	0.330	$77,456	$12,914,759
2033	0.317	$83,212	$12,997,971
2034	0.305	$153,561	$13,151,532
2035	0.294	$69,057	$13,220,589
2036	0.283	$66,465	$13,287,053
2037	0.272	$63,970	$13,351,023
2038	0.262	$66,969	$13,417,992
2039	0.252	$61,856	$13,479,848
2040	0.243	$57,033	$13,536,881
2041	0.234	$54,892	$13,591,774
2042	0.225	$52,832	$13,644,606
2043	0.216	$56,758	$13,701,364
2044	0.208	$104,743	$13,806,107
2045	0.201	$47,103	$13,853,211
2046	0.193	$45,335	$13,898,546
2047	0.186	$43,633	$13,942,179
2048	0.179	$45,679	$13,987,858
2049	0.172	$42,192	$14,030,050
2050	0.166	$38,902	$14,068,952
2051	0.159	$37,442	$14,106,394

LIFE CYCLE COST REPORT

1 Scenario A-1

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2052	0.153	$36,036	$14,142,430
2053	0.148	$38,715	$14,181,145

LIFE CYCLE COST REPORT

2 Scenario A-2

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2004	$278,154	$82,076	$0	$4,326,840	$86,537
2005	$20,604	$82,076	$0	$19,059	$86,537
2006	$20,604	$82,076	$0	$19,059	$86,537
2007	$20,604	$82,076	$0	$19,059	$86,537
2008	$20,604	$82,076	$0	$19,059	$86,537
2009	$20,604	$82,076	$0	$19,059	$86,537
2010	$20,604	$82,076	$0	$19,059	$86,537
2011	$20,604	$82,076	$0	$19,059	$86,537
2012	$20,604	$82,076	$0	$19,059	$86,537
2013	$20,604	$88,772	$0	$19,059	$86,537
2014	$278,154	$82,076	$0	$19,059	$86,537
2015	$20,604	$82,076	$0	$19,059	$86,537
2016	$20,604	$82,076	$0	$19,059	$86,537
2017	$20,604	$82,076	$0	$19,059	$86,537
2018	$20,604	$82,076	$0	$19,059	$86,537
2019	$20,604	$82,076	$0	$19,059	$86,537
2020	$20,604	$82,076	$0	$19,059	$86,537
2021	$20,604	$82,076	$0	$19,059	$86,537
2022	$20,604	$82,076	$0	$19,059	$86,537
2023	$20,604	$88,772	$0	$19,059	$86,537
2024	$278,154	$82,076	$0	$19,059	$86,537
2025	$20,604	$82,076	$0	$19,059	$86,537
2026	$20,604	$82,076	$0	$19,059	$86,537
2027	$20,604	$82,076	$0	$19,059	$86,537
2028	$20,604	$82,076	$0	$19,059	$86,537
2029	$20,604	$82,076	$0	$19,059	$86,537
2030	$20,604	$82,076	$0	$19,059	$86,537
2031	$20,604	$82,076	$0	$19,059	$86,537
2032	$20,604	$82,076	$0	$19,059	$86,537
2033	$20,604	$88,772	$0	$19,059	$86,537
2034	$278,154	$82,076	$0	$19,059	$86,537
2035	$20,604	$82,076	$0	$19,059	$86,537
2036	$20,604	$82,076	$0	$19,059	$86,537
2037	$20,604	$82,076	$0	$19,059	$86,537
2038	$20,604	$82,076	$0	$19,059	$86,537
2039	$20,604	$82,076	$0	$19,059	$86,537
2040	$20,604	$82,076	$0	$19,059	$86,537
2041	$20,604	$82,076	$0	$19,059	$86,537
2042	$20,604	$82,076	$0	$19,059	$86,537
2043	$20,604	$88,772	$0	$19,059	$86,537
2044	$278,154	$82,076	$0	$19,059	$86,537
2045	$20,604	$82,076	$0	$19,059	$86,537
2046	$20,604	$82,076	$0	$19,059	$86,537
2047	$20,604	$82,076	$0	$19,059	$86,537
2048	$20,604	$82,076	$0	$19,059	$86,537
2049	$20,604	$82,076	$0	$19,059	$86,537
2050	$20,604	$82,076	$0	$19,059	$86,537
2051	$20,604	$82,076	$0	$19,059	$86,537

LIFE CYCLE COST REPORT

2 Scenario A-2

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2052	$20,604	$82,076	$0	$19,059	$86,537
2053	$20,604	$88,772	$0	$19,059	$86,537
%NPV	6.79	11.00	0.00	27.80	11.52
	$1,114,916	$1,806,035	$0	$4,562,622	$1,891,285
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	E-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation

LIFE CYCLE COST REPORT

2 Scenario A-2

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2004	$103,020	$5,789,312	$0	$0	$10,665,939
2005	$0	$31,009	$0	$0	$239,285
2006	$0	$31,009	$0	$0	$239,285
2007	$0	$31,009	$0	$0	$239,285
2008	$0	$51,613	$0	$0	$259,889
2009	$0	$618,635	$0	$0	$826,911
2010	$0	$40,178	$0	$0	$248,454
2011	$0	$40,178	$0	$0	$248,454
2012	$0	$40,178	$0	$0	$248,454
2013	$0	$60,782	$0	$0	$275,754
2014	$0	$50,480	$0	$0	$516,306
2015	$0	$40,178	$0	$0	$248,454
2016	$0	$40,178	$0	$0	$248,454
2017	$0	$40,178	$0	$0	$248,454
2018	$0	$60,782	$0	$0	$269,058
2019	$0	$50,480	$0	$0	$258,756
2020	$0	$40,178	$0	$0	$248,454
2021	$0	$40,178	$0	$0	$248,454
2022	$0	$40,178	$0	$0	$248,454
2023	$0	$60,782	$0	$0	$275,754
2024	$0	$50,480	$0	$0	$516,306
2025	$0	$40,178	$0	$0	$248,454
2026	$0	$40,178	$0	$0	$248,454
2027	$0	$40,178	$0	$0	$248,454
2028	$0	$60,782	$0	$0	$269,058
2029	$0	$50,480	$0	$0	$258,756
2030	$0	$38,117	$0	$0	$246,393
2031	$0	$38,117	$0	$0	$246,393
2032	$0	$38,117	$0	$0	$246,393
2033	$0	$58,721	$0	$0	$273,693
2034	$0	$48,419	$0	$0	$514,245
2035	$0	$38,117	$0	$0	$246,393
2036	$0	$38,117	$0	$0	$246,393
2037	$0	$38,117	$0	$0	$246,393
2038	$0	$58,721	$0	$0	$266,997
2039	$0	$48,419	$0	$0	$256,695
2040	$0	$38,117	$0	$0	$246,393
2041	$0	$38,117	$0	$0	$246,393
2042	$0	$38,117	$0	$0	$246,393
2043	$0	$58,721	$0	$0	$273,693
2044	$0	$48,419	$0	$0	$514,245
2045	$0	$38,117	$0	$0	$246,393
2046	$0	$38,117	$0	$0	$246,393
2047	$0	$38,117	$0	$0	$246,393
2048	$0	$58,721	$0	$0	$266,997
2049	$0	$48,419	$0	$0	$256,695
2050	$0	$38,117	$0	$0	$246,393
2051	$0	$38,117	$0	$0	$246,393

LIFE CYCLE COST REPORT

2 Scenario A-2

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2052	$0	$38,117	$0	$0	$246,393
2053	$0	$58,721	$0	$0	$273,693
%NPV	0.60	42.28	0.00	0.00	
	$99,153	$6,941,133	$0	$0	
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	

3.9% DISCOUNT RATE, 50 YEARS

LIFE CYCLE COST REPORT

2 Scenario A-2

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2004	0.962	$10,265,581	$10,265,581
2005	0.926	$221,658	$10,487,240
2006	0.892	$213,338	$10,700,578
2007	0.858	$205,330	$10,905,909
2008	0.826	$214,640	$11,120,548
2009	0.795	$657,303	$11,777,851
2010	0.765	$190,080	$11,967,931
2011	0.736	$182,945	$12,150,877
2012	0.709	$176,078	$12,326,955
2013	0.682	$188,090	$12,515,046
2014	0.656	$338,950	$12,853,996
2015	0.632	$156,985	$13,010,981
2016	0.608	$151,093	$13,162,074
2017	0.585	$145,421	$13,307,496
2018	0.563	$151,570	$13,459,065
2019	0.542	$140,295	$13,599,360
2020	0.522	$129,653	$13,729,013
2021	0.502	$124,786	$13,853,799
2022	0.483	$120,102	$13,973,901
2023	0.465	$128,295	$14,102,197
2024	0.448	$231,196	$14,333,393
2025	0.431	$107,079	$14,440,472
2026	0.415	$103,060	$14,543,531
2027	0.399	$99,191	$14,642,722
2028	0.384	$103,385	$14,746,107
2029	0.370	$95,694	$14,841,802
2030	0.356	$87,702	$14,929,503
2031	0.343	$84,410	$15,013,913
2032	0.330	$81,241	$15,095,155
2033	0.317	$86,855	$15,182,010
2034	0.305	$157,068	$15,339,078
2035	0.294	$72,432	$15,411,510
2036	0.283	$69,713	$15,481,224
2037	0.272	$67,096	$15,548,320
2038	0.262	$69,978	$15,618,298
2039	0.252	$64,753	$15,683,051
2040	0.243	$59,821	$15,742,872
2041	0.234	$57,575	$15,800,447
2042	0.225	$55,414	$15,855,862
2043	0.216	$59,244	$15,915,105
2044	0.208	$107,135	$16,022,241
2045	0.201	$49,406	$16,071,646
2046	0.193	$47,551	$16,119,197
2047	0.186	$45,766	$16,164,963
2048	0.179	$47,732	$16,212,695
2049	0.172	$44,167	$16,256,862
2050	0.166	$40,804	$16,297,666
2051	0.159	$39,272	$16,336,938

LIFE CYCLE COST REPORT

2 Scenario A-2

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2052	0.153	$37,798	$16,374,736
2053	0.148	$40,410	$16,415,145

LIFE CYCLE COST REPORT

3 Scenario B

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2004	$278,154	$70,430	$347,074	$0	$86,537
2005	$20,604	$70,430	$347,074	$0	$86,537
2006	$20,604	$70,430	$347,074	$0	$86,537
2007	$20,604	$70,430	$347,074	$0	$86,537
2008	$20,604	$70,430	$347,074	$0	$86,537
2009	$20,604	$70,430	$347,074	$0	$86,537
2010	$20,604	$70,430	$347,074	$0	$86,537
2011	$20,604	$70,430	$347,074	$0	$86,537
2012	$20,604	$70,430	$347,074	$0	$86,537
2013	$20,604	$77,126	$347,074	$0	$86,537
2014	$278,154	$70,430	$347,074	$0	$86,537
2015	$20,604	$70,430	$347,074	$0	$86,537
2016	$20,604	$70,430	$347,074	$0	$86,537
2017	$20,604	$70,430	$347,074	$0	$86,537
2018	$20,604	$70,430	$347,074	$0	$86,537
2019	$20,604	$70,430	$347,074	$0	$86,537
2020	$20,604	$70,430	$347,074	$0	$86,537
2021	$20,604	$70,430	$347,074	$0	$86,537
2022	$20,604	$70,430	$347,074	$0	$86,537
2023	$20,604	$77,126	$347,074	$0	$86,537
2024	$278,154	$70,430	$0	$0	$86,537
2025	$20,604	$70,430	$0	$0	$86,537
2026	$20,604	$70,430	$0	$0	$86,537
2027	$20,604	$70,430	$0	$0	$86,537
2028	$20,604	$70,430	$0	$0	$86,537
2029	$20,604	$70,430	$0	$0	$86,537
2030	$20,604	$70,430	$0	$0	$86,537
2031	$20,604	$70,430	$0	$0	$86,537
2032	$20,604	$70,430	$0	$0	$86,537
2033	$20,604	$77,126	$0	$0	$86,537
2034	$278,154	$70,430	$0	$0	$86,537
2035	$20,604	$70,430	$0	$0	$86,537
2036	$20,604	$70,430	$0	$0	$86,537
2037	$20,604	$70,430	$0	$0	$86,537
2038	$20,604	$70,430	$0	$0	$86,537
2039	$20,604	$70,430	$0	$0	$86,537
2040	$20,604	$70,430	$0	$0	$86,537
2041	$20,604	$70,430	$0	$0	$86,537
2042	$20,604	$70,430	$0	$0	$86,537
2043	$20,604	$77,126	$0	$0	$86,537
2044	$278,154	$70,430	$0	$0	$86,537
2045	$20,604	$70,430	$0	$0	$86,537
2046	$20,604	$70,430	$0	$0	$86,537
2047	$20,604	$70,430	$0	$0	$86,537
2048	$20,604	$70,430	$0	$0	$86,537
2049	$20,604	$70,430	$0	$0	$86,537
2050	$20,604	$70,430	$0	$0	$86,537
2051	$20,604	$70,430	$0	$0	$86,537

LIFE CYCLE COST REPORT

3 Scenario B

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2052	$20,604	$70,430	$0	$0	$86,537
2053	$20,604	$77,126	$0	$0	$86,537
%NPV	7.49	10.42	31.96	0.00	12.70
	$1,114,916	$1,551,509	$4,758,893	$0	$1,891,285
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	E-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation

LIFE CYCLE COST REPORT

3 Scenario B

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2004	$0	$969,600	$128,775	$226,644	$2,107,214
2005	$0	$28,100	$128,775	$11,332	$692,852
2006	$0	$28,100	$128,775	$11,332	$692,852
2007	$0	$28,100	$128,775	$11,332	$692,852
2008	$0	$28,100	$128,775	$11,332	$692,852
2009	$0	$598,500	$128,775	$11,332	$1,263,252
2010	$0	$24,300	$128,775	$11,332	$689,052
2011	$0	$24,300	$128,775	$11,332	$689,052
2012	$0	$24,300	$128,775	$11,332	$689,052
2013	$0	$24,300	$128,775	$11,332	$695,748
2014	$0	$24,300	$128,775	$226,644	$1,161,914
2015	$0	$24,300	$128,775	$11,332	$689,052
2016	$0	$24,300	$128,775	$11,332	$689,052
2017	$0	$24,300	$128,775	$11,332	$689,052
2018	$0	$24,300	$128,775	$11,332	$689,052
2019	$0	$24,300	$128,775	$11,332	$689,052
2020	$0	$24,300	$128,775	$11,332	$689,052
2021	$0	$24,300	$128,775	$11,332	$689,052
2022	$0	$24,300	$128,775	$11,332	$689,052
2023	$0	$24,300	$128,775	$11,332	$695,748
2024	$103,020	$24,300	$128,775	$226,644	$917,860
2025	$0	$24,300	$128,775	$11,332	$341,978
2026	$0	$24,300	$128,775	$11,332	$341,978
2027	$0	$24,300	$128,775	$11,332	$341,978
2028	$0	$24,300	$128,775	$11,332	$341,978
2029	$0	$24,300	$128,775	$11,332	$341,978
2030	$0	$24,300	$128,775	$11,332	$341,978
2031	$0	$24,300	$128,775	$11,332	$341,978
2032	$0	$24,300	$128,775	$11,332	$341,978
2033	$0	$24,300	$128,775	$11,332	$348,674
2034	$0	$24,300	$128,775	$226,644	$814,840
2035	$0	$24,300	$128,775	$11,332	$341,978
2036	$0	$24,300	$128,775	$11,332	$341,978
2037	$0	$24,300	$128,775	$11,332	$341,978
2038	$0	$24,300	$128,775	$11,332	$341,978
2039	$0	$24,300	$128,775	$11,332	$341,978
2040	$0	$24,300	$128,775	$11,332	$341,978
2041	$0	$24,300	$128,775	$11,332	$341,978
2042	$0	$24,300	$128,775	$11,332	$341,978
2043	$0	$24,300	$128,775	$11,332	$348,674
2044	$0	$24,300	$128,775	$226,644	$814,840
2045	$0	$24,300	$128,775	$11,332	$341,978
2046	$0	$24,300	$128,775	$11,332	$341,978
2047	$0	$24,300	$128,775	$11,332	$341,978
2048	$0	$24,300	$128,775	$11,332	$341,978
2049	$0	$24,300	$128,775	$11,332	$341,978
2050	$0	$24,300	$128,775	$11,332	$341,978
2051	$0	$24,300	$128,775	$11,332	$341,978

LIFE CYCLE COST REPORT

3 Scenario B

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2052	$0	$24,300	$128,775	$11,332	$341,978
2053	$0	$24,300	$128,775	$11,332	$348,674
%NPV	0.31	12.83	18.90	5.39	
	$46,131	$1,910,632	$2,814,406	$803,279	
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	

3.9% DISCOUNT RATE, 50 YEARS

LIFE CYCLE COST REPORT

3 Scenario B

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2004	0.962	$2,028,117	$2,028,117
2005	0.926	$641,814	$2,669,932
2006	0.892	$617,723	$3,287,655
2007	0.858	$594,536	$3,882,191
2008	0.826	$572,220	$4,454,411
2009	0.795	$1,004,146	$5,458,556
2010	0.765	$527,161	$5,985,717
2011	0.736	$507,373	$6,493,090
2012	0.709	$488,328	$6,981,419
2013	0.682	$474,566	$7,455,985
2014	0.656	$762,786	$8,218,771
2015	0.632	$435,377	$8,654,148
2016	0.608	$419,035	$9,073,183
2017	0.585	$403,306	$9,476,488
2018	0.563	$388,167	$9,864,656
2019	0.542	$373,597	$10,238,252
2020	0.522	$359,574	$10,597,826
2021	0.502	$346,077	$10,943,902
2022	0.483	$333,086	$11,276,989
2023	0.465	$323,699	$11,600,687
2024	0.448	$411,008	$12,011,695
2025	0.431	$147,386	$12,159,081
2026	0.415	$141,854	$12,300,935
2027	0.399	$136,529	$12,437,464
2028	0.384	$131,404	$12,568,868
2029	0.370	$126,472	$12,695,340
2030	0.356	$121,725	$12,817,064
2031	0.343	$117,156	$12,934,220
2032	0.330	$112,758	$13,046,978
2033	0.317	$110,650	$13,157,628
2034	0.305	$248,880	$13,406,509
2035	0.294	$100,531	$13,507,040
2036	0.283	$96,758	$13,603,797
2037	0.272	$93,126	$13,696,923
2038	0.262	$89,630	$13,786,553
2039	0.252	$86,266	$13,872,819
2040	0.243	$83,028	$13,955,847
2041	0.234	$79,911	$14,035,758
2042	0.225	$76,912	$14,112,669
2043	0.216	$75,474	$14,188,143
2044	0.208	$169,760	$14,357,903
2045	0.201	$68,572	$14,426,475
2046	0.193	$65,998	$14,492,473
2047	0.186	$63,521	$14,555,993
2048	0.179	$61,136	$14,617,130
2049	0.172	$58,841	$14,675,971
2050	0.166	$56,633	$14,732,604
2051	0.159	$54,507	$14,787,111

LIFE CYCLE COST REPORT

3 Scenario B

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2052	0.153	$52,461	$14,839,572
2053	0.148	$51,480	$14,891,052

LIFE CYCLE COST REPORT

4 Baseline

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2004	$0	$86,537	$347,074	$0	$0
2005	$0	$86,537	$347,074	$0	$0
2006	$0	$86,537	$347,074	$0	$0
2007	$0	$86,537	$347,074	$0	$0
2008	$0	$86,537	$347,074	$0	$0
2009	$0	$86,537	$347,074	$0	$0
2010	$0	$86,537	$347,074	$0	$0
2011	$0	$86,537	$347,074	$0	$0
2012	$0	$86,537	$347,074	$0	$0
2013	$0	$86,537	$347,074	$0	$0
2014	$0	$86,537	$347,074	$0	$0
2015	$0	$86,537	$347,074	$0	$0
2016	$0	$86,537	$347,074	$0	$0
2017	$0	$86,537	$347,074	$0	$0
2018	$0	$86,537	$347,074	$0	$0
2019	$0	$86,537	$347,074	$0	$0
2020	$0	$86,537	$347,074	$0	$0
2021	$0	$86,537	$347,074	$0	$0
2022	$0	$86,537	$347,074	$0	$0
2023	$0	$86,537	$347,074	$0	$0
2024	$0	$86,537	$0	$0	$0
2025	$0	$86,537	$0	$0	$0
2026	$0	$86,537	$0	$0	$0
2027	$0	$86,537	$0	$0	$0
2028	$0	$86,537	$0	$0	$0
2029	$0	$86,537	$0	$0	$0
2030	$0	$86,537	$0	$0	$0
2031	$0	$86,537	$0	$0	$0
2032	$0	$86,537	$0	$0	$0
2033	$0	$86,537	$0	$0	$0
2034	$0	$86,537	$0	$0	$0
2035	$0	$86,537	$0	$0	$0
2036	$0	$86,537	$0	$0	$0
2037	$0	$86,537	$0	$0	$0
2038	$0	$86,537	$0	$0	$0
2039	$0	$86,537	$0	$0	$0
2040	$0	$86,537	$0	$0	$0
2041	$0	$86,537	$0	$0	$0
2042	$0	$86,537	$0	$0	$0
2043	$0	$86,537	$0	$0	$0
2044	$0	$86,537	$0	$0	$0
2045	$0	$86,537	$0	$0	$0
2046	$0	$86,537	$0	$0	$0
2047	$0	$86,537	$0	$0	$0
2048	$0	$86,537	$0	$0	$0
2049	$0	$86,537	$0	$0	$0
2050	$0	$86,537	$0	$0	$0
2051	$0	$86,537	$0	$0	$0

LIFE CYCLE COST REPORT

4 Baseline

YEAR	Storefront Concept (1)	Maintenance (2)	Mobile Range (3)	New Indoor Range (4)	New Marine MCCS Range (5)
2052	$0	$86,537	$0	$0	$0
2053	$0	$86,537	$0	$0	$0
%NPV	0.00	19.89	50.04	0.00	0.00
	$0	$1,891,285	$4,758,893	$0	$0
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	E-O-Y
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	No Inflation

LIFE CYCLE COST REPORT

4 Baseline

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2004	$0	$0	$128,775	$0	$562,386
2005	$0	$0	$128,775	$0	$562,386
2006	$0	$0	$128,775	$0	$562,386
2007	$0	$0	$128,775	$0	$562,386
2008	$0	$0	$128,775	$0	$562,386
2009	$0	$0	$128,775	$0	$562,386
2010	$0	$0	$128,775	$0	$562,386
2011	$0	$0	$128,775	$0	$562,386
2012	$0	$0	$128,775	$0	$562,386
2013	$0	$0	$128,775	$0	$562,386
2014	$0	$0	$128,775	$0	$562,386
2015	$0	$0	$128,775	$0	$562,386
2016	$0	$0	$128,775	$0	$562,386
2017	$0	$0	$128,775	$0	$562,386
2018	$0	$0	$128,775	$0	$562,386
2019	$0	$0	$128,775	$0	$562,386
2020	$0	$0	$128,775	$0	$562,386
2021	$0	$0	$128,775	$0	$562,386
2022	$0	$0	$128,775	$0	$562,386
2023	$0	$0	$128,775	$0	$562,386
2024	$103,020	$0	$128,775	$0	$318,332
2025	$0	$0	$128,775	$0	$215,312
2026	$0	$0	$128,775	$0	$215,312
2027	$0	$0	$128,775	$0	$215,312
2028	$0	$0	$128,775	$0	$215,312
2029	$0	$0	$128,775	$0	$215,312
2030	$0	$0	$128,775	$0	$215,312
2031	$0	$0	$128,775	$0	$215,312
2032	$0	$0	$128,775	$0	$215,312
2033	$0	$0	$128,775	$0	$215,312
2034	$0	$0	$128,775	$0	$215,312
2035	$0	$0	$128,775	$0	$215,312
2036	$0	$0	$128,775	$0	$215,312
2037	$0	$0	$128,775	$0	$215,312
2038	$0	$0	$128,775	$0	$215,312
2039	$0	$0	$128,775	$0	$215,312
2040	$0	$0	$128,775	$0	$215,312
2041	$0	$0	$128,775	$0	$215,312
2042	$0	$0	$128,775	$0	$215,312
2043	$0	$0	$128,775	$0	$215,312
2044	$0	$0	$128,775	$0	$215,312
2045	$0	$0	$128,775	$0	$215,312
2046	$0	$0	$128,775	$0	$215,312
2047	$0	$0	$128,775	$0	$215,312
2048	$0	$0	$128,775	$0	$215,312
2049	$0	$0	$128,775	$0	$215,312
2050	$0	$0	$128,775	$0	$215,312
2051	$0	$0	$128,775	$0	$215,312

LIFE CYCLE COST REPORT

4 Baseline

YEAR	Range Closure (6)	Improve Existing Ranges (7)	Use Private Ranges (8)	Use of Simulators (9)	TOTAL ANNUAL OUTLAYS
2052	$0	$0	$128,775	$0	$215,312
2053	$0	$0	$128,775	$0	$215,312
%NPV	0.49	0.00	29.59	0.00	
	$46,131	$0	$2,814,406	$0	
DISCOUNTING CONVENTION	E-O-Y	E-O-Y	E-O-Y	E-O-Y	
INFLATION INDEX	No Inflation	No Inflation	No Inflation	No Inflation	

3.9% DISCOUNT RATE, 50 YEARS

LIFE CYCLE COST REPORT

4 Baseline

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2004	0.962	$541,276	$541,276
2005	0.926	$520,959	$1,062,235
2006	0.892	$501,404	$1,563,639
2007	0.858	$482,583	$2,046,222
2008	0.826	$464,469	$2,510,691
2009	0.795	$447,035	$2,957,726
2010	0.765	$430,255	$3,387,981
2011	0.736	$414,105	$3,802,086
2012	0.709	$398,561	$4,200,646
2013	0.682	$383,600	$4,584,247
2014	0.656	$369,202	$4,953,448
2015	0.632	$355,343	$5,308,791
2016	0.608	$342,005	$5,650,796
2017	0.585	$329,167	$5,979,964
2018	0.563	$316,812	$6,296,776
2019	0.542	$304,920	$6,601,695
2020	0.522	$293,474	$6,895,170
2021	0.502	$282,458	$7,177,628
2022	0.483	$271,856	$7,449,484
2023	0.465	$261,652	$7,711,136
2024	0.448	$142,546	$7,853,682
2025	0.431	$92,795	$7,946,477
2026	0.415	$89,312	$8,035,789
2027	0.399	$85,960	$8,121,749
2028	0.384	$82,733	$8,204,482
2029	0.370	$79,628	$8,284,110
2030	0.356	$76,639	$8,360,748
2031	0.343	$73,762	$8,434,511
2032	0.330	$70,993	$8,505,504
2033	0.317	$68,328	$8,573,832
2034	0.305	$65,764	$8,639,596
2035	0.294	$63,295	$8,702,891
2036	0.283	$60,919	$8,763,811
2037	0.272	$58,633	$8,822,443
2038	0.262	$56,432	$8,878,875
2039	0.252	$54,314	$8,933,189
2040	0.243	$52,275	$8,985,463
2041	0.234	$50,313	$9,035,776
2042	0.225	$48,424	$9,084,200
2043	0.216	$46,606	$9,130,807
2044	0.208	$44,857	$9,175,664
2045	0.201	$43,173	$9,218,837
2046	0.193	$41,553	$9,260,390
2047	0.186	$39,993	$9,300,383
2048	0.179	$38,492	$9,338,875
2049	0.172	$37,047	$9,375,922
2050	0.166	$35,656	$9,411,578
2051	0.159	$34,318	$9,445,896

LIFE CYCLE COST REPORT

4 Baseline

YEAR	END OF YEAR DISCOUNT FACTORS	PRESENT VALUE	CUMULATIVE NET PRESENT VALUE
2052	0.153	$33,030	$9,478,926
2053	0.148	$31,790	$9,510,716

LIFE CYCLE COST REPORT

SOURCE AND DERIVATION OF COSTS AND BENEFITS:

SCENARIO A-1 - Maximum Capital Investment
==========

Under this scenario, maximum "first-cost" money would be spent to improve the training ranges, either by the purchasing of new land and building more ranges, or closing mobile ranges.

The costs associated with each alternative are broken out further by each cost item and it's occurrance, be it an annual cost or a one time cost.

Storefront Concept

The ranges in the Mid-Atlantic region would be centrally managed under a storefront philosophy. The storefront would be responsible for the scheduling, staffing, and maintenance of the ranges. Assume computer software/hardware obsolete in 10 years and replace w/new system.

RFMSS Scheduling Software	$175,134	One time Cost
Initial Training	$51,510	One time Cost
Computer Hardware	$51,510	One time Cost
	$278,154	One time Cost

Computer Hardware Upgrade	$10,302	Annual
Annual Training	$10,302	Annual
	$20,604	Annual

Maintenance

The maintenance of the ranges varies from the mechanical systems of the buildings to the targets themselves.

Filters (Indoor Range)	$5,898	Annual
Indoor Range Maintenance Contract	$41,208	Annual
Outdoor Range Targets/Wood	$23,488	Annual
	$70,594	Annual

Outdoor Range Backstop Refurbishment	$6,697	Per 10 Year Interval

Mobile Range Maintenance

As the mobile ranges are closed in this scenario, there is no cost associated with this item.

New Indoor Range

A new indoor range will need to be built to supplement the current ranges and provide increased capacity. An environmental analysis is requred to build new range and cost is included.

Construction Cost	$2,060,400	One time Cost
Indoor Range EA	$206,040	One time Cost
	$2,266,440	One time Cost

Rubber Backstop Replacement	$19,059	Annual

New Marine MCCS Range

This is the cost to use the new Marine MCCS range (4 hrs per day).

Use of Marine MCCS Range	$86,537	Annual

Range Closure

There will be range closures associated with Scenario A-1.
All mobile ranges will be phased out.

Mobile Range Close Out	$103,020	One time Cost
	$103,020	One time Cost

Improve Existing CNRMA Ranes

At existing ranges, improvements will be made to bring these ranges to certification standards.

Little Creek NAB

A project will retrofit the ventilation system at NAB indoor ranges to meet Navy Range Certification Standards. Wet snail lubricant maintenance would have continued use for next five years, then will be replaced with granular rubber backstop.

Indoor Ranges Ventilation (retrofit)	$618,120	One time Cost
Install New Granular Rubber Backstop	$597,516	One time Cost (Yr 6)
Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval
Wet Snail Lubricant Maintenance	$9,890	Annual(Yr 1-5)
Granular Rubber Backstop Replacement	$5,975	Annual(Yr 7-50)

NNSY Indoor Range

A project will replace existing target system with turning monorail target system. The granular rubber backstop will also be replaced annually.

Indoor Range Target System Replacement	$61,812	One time Cost
Indoor Range Backstop Replacement	$19,059	Annual

DAM Neck Range

A project will install a radar system to help maintain a safe SDZ at the outdoor range.

Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval

CAX Range

A project will install a radar system to help maintain a safe SDZ at the outdoor

range.

Install Radar System - SDZ monitoring $10,302 Per 5 Year Interval

Northwest IAMS Range

This range requires the removal of the tire berm, which is considered a hazardous waste material. A project will extend the current SDZ through land aquisition and an environmental analysis will also be required. At this range, a battery powered target system at (2) 20 ln cells (100, 200, 300 yds) will also be installed.

Tire Berm Removal	$309,060 One time Cost
SDZ extention	$3,605,700 One time Cost
SDZ extention EA	$154,530 One time Cost
Target System	$1,030,200 One time Cost
	$5,099,490 One time Cost

Target System Maintenance $2,060 Annual(Yr 2-25)

The target system has an anticipated life of 25 years. After this time, the system is considered to be outdated and not replaced.

Use of Private Ranges

As private ranges are not used in this scenario, there is no cost associated with this item.

Maximum Use of Simulators

As additional Simulators are not used in this scenario, there is no cost associated with this item.

SCENARIO A2 - Maximum Capital Investment

Under this scenario, maximum "first-cost" money would be spent to improve the training ranges, either by the purchasing of new land and building more ranges, or closing mobile ranges.

The costs associated with each alternative are broken out further by each cost item and it's occurrance, be it an annual cost or a one time cost.

Storefront Concept

The ranges in the Mid-Atlantic region would be centrally managed under a storefront philosophy. The storefront would be responsible for the scheduling, staffing, and maintenance of the ranges. Assume computer software/hardware obsolete in 10 years and replace w/ new system.

RFMSS Scheduling Software	$175,134 One time Cost
Initial Training	$51,510 One time Cost
Computer Hardware	$51,510 One time Cost
	$278,154 One time Cost

Computer Hardware Upgrade	$10,302 Annual
Annual Training	$10,302 Annual
	$20,604 Annual

Maintenance

The maintenance of the ranges varies from the mechanical systems of the buildings to the targets themselves.

Filters (Indoor Range)	$7,077 Annual
Indoor Range Maintenance Contract	$51,510 Annual
Outdoor Range Targets/Wood	$23,489 Annual
	$82,076 Annual

Outdoor Range Backstop Refurbishment	$6,696 Per 10 Year Interval

Mobile Range Maintenance

As the mobile ranges are closed in this scenario, there is no cost associated with this item.

New Indoor Range

A new indoor range will need to be built to supplement the current ranges and provide increased capacity. An environmental analysis is requred to build new range and cost is included.

Construction Cost	$4,120,800 One time Cost
Indoor Range EA	$206,040 One time Cost
	$4,326,840 One time Cost

Rubber Backstop Replacement	$19,059 Annual

New Marine MCCS Range

This is the cost to use the new Marine MCCS range (4 hrs per day).

Use of Marine MCCS Range	$86,537 Annual

Range Closure

There will be range closures associated with Scenario A-2. All mobile ranges will be phased out.

Mobile Range Close Out	$103,020 One time Cost
	$103,020 One time Cost

Improve Existing CNRMA Ranges

At existing ranges, improvements will be made to bring these ranges to certification standards.

Little Creek NAB

A project will retrofit the ventilation system at NAB indoor ranges to meet Navy Range Certification Standards. Wet snail lubricant maintenance would have continued use for next five years, then will be replaced with granular rubber backstop.

Indoor Ranges Ventilation (retrofit)	$618,120	One time Cost
Install New Granular Rubber Backstop	$597,516	One time Cost (Yr 6)
Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval
Wet Snail Lubricant Maintenance	$9,890	Annual(Yr 1-5)
Granular Rubber Backstop Replacement	$5,975	Annual(Yr 7-50)

NNSY Indoor Range

A project will replace existing target system with turning monorail target system. The granular rubber backstop will also be replaced annually.

Indoor Range Target System Replacement	$61,812	One time Cost
Indoor Range Backstop Replacement	$19,059	Annual

DAM Neck Range

A project will install a radar system to help maintain a safe SDZ at the outdoor range.

Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval

CAX Range

A project will install a radar system to help maintain a safe SDZ at the outdoor range.

Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval

Northwest IAMS Range

This range requires the removal of the tire berm, which is considered a hazardous waste material. A project will extend the current SDZ through land aquisition, an environmental analysis will also be required. At this range, a battery powered target system at (2) 20 ln cells (100, 200, 300 yds) will also be installed.

Tire Berm Removal	$309,060	One time Cost
SDZ extention	$3,605,700	One time Cost
SDZ extention EA	$154,530	One time Cost
Target System	$1,030,200	One time Cost
	$5,099,490	One time Cost
Target System Maintenance	$2,060	Annual(Yr 2-25)

The target system has an anticipated life of 25 years. After this time the system is considered to be outdated and not replaced.

Use of Private Ranges

As private ranges are not used in this scenario, there is no cost associated with this item.

Maximum Use of Simulators

As additional simulators are not used in this scenario, there is no cost associated with this item.

SCENARIO B - Minimum Capital Investment

Under this scenario, minimum "first-cost" money would be spent to improve the training ranges. This would be accomplished through the use of non-Navy DoD ranges, the continued use of the portable ranges and use of simulators.

The costs associated with each alternative are broken out further by each cost item and it's occurrance, be it an annual cost or a one time cost.

Storefront Concept

The ranges in the Mid-Atlantic region would be centrally managed under a storefront philosophy. The storefront would be responsible for the scheduling, staffing, and maintenance of the ranges. Assume computer software/hardware obsolete in 10 years and replaced with a new system.

RFMSS Scheduling Software	$175,134	One time Cost
Initial Training	$51,510	One time Cost
Computer Hardware	$51,510	One time Cost
	$278,154	One time Cost
Computer Hardware Upgrade	$10,302	Annual
Annual Training	$10,302	Annual
	$20,604	Annual

Maintenance

The maintenance of the ranges varies from the mechanical systems of the buildings to the targets themselves.

Filters (Indoor Range)	$4,703	Annual
Indoor Range Maintenance Contract	$32,966	Annual
Outdoor Range Targets/Wood	$32,760	Annual
	$70,430	Annual
Outdoor Range Backstop Refurbishment	$6,696	Per 10 Year Interval

Mobile Range Maintenance

There are currently five mobile ranges. The following are annual costs for these ranges, ranging from Lamella and filter changes to wall and target maintenance. The mobile ranges will be phased out after year 20.

Lammella Change Out	$206,040	Annual (Yr 1-20)
Wall Maintenance	$51,510	Annual (Yr 1-20)
HEPA Filter	$30,906	Annual (Yr 1-20)
Target System Repair Maintenance	$36,057	Annual (Yr 1-20)

Targets	$5,151	Annual (Yr 1-20)
Safety Equipment (tyvek, gloves, etc)	$17,410	Annual (Yr 1-20)
	$347,074	Annual (Yr 1-20)

New Indoor Range

No new ranges will be contructed in this scenario, as there is no cost associated with this item.

New Marine MCCS Range

This is the cost to use the new Marine MCCS range (4 hrs per day).

Use of Marine MCCS Range	$86,537	Annual

Range Closures

There will be range closures associated with Scenario B. In year 21, all mobile ranges will be phased out.

Mobile Range Close Out	$103,020	One time Cost

Improve Existing CNRMA Ranges

At existing ranges, improvements will be made to bring these ranges to certification standards.

Little Creek NAB

A project will retrofit the ventilation system at NAB indoor ranges to meet Navy Range Certification Standards. Wet snail lubricant maintenance would have continued use for next five years, then will be replaced with granular rubber backstop.

Indoor Ranges Ventilation (retrofit)	$618,120	One time Cost
Install New Granular Rubber Backstop	$597,516	One time Cost (Yr 6)
Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval
Wet Snail Lubricant Maintenance	$9,890	Annual(Yr 1-5)
Granular Rubber Backstop Replacement	$5,975	Annual(Yr 7-50)

NNSY Indoor Range

A project will replace existing target system with turning monorail target system. The granular rubber backstop will also be replaced annually.

Indoor Range Target System Replacement	$61,812	One time Cost
Indoor Range Backstop Replacement	$19,059	Annual

DAM Neck Range

A project will install a radar system to help maintain a safe SDZ at the outdoor range.

Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval

CAX Range

A project will install a radar system to help maintain a safe SDZ at the outdoor range.

Install Radar System - SDZ monitoring	$10,302	Per 5 Year Interval

Northwest IAMS Range

This range requires the removal of the tire berm, which is considered a hazardous waste material.

Tire Berm Removal	$309,060	One time Cost

Use of Private Ranges

The use of private ranges would allow Navy personnell to receive training without the need for operations and maintenance of these facilities. The following ranges would be utilized:

Blackwater	$72,114	Annual
SPECWAR Outdoor Shooting Range	$25,755	Annual
Non-SPECWAR Outdoor Shooting Range	$20,604	Annual
Other Facilities	$10,302	Annual
	$128,775	Annual

Maximum Use of Simulators

This would provide training through the use of visual simulators. Assume simulator software/hardware obsolete in 10 years and replace with a new system.

Laser Simulator Purchase	$226,644	One time Cost
Training	$8,242	Annual
Software Upgrades	$3,090	Annual
	$11,332	Annual

BASELINE - Baseline Case
==========

These are a representation of the current baseline or status quo costs. As this will not be continued, this is for informational/comparison purposes.

Storefront Concept

There is no current storefront concept.

Maintenance

The maintenance of the ranges varies from the mechanical systems of the buildings to the targets themselves.

Little Creek NAB (Indoor Range)	$50,480	Annual
Little Creek NAB (Outdoor Range)	$5,151	Annual
NNSY (Indoor Range)	$5,151	Annual

CAX (Outdoor Range)	$5,151 Annual
Yorktown (Outdoor Range)	$5,151 Annual
Dam Neck Rifle Range	$5,151 Annual
Northwest IAMS Range	$5,151 Annual
	$86,537 Annual

Mobile Range Maintenance

There are currently five mobile ranges. The following are annual costs for these ranges, ranging from Lamella and filter changes to wall and target maintenance. The mobile ranges will be phased out after year 20.

Lammella Change Out	$206,040 Annual (Yr 1-20)
Wall Maintenance	$51,510 Annual (Yr 1-20)
HEPA Filter	$30,906 Annual (Yr 1-20)
Target System Repair Maintenance	$36,057 Annual (Yr 1-20)
Targets	$5,151 Annual (Yr 1-20)
Safety Equipment (tyvek, gloves, etc)	$17,410 Annual (Yr 1-20)
	$347,074 Annual (Yr 1-20)

New Indoor Range

No new ranges will be contructed in this scenario, there is no cost associated with this item.

New Marine MCCS Range

There currently is not use of the Marine MCCS range, therefore no cost is associated with this item.

Range Closures

There will be range closures associated with the baseline scenario. In year 21, all mobile ranges will be phased out.

Mobile Range Close Out	$103,020 One time Cost

Improve Existing CNRMA Ranges

There will be no range improvements associated this scenario.

Use of Private Ranges

The use of private ranges would allow Navy personnell to receive training without the need for operations and maintenance of these facilities. The following ranges would be utilized:

Blackwater	$72,114 Annual
SPECWAR Outdoor Shooting Range	$25,755 Annual
Non-SPECWAR Outdoor Shooting Range	$20,604 Annual
Other Facilities	$10,302 Annual
	$128,775 Annual

Maximum Use of Simulators

As additional simulators are not used in this scenario, there is no cost associated with this item.

COST SENSITIVITY ANALYSIS 1

TITLE: Cost Sensitivity Analysis 1

This sensitivity analysis checks for alternative 3 to be ranked least cost as a result of changes in the expense item(s) listed below:

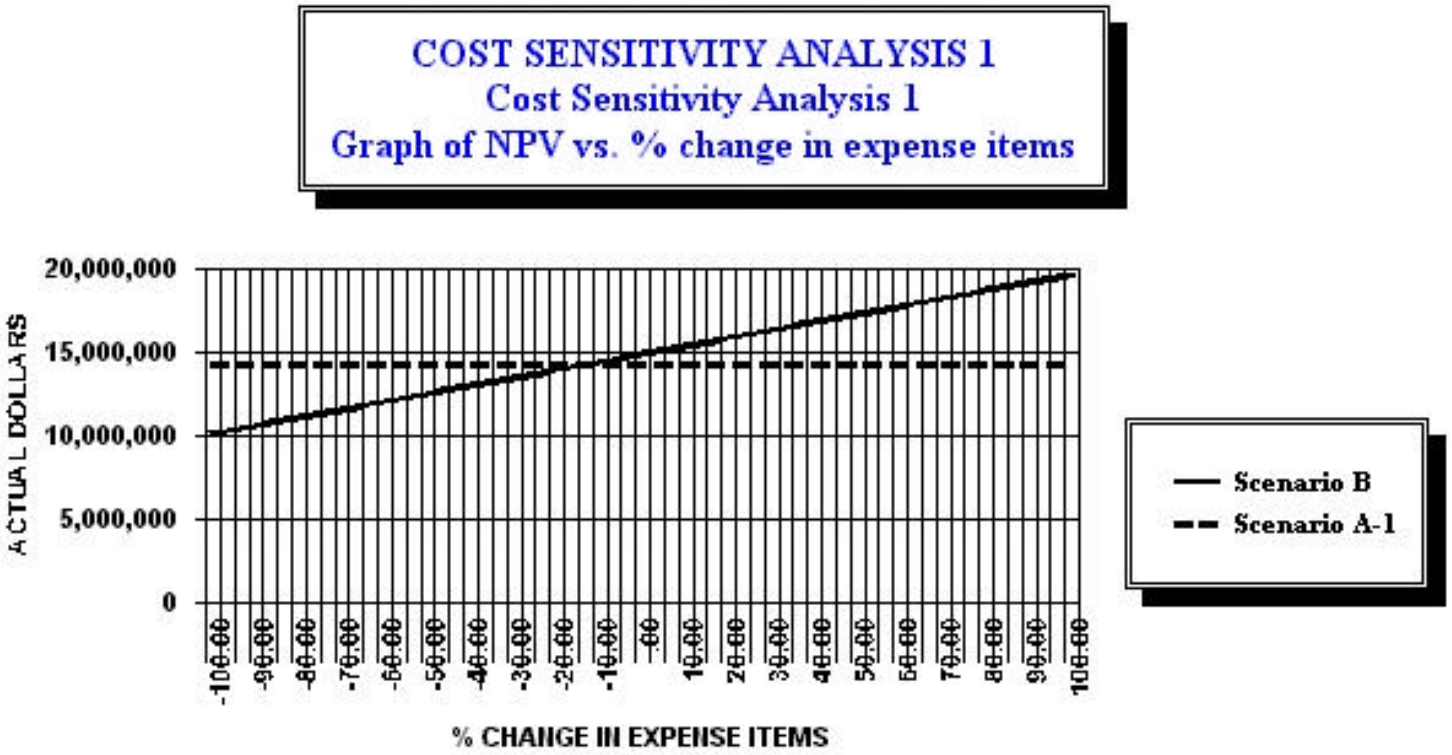
ALTERNATIVE	EXPENSE ITEM(S)
3 Scenario B	3 Mobile Range
1 Scenario A-1	** NOTHING CHANGED **

The selected expense items are allowed to vary from a value of -100.00% to 100.00%

ALTERNATIVE	NET PRESENT VALUE
1 Scenario A-1	$14,181,145
3 Scenario B	$14,891,052

RESULTS:

For alternative 3 to be ranked least cost, reduce the selected expense item(s) by more than 14.92%.


COST SENSITIVITY ANALYSIS 1
Cost Sensitivity Analysis 1
Graph of NPV vs. % change in expense items
20,000,000
15,000,000
10,000,000
5,000,000
0
ACTUAL DOLLARS
-100.00
-90.00
-80.00
-70.00
-60.00
-50.00
-40.00
-30.00
-20.00
-10.00
.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
% CHANGE IN EXPENSE ITEMS
Scenario B
Scenario A-1

COST SENSITIVITY ANALYSIS 2

TITLE: Cost Sensitivity Analysis 2

This sensitivity analysis checks for alternative 2 to be ranked least cost as a result of changes in the expense item(s) listed below:

ALTERNATIVE	EXPENSE ITEM(S)
2 Scenario A-2	7 Improve Existing Ran
1 Scenario A-1	** NOTHING CHANGED **

The selected expense items are allowed to vary from a value of -100.00% to 100.00%

ALTERNATIVE	NET PRESENT VALUE
1 Scenario A-1	$14,181,145
2 Scenario A-2	$16,415,145

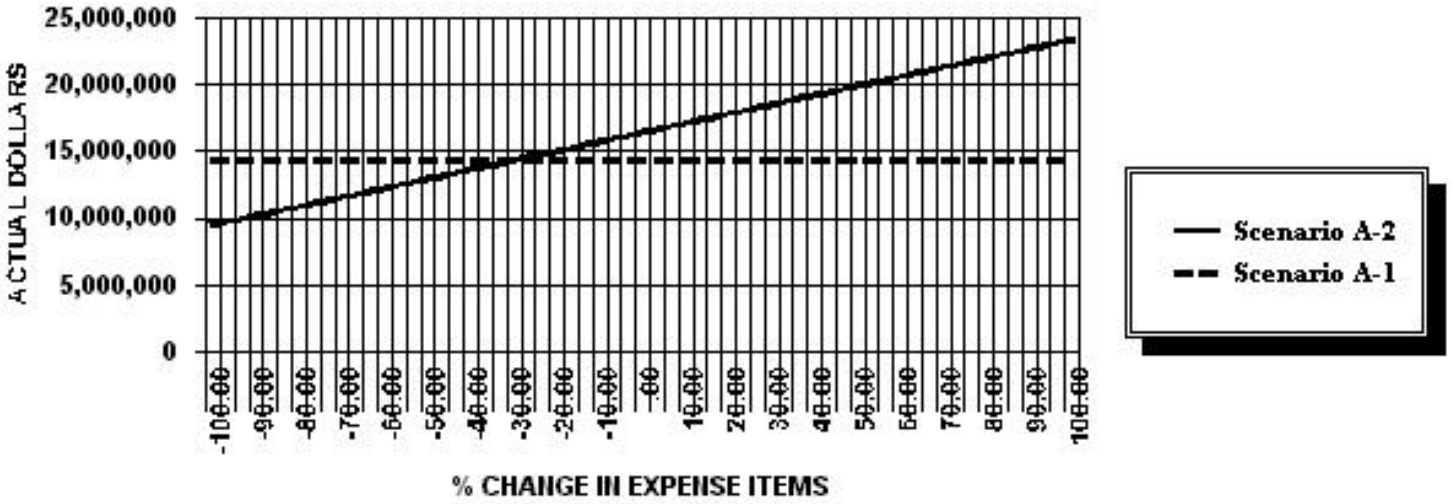
RESULTS:

For alternative 2 to be ranked least cost, reduce the selected expense item(s) by more than 32.18%.

COST SENSITIVITY ANALYSIS 2

Cost Sensitivity Analysis 2

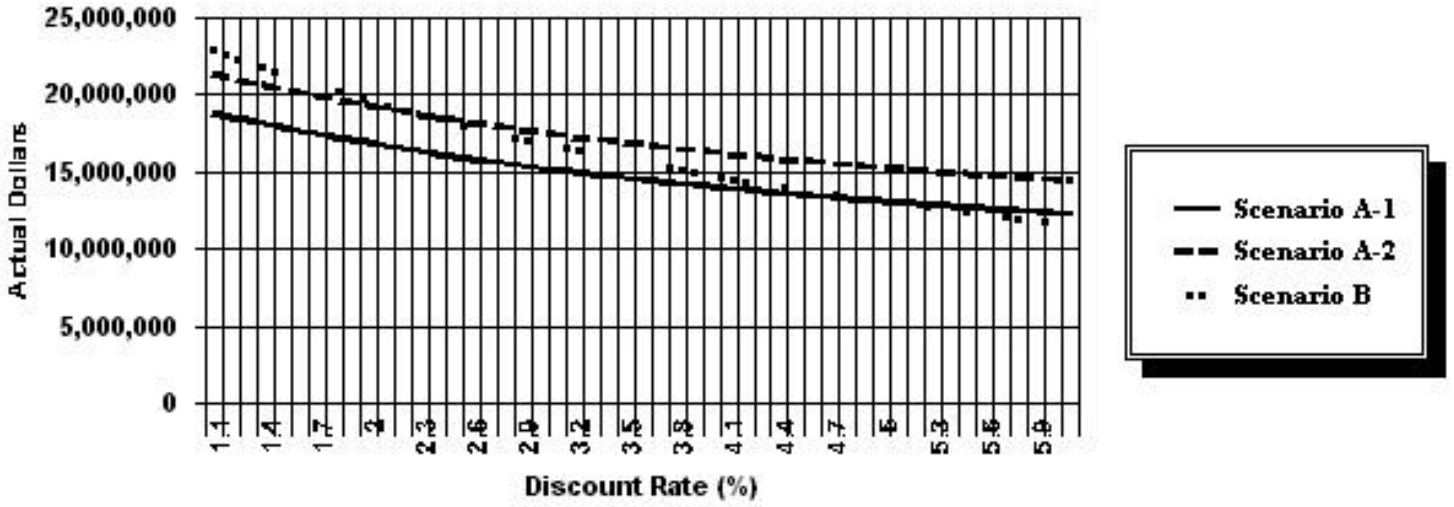
Graph of NPV vs. % change in expense items



DISCOUNT RATE SENSITIVITY ANALYSIS 1

Discount Rate Sensitivity Analysis

Graph of Net Present Value vs. Discount Rate



DISCOUNT RATE SENSITIVITY ANALYSIS 1

TITLE: Discount Rate Sensitivity Analysis

Summary of Alternative Rankings by Discount Rate

Discount Rate: 3.9 Lower Limit: 01.10 Upper Limit: 06.10

	Discount Rate (%)	Alternative Ranking		Discount Rate (%)	Alternative Ranking
	1.10	1 2 3		3.70	1 3 2
	1.20	1 2 3		3.80	1 3 2
	1.30	1 2 3		3.90	1 3 2
	1.40	1 2 3		4.00	1 3 2
	1.50	1 2 3		4.10	1 3 2
	1.60	1 2 3		4.20	1 3 2
	1.70	1 2 3		4.30	1 3 2
	1.80	1 2 3		4.40	1 3 2
	1.90	1 2 3		4.50	1 3 2
	2.00	1 2 3		4.60	1 3 2
	2.10	1 2 3		4.70	1 3 2
	2.20	1 2 3		4.80	1 3 2
*	2.30	1 3 2	*	4.90	3 1 2
	2.40	1 3 2		5.00	3 1 2
	2.50	1 3 2		5.10	3 1 2
	2.60	1 3 2		5.20	3 1 2
	2.70	1 3 2		5.30	3 1 2
	2.80	1 3 2		5.40	3 1 2
	2.90	1 3 2		5.50	3 1 2
	3.00	1 3 2		5.60	3 1 2
	3.10	1 3 2		5.70	3 1 2
	3.20	1 3 2		5.80	3 1 2
	3.30	1 3 2		5.90	3 1 2
	3.40	1 3 2		6.00	3 1 2
	3.50	1 3 2		6.10	3 1 2
	3.60	1 3 2			

RESULTS:

* indicates a change in the alternative ranking occurred.

DISCOUNT RATE SENSITIVITY ANALYSIS 1

TITLE: Discount Rate Sensitivity Analysis

Table of Net Present Value for each Discount Rate

Disc Rate = 01.10%	Disc Rate = 01.20%	Disc Rate = 01.30%	Disc Rate = 01.40%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $18,836,948	1 - $18,596,887	1 - $18,364,141	1 - $18,138,440
2 - $21,314,703	2 - $21,062,685	2 - $20,818,304	2 - $20,581,279
3 - $22,793,974	3 - $22,394,729	3 - $22,006,939	3 - $21,630,201

Disc Rate = 01.50%	Disc Rate = 01.60%	Disc Rate = 01.70%	Disc Rate = 01.80%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $17,919,525	1 - $17,707,149	1 - $17,501,073	1 - $17,301,067
2 - $20,351,339	2 - $20,128,226	2 - $19,911,689	2 - $19,701,491
3 - $21,264,125	3 - $20,908,338	3 - $20,562,481	3 - $20,226,211

Disc Rate = 01.90%	Disc Rate = 02.00%	Disc Rate = 02.10%	Disc Rate = 02.20%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $17,106,914	1 - $16,918,400	1 - $16,735,326	1 - $16,557,495
2 - $19,497,403	2 - $19,299,203	2 - $19,106,682	2 - $18,919,636
3 - $19,899,196	3 - $19,581,118	3 - $19,271,671	3 - $18,970,562

Disc Rate = 02.30%	Disc Rate = 02.40%	Disc Rate = 02.50%	Disc Rate = 02.60%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $16,384,721	1 - $16,216,826	1 - $16,053,636	1 - $15,894,987
3 - $18,677,509	3 - $18,392,239	3 - $18,114,491	3 - $17,844,015
2 - $18,737,869	2 - $18,561,196	2 - $18,389,436	2 - $18,222,417

Disc Rate = 02.70%	Disc Rate = 02.80%	Disc Rate = 02.90%	Disc Rate = 03.00%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $15,740,719	1 - $15,590,680	1 - $15,444,723	1 - $15,302,707
3 - $17,580,568	3 - $17,323,919	3 - $17,073,843	3 - $16,830,126
2 - $18,059,972	2 - $17,901,942	2 - $17,748,175	2 - $17,598,522

Disc Rate = 03.10%	Disc Rate = 03.20%	Disc Rate = 03.30%	Disc Rate = 03.40%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $15,164,496	1 - $15,029,959	1 - $14,898,972	1 - $14,771,414
3 - $16,592,560	3 - $16,360,947	3 - $16,135,093	3 - $15,914,815
2 - $17,452,842	2 - $17,310,999	2 - $17,172,862	2 - $17,038,306

DISCOUNT RATE SENSITIVITY ANALYSIS 1

TITLE: Discount Rate Sensitivity Analysis

Table of Net Present Value for each Discount Rate

Disc Rate = 03.50%	Disc Rate = 03.60%	Disc Rate = 03.70%	Disc Rate = 03.80%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $14,647,168	1 - $14,526,124	1 - $14,408,173	1 - $14,293,213
3 - $15,699,934	3 - $15,490,280	3 - $15,285,686	3 - $15,085,995
2 - $16,907,208	2 - $16,779,453	2 - $16,654,929	2 - $16,533,528

Disc Rate = 03.90%	Disc Rate = 04.00%	Disc Rate = 04.10%	Disc Rate = 04.20%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $14,181,145	1 - $14,071,872	1 - $13,965,303	1 - $13,861,348
3 - $14,891,052	3 - $14,700,711	3 - $14,514,828	3 - $14,333,267
2 - $16,415,145	2 - $16,299,682	2 - $16,187,043	2 - $16,077,134

Disc Rate = 04.30%	Disc Rate = 04.40%	Disc Rate = 04.50%	Disc Rate = 04.60%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $13,759,924	1 - $13,660,947	1 - $13,564,339	1 - $13,470,022
3 - $14,155,896	3 - $13,982,586	3 - $13,813,216	3 - $13,647,666
2 - $15,969,867	2 - $15,865,156	2 - $15,762,919	2 - $15,663,076

Disc Rate = 04.70%	Disc Rate = 04.80%	Disc Rate = 04.90%	Disc Rate = 05.00%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
1 - $13,377,925	1 - $13,287,976	3 - $13,172,816	3 - $13,021,443
3 - $13,485,822	3 - $13,327,574	1 - $13,200,107	1 - $13,114,253
2 - $15,565,550	2 - $15,470,267	2 - $15,377,158	2 - $15,286,152

Disc Rate = 05.10%	Disc Rate = 05.20%	Disc Rate = 05.30%	Disc Rate = 05.40%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
3 - $12,873,359	3 - $12,728,465	3 - $12,586,671	3 - $12,447,887
1 - $13,030,350	1 - $12,948,337	1 - $12,868,156	1 - $12,789,750
2 - $15,197,184	2 - $15,110,191	2 - $15,025,111	2 - $14,941,885

Disc Rate = 05.50%	Disc Rate = 05.60%	Disc Rate = 05.70%	Disc Rate = 05.80%
Alt - NPV	Alt - NPV	Alt - NPV	Alt - NPV
3 - $12,312,027	3 - $12,179,007	3 - $12,048,747	3 - $11,921,170
1 - $12,713,064	1 - $12,638,045	1 - $12,564,643	1 - $12,492,809
2 - $14,860,456	2 - $14,780,769	2 - $14,702,770	2 - $14,626,410

DISCOUNT RATE SENSITIVITY ANALYSIS 1

TITLE: Discount Rate Sensitivity Analysis

Table of Net Present Value for each Discount Rate

Disc Rate = 05.90% Alt - NPV		Disc Rate = 06.00% Alt - NPV		Disc Rate = 06.10% Alt - NPV	
3 -	$11,796,200	3 -	$11,673,764	3 -	$11,553,793
1 -	$12,422,495	1 -	$12,353,657	1 -	$12,286,248
2 -	$14,551,638	2 -	$14,478,407	2 -	$14,406,670