DATE ISSUED DEC 10 1987

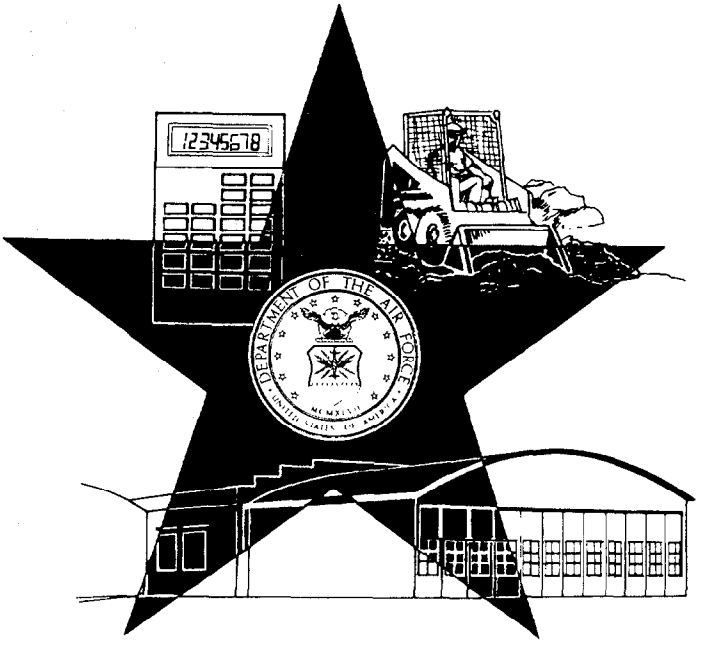
ornl

ORNL/TM-10476/V2

OAK RIDGE NATIONAL LABORATORY

MARTIN MARIETTA

Military Construction Program Economic Analysis Manual: Sample Economic Analyses



OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

Printed in the United States of America. Available from
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road, Springfield, Virginia 22161
NTIS price codes—Printed Copy: A12 Microfiche A01

ORNL/TM-10476/V2

MILITARY CONSTRUCTION PROGRAM ECONOMIC ANALYSIS MANUAL: SAMPLE ECONOMIC ANALYSES

Hazardous Waste Remedial Actions Program

Date Published: December 1987

Prepared for:
THE UNITED STATES AIR FORCE

SAF/ACC and USAF/LEE coordinated document

Prepared by:
URS CORPORATION
Santa Barbara, California 93101

and

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831
operated by
Martin Marietta Energy Systems, Inc.
for the U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

MILITARY CONSTRUCTION PROGRAM
ECONOMIC ANALYSIS MANUAL

Contents

Page

Volume 1. Text and Appendixes

Abstract vii

Introduction 1

Determining Whether to Perform an Economic Analysis 5

How to Use this Manual 7

Step 1: Defining the Requirement 11

Step 2: Identifying Alternatives 15

Step 3: Calculating Life-Cycle Costs 21

Step 4: Evaluating Benefits 37

Step 5: Comparing Costs and Benefits of Alternatives 47

Step 6: Performing Sensitivity Analyses 55

Step 7: Documenting the Analysis 59

Appendixes

Appendix A: Glossary A-1

Appendix B: Life-Cycle Cost Data Sources B-1

Appendix C: Economic Analysis Multipliers C-1

Appendix D: Qualitative Evaluation Criteria D-1

Volume 2. Sample Economic Analyses

Preface 1

Unaccompanied Enlisted Personnel Housing S1-1

Consolidated Supply Facility S2-1

Air Test Center Engineering Management Facility S3-1

List of Figures

Page

Figure 1: Economic Analysis Flow Diagram 8

Figure 2: Cash Flow Diagram 49

PREFACE

This is a companion document to the Military Construction Program Economic Analysis Manual. It contains three sample economic analyses, prepared using the manual, that demonstrate how the methodology is applied and how the worksheets and forms are completed. The sample analyses, all fiscal year (FY) 1990 Military Construction Program (MCP) projects, include typical examples of (1) unaccompanied enlisted personnel housing (UEPH), (2) a consolidated supply facility, and (3) an administrative facility, in this case an engineering management facility.

As the samples demonstrate, the mandatory components of an economic analysis typically forwarded with DD Form 1391 to major command and Air Staff include

1. a Certification of Satisfactory Economic Analysis,

2. a narrative discussion, and

3. Forms S-1, S-2 (if completed), and S-3.

The worksheets are included in the samples, but they are typically not forwarded with the DD Form 1391; they remain at the base as back-up documentation, unless specifically requested by the major command.

The UEPH sample analysis evaluates three alternatives: (1) building a new UEPH, (2) renovating an existing vacant facility, and (3) continuing to pay allowances to personnel for off-base housing. The analysis concludes that the new construction alternative would have the lowest life-cycle costs (in present value) and provide the most benefits (both quantitative and qualitative). This sample is a straight-forward example of an economic analysis in which the least-cost alternative is the recommended approach.

The consolidated supply facility sample analysis also has three alternatives: (1) construction of a new consolidated supply facility, (2) renovation of eight existing facilities, and (3) continued use of the existing facilities with regular maintenance as needed (status quo). Most of the existing facilities, which are located on various portions of the base several miles apart, are in need of major repair and/or replacement of several building subsystems. In this economic analysis, the new construction alternative is not the least costly but it does have the highest benefit-

cost ratio and is, therefore, the most cost-effective solution to fulfilling the supply function. This is an example in which cost was not the deciding factor.

The third sample analysis, involving an Air Test Center engineering management facility (EMF), is unique in that the status quo is not one of the alternatives considered. In this case, the base expects a mission expansion that will increase the staff level from 471 to 536 personnel. The status quo facilities do not provide adequate space for the existing personnel and could not, therefore, accommodate additional personnel. The status quo facilities also do not provide adequate secure meeting areas or conference space, so a conference facility is included in the programmed project.

The EMF sample analysis evaluates three alternatives involving various facility components. It concludes that the most cost-effective approach is construction of a new EMF with 536 offices and conference space. In addition to being the least costly alternative, it provides direct benefits from consolidation of the operation into a centralized facility and indirect benefits from vacating the status quo facility, allowing personnel presently working in 56 leased trailers to move into permanent facilities. The lease for those trailers would be terminated, resulting in measurable savings.

The three sample economic analyses in this document represent a range of facility types, requirements, and analytical complexity. They also demonstrate the use of various data sources and methods for calculating costs, which are discussed both in the narratives and on the worksheets. As they illustrate, objectivity, creativity, and accuracy are all important qualities of an effective and satisfactory economic analysis.

ECONOMIC ANALYSIS

UNACCOMPANIED ENLISTED PERSONNEL HOUSING
FY 1990 MCP

General Eric AFB

Homeville, US

CERTIFICATE OF SATISFACTORY ECONOMIC ANALYSIS

Installation/MAJCOM: General Eric AFB

Project Title: Unaccompanied Enlisted Personnel Housing (UEPH)

Project Number: ABCD900123

Alternatives Considered:

Status Quo

Construct New UEPH

Renovate Existing UEPH

Summary of Analysis Results:

The economic analysis concluded that the new construction alternative would be the most cost-effective approach to meeting UEPH needs at General Eric AFB, based on life-cycle costs. The life-cycle costs of the renovation alternative would be 21 percent higher than new construction, and renovation would provide fewer benefits than new construction. The new construction alternative is, therefore, recommended.

Base-level ACC Evaluation: _____ *(signature)*

Concurrence (AC): _____ *(signature)*

Concurrence (DE): _____ *(signature)*

Evaluation by MAJCOM ACC:

Concur with the selection of new construction as the most cost-effective alternative for meeting base UEPH needs. It has the most benefits and is the least costly of all the alternatives considered.

MAJCOM ACC Evaluation: _____ *(signature)*

Contents

Section		*Page*
1.0	Introduction	1
1.1	Requirement	1
1.2	Background	1
1.3	Objectives	1
2.0	Alternatives	2
2.1	Alternatives Evaluated	2
2.2	Alternatives Determined To Be Infeasible	2
3.0	Life-Cycle Cost Analysis	3
3.1	Constraints and Assumptions	3
3.2	Life-Cycle Costs	6
4.0	Benefits Analysis	7
4.1	Constraints and Assumptions	7
4.2	Benefits	7
5.0	Comparison of Alternatives	8
6.0	Sensitivity Analysis	10
7.0	Conclusions and Recommendation	11

1.0 INTRODUCTION

1.1 Requirement

General Eric AFB has a validated requirement to house 1,500 unaccompanied enlisted personnel on base. Currently there are 12 dormitories on base capable of housing 2,000 personnel. Five of these, with space for 700 personnel, are vacant and considered substandard, leaving only 1,300 usable spaces on base. There is a need to provide adequate housing for 200 additional E-1 through E-4 personnel.

1.2 Background

Gen Eric AFB has a total of 2,200 unaccompanied enlisted personnel currently assigned to the base. Of these, 1,500 personnel are required to live on base or are listed on the Base Allowance for Quarters (BAQ) waiting list as priority 2. Currently, 1,300 unaccompanied enlisted personnel are housed on base, and 900 reside in off-base quarters.

A survey and determination of family housing requirements was conducted for Gen Eric AFB in 1986. It indicates that, although off-base housing is available, it is located in Homeville which is 22 miles from the base. The area immediately surrounding the base is primarily agricultural. Housing closer to the base is scarce, and what exists is generally substandard. Housing costs in Homeville are relatively expensive; the average rent for a two-bedroom apartment is $487 per month, based on a recent survey conducted by the base housing office.

The five vacant dormitories on base were part of an old training complex located 5 miles north of the main cantonment area. These buildings are substandard, condition code 3 facilities that are currently scheduled for demolition. The Base Civil Engineer (BCE) evaluated all of the facilities and determined that two of the buildings could be renovated to supply the additional rooms required. One of those buildings has a 3,000-square-foot kitchen/dining facility. The remaining three buildings cannot be economically repaired or maintained and will be demolished.

1.3 Objectives

The purpose of this analysis is to identify the most effective means of providing adequate housing for 200 unaccompanied enlisted personnel at Gen Eric AFB. Objectives considered in evaluating potential alternatives include:

1. Provide adequate on-base housing for an additional 200 unaccompanied E-1 through E-4 personnel (1,500 unaccompanied enlisted personnel total).

2. Provide housing in a cost-effective manner.

3. Improve the maintainability of on-base facilities.

4. Maintain high morale among base personnel by providing an adequate living environment.

2.0 ALTERNATIVES

2.1 Alternatives Evaluated

The following alternatives are evaluated in this analysis:

STATUS QUO. This alternative involves continuing to pay an average of $452 per month in fiscal year 1986 (FY86) dollars for BAQ and Variable Housing Allowance (VHA) to each of the 200 enlisted personnel housed off base. The requirement to house 1,500 enlisted personnel on base would remain unfulfilled.

CONSTRUCT NEW DORMITORY. This alternative involves constructing a new 200-person dormitory in FY90 on an available site in the main part of the base. The proposed site is near other housing in the main cantonment area and closer to dining halls, community services, and recreation facilities. The new dormitory would have a total of 38,000 square feet and would meet all standards in AFR 90-9, including adequate net living area and accommodations. The five vacant facilities in the old training complex would be demolished.

RENOVATE EXISTING FACILITIES. This alternative would involve renovating two vacant dormitory buildings in the old training complex, including repairing or replacing electrical and plumbing systems, roofing, flooring, and siding. Insulation would be added to walls and ceilings to improve energy efficiency, and windows and doors would be replaced with more energy-efficient designs. Air conditioning would be added to the facilities. The total size of the existing buildings is 40,700 square feet.

An addition/alteration project would be programmed for FY90. The existing 3,000 square feet of kitchen/dining space would be converted to a lounge area. The project would raise the two renovated facilities to condition code 1. The remaining three buildings would be demolished. A new bus line would need to be added to the existing on-base transportation system to link the old training complex to the main cantonment area of the base.

2.2 Alternatives Determined To Be Infeasible

In addition to the three alternatives evaluated, the following alternatives were considered but determined to be infeasible:

BUILD A NEW DORMITORY AND CONVERT THE EXISTING VACANT FACILITY TO ANOTHER USE. This alternative is similar to the new construction alternative evaluated, except the existing facilities would be converted to another use rather than demolished. Their remote location and configuration make it impractical for most office or industrial uses. The facilities would likely require substantial alteration to be usable as other than dormitories. Even if the buildings' physical and structural deficiencies were corrected, their location would still be undesirable. In conclusion, conversion of the existing vacant dormitories to another use was determined to be impractical and eliminated from further consideration.

BUILD A NEW DORMITORY ON THE SAME SITE AS THE EXISTING DORMITORIES. This alternative is similar to the new construction alternative evaluated, except it would

involve demolishing the existing vacant facilities and replacing them with a new facility on the same site. Preliminary cost estimates indicated that this alternative would be as costly as constructing a new facility on a site in the main cantonment area, but locating a new dormitory in the old training complex would provide fewer benefits because of the remote location. Therefore, this alternative was eliminated from further consideration.

3.0 LIFE-CYCLE COST ANALYSIS

3.1 Constraints and Assumptions

In the life-cycle cost analysis, all costs are stated in program year FY90 dollars. Historic costs are inflated to FY90 dollars using the Office of the Secretary of Defense (OSD) inflation index (date of ACC issue: 24 February 1986). FY85 dollars are inflated by 18.8 percent and FY86 dollars by 15.1 percent to obtain FY90 costs.

Capital Investment

No capital investment would be required for the status quo alternative.

New construction costs would be $70 per square foot. This figure is inflated by a size adjustment factor of 1.02, an area cost factor of 1.04, a 5 percent contingency factor, and supervision, inspection, and overhead (SIOH) costs amounting to an additional 5.5 percent. The total cost would be $3,586,000.

Based on *Means Square Foot Costs*, renovating the existing vacant dormitories would involve 76 percent of full replacement (this assumes that items such as foundations and basic structural elements would not be replaced). Renovation also requires removing the existing components that will be replaced, which increases construction costs by 30 percent. Thus renovation costs would be 99 percent (76 percent x 130 percent) of new construction ($69 per square foot). The estimated cost of renovation is inflated by an area cost factor of 1.04, a 10 percent contingency factor, and SIOH costs of 5.5 percent. The total cost of renovation would be $3,902,000.

Annual Maintenance Costs

A study of annual maintenance costs was conducted by the base ACC office. This study indicated that new and renovated facilities had an average annual maintenance costs of approximately $0.23 per square foot in the first year of occupancy. It also indicated that maintenance costs increase at various average annual rates depending on the age of facilities. The rates of increase are presented in the following table.

Facility Age (years)	*Average Annual Increase in Maintenance Costs (%)*
NEW FACILITIES	
1-5	0.5
6-10	1.0
11-25	2.0
>25	4.0
RENOVATED FACILITIES	
1-5	1.0
6-20	2.0
>20	4.0

These rates were used to escalate annual maintenance costs for the renovation and new construction alternatives. For the status quo, maintenance costs are assumed to be included in the BAQ and VHA payments for off-base housing.

Periodic Maintenance, Repair, and Replacement Costs

The assumed life expectancy and cost of each anticipated repair item are presented below. Maintenance, repair, and replacement costs were determined using *Means Construction Cost Data, 1986.*

	Life Expectancy (years)	*Cost per square foot* ($)
Roofing	15	4.60
Exterior Siding	30	4.83
Wall Finishes, Carpeting	10	3.93
HVAC	15	2.88
Plumbing	30	3.52
Electrical	30	3.59

Life expectancies of common repair items were determined for the new construction and renovation alternatives from historic data at Gen Eric AFB. Repair costs for the status quo are included in the BAQ and VHA payments.

Electrical repair is assumed to involve replacement of all wiring. HVAC repair is assumed to involve replacing HVAC units, reinsulating ducts, and repairing or replacing ducts as required. New plumbing fixtures and pipes would be required. Roof repairs involve full roof replacement, and exterior siding would also be replaced in full. Exterior and interior finishes require painting at the intervals noted. Floor coverings (carpets) would be repaired by replacement. Flooring, windows, and doors would be expected to last over 50 years before they required replacement.

Utilities

Engineering Technical Letter (ETL) 86-1 indicates that a new or renovated facility in Region 2 has a design criterion of 45,000 British thermal units (Btus) per square foot of building space. ETL 86-1 excluded housing from its energy budget distributions; therefore, the distribution for community-type facilities is assumed to be similar to that of dormitories. ETL 86-1 indicates that community-type facilities consume approximately 25 percent of their energy budget for heating, 10 percent for domestic hot water, 10 percent for ventilation, 35 percent for lighting, and 20 percent for cooling.

The old dormitories originally used coal for space and water heating; they were converted to fuel oil in the late 1950s. Natural gas lines do not extend to the old training complex. It is assumed that fuel oil would continue to be used under the renovation alternative due to the prohibitive cost of extending a gas line 5 miles to the old training complex.

Since a new dormitory would be located in a portion of the base that has natural gas service, natural gas is assumed to be the energy source for both space heating and domestic hot water with the new construction alternative. Electricity would be used for ventilation, lighting, and cooling with both alternatives. The energy costs for each alternative are shown below.

	Btus per square foot	*Number of square feet*	*Cost per Btu ($)*	*Total Cost ($)*
New Construction				
Electricity	29,300	38,000	.02046	22,784
Natural Gas	15,800	38,000	.00574	3,445
Renovation				
Electricity	29,300	40,700	.02046	24,403
Fuel Oil	15,800	40,700	.00675	4,341

Data on water and sewage usage and costs were obtained from the base utility office. The average water use per person in UEPH is assumed to be 100 gallons per day, 365 days per year. The price of water is $1.99 per thousand gallons. The price of sewage disposal is $1.83 per thousand gallons. According to the base utility office, 70 percent of the water purchased ends up in the sewage stream.

Total annual utility costs are $50,136 for the new construction alternative and $52,650 for renovation. Energy costs for electricity, natural gas, and fuel oil were acquired from the base energy office. Status quo utility costs are included in the compensation given personnel who live off base.

Miscellaneous Operations and Maintenance Costs

Trash removal and custodial service costs are estimated based on the average cost per square foot in the existing dormitories. These costs were $0.98 per square foot for custodial services and $0.46 per square foot for trash removal. The total cost for the new construction alternative for these two services would be $54,506 annually. The cost would be slightly higher for the renovation alternative ($57,375) because the two existing facilities together include more square feet than the planned size of the single new facility. Trash removal and custodial costs for the status quo are included in the housing allowances.

Miscellaneous User Costs

Miscellaneous user costs include expenditures for furnishings and transportation. Furnishings for each of the 100 dormitory rooms would cost approximately $2,698.67 every 5 years. This is based on the average cost per room in the existing 1,300 dormitory spaces on Gen Eric AFB. These costs would be the same for both the renovation and new construction alternatives. The total cost for each alternative would be $310,617 every 5 years.

Transportation costs of $78,212 would be incurred under the renovation alternative to provide bus service between the old training complex and the main part of the base. This figure is based on the assumption that there would be 31 5-mile shuttle trips made daily between the old training complex and the main cantonment area. The shuttle would operate between the hours of 0600 and 2200. It would leave the main base every hour on the hour and leave the old training complex every hour on the quarter hour. The vehicle used to transport residents is assumed to be a 28-passenger bus with an average operation cost of $0.99 per mile (including the cost of an E-4 operator). Transportation cost estimates were made by the base transportation officer.

Housing Allowances

BAQ and VHA housing allowances, averaging $537.25 per month per enlisted personnel, would continue to be incurred under the status quo alternative. The total cost would be $1,289,400 annually for the 200 enlisted personnel.

3.2 Life-Cycle Costs

All costs were totaled in FY90 dollars on Form S-1 (attached for all alternatives) and discounted to present value using a discount rate of 10 percent. The total program-year dollars and net present value of each alternative are presented below.

	Life-Cycle Costs ($ FY 1990)	
	Constant Dollars	*Present Value*
Status Quo	64,470,000	12,784,162
New Construction	16,099,216	5,847,620
Renovation	20,727,808	7,031,039

4.0 BENEFITS ANALYSIS

4.1 Constraints and Assumptions

None of the alternatives evaluated are expected to result in user cost savings or quantifiable productivity increases. The provision of adequate on-base living quarters can be expected to increase overall morale and, thereby, performance of enlisted personnel currently living off base, but this improved performance is impossible to quantify. As a result, only qualitative benefits were considered in the analysis.

Qualitative criteria used in the analysis include:

1. Morale, which is affected by the adequacy and quality of the living units.

2. Accessibility to other on-base facilities.

4.2 Benefits

The new construction alternative performed relatively high in all benefit categories. By providing a facility that meets all AFR 90-9 standards, this alternative is expected to improve the quality of life and the morale of residents. Since the new facility would be in the main part of the base and near other housing areas, it would be closer to base dining halls, recreation areas, the community center, and other facilities frequented by base personnel.

Renovating the vacant facilities in the old training complex would also be expected to improve the morale of the residents, although not as much as a new dormitory. The old training complex is located 5 miles from the main cantonment area, and bus service would provide relatively frequent and easy access to base dining halls, recreation areas, the community center, and other facilities. However, the accessibility would not be as high as a new facility located in the main part of the base.

The status quo alternative is rated very low in the qualitative benefit analysis because adequate housing in Homeville is generally more expensive than the housing allowances paid by the government, and Homeville is located 22 miles from the main part of the base.

Alternatives were rated for qualitative benefits, using a scale of 1 to 10, and then weighted to reflect base priorities and objectives. The criterion considered most important was morale (weighted 5), followed by accessibility (weighted 3). Weighted qualitative scores of the alternatives are presented below.

	Alternative		
Criterion	*Status Quo*	*New Construction*	*Renovation*
Morale	10	50	30
Accessibility	3	30	21
TOTAL	13	80	51

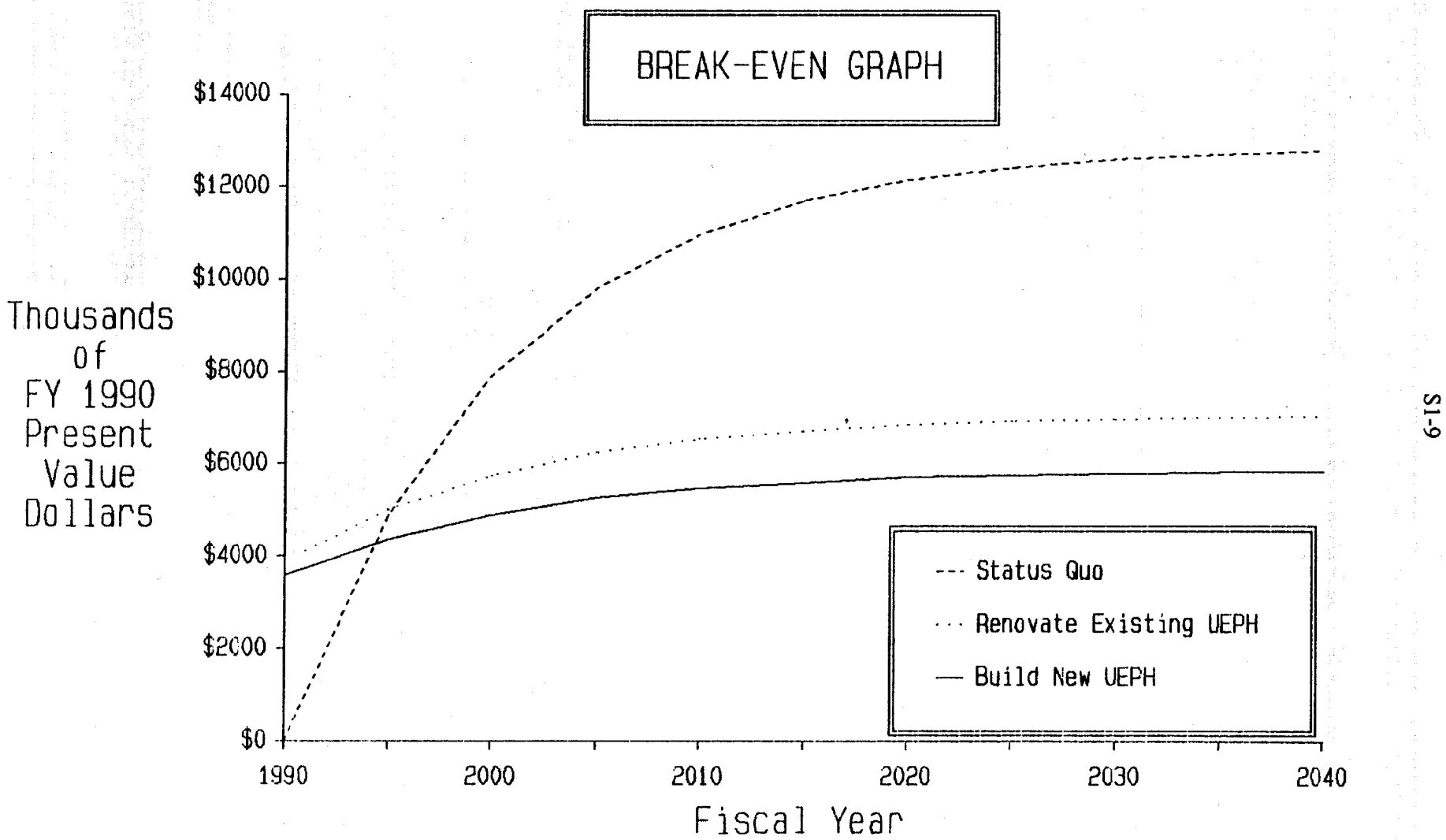
5.0 COMPARISON OF ALTERNATIVES

The least-cost alternative is new construction. As the attached break-even graph demonstrates, the new construction alternative becomes the least costly of the three alternatives early in the 50-year life cycle analysis (the break-even point would occur between the fourth and fifth years). The savings-investment ratio (SIR) is nearly 3 (see Form S-3 attached).

Actual construction costs are less for building a new UEPH facility than the renovation project, which involves more square footage. Due mainly to the additional square footage, the renovation alternative also has slightly higher maintenance, repair, utility, and operations costs. These costs, combined with the additional transportation costs of operating bus service to the old training complex, are the primary reasons for the difference between the two on-base alternatives. Utility costs would also be slightly lower in the new facility due to the lower cost of natural gas compared with fuel oil used in the renovated facility.

Both the new construction and renovation alternatives are more cost-effective than the status quo, based on benefit-cost ratio (BCR). The new construction alternative has a BCR of 2.19, which is significantly higher than the renovation alternative's BCR of 1.82. A comparison of the alternatives is shown below.

	Alternative		
Criterion	*Status Quo*	*New Construction*	*Renovation*
BCR	1	2.19	1.82
Payback Period	N/A	4-5 years	5-6 years
SIR	N/A	2.93	2.47
EPIR	N/A	N/A	N/A


BREAK-EVEN GRAPH
Thousands of FY 1990 Present Value Dollars
$14000
$12000
$10000
$8000
$6000
$4000
$2000
$0
1990
2000
2010
2020
2030
2040
Fiscal Year
--- Status Quo
··· Renovate Existing UEPH
— Build New UEPH

Based on cost, the qualitative scores, and the necessity to choose an alternative that meets mission requirements, the new construction alternative is ranked first. The new construction alternative provides the required space for the personnel and is located in a more accessible portion of the base. It would also take advantage of lower-cost heating (natural gas versus fuel oil) to further reduce expenditures. The new facility would be easier and cheaper to maintain and would increase the morale of the personnel residing in the facility.

The renovation alternative is ranked second because it also meets the requirement of providing additional spaces on Gen Eric AFB. The higher cost of this alternative makes it less attractive than new construction.

The status quo alternative is ranked third because it does not provide the required number of on-base rooms. The high cost associated with providing housing allowances is an inefficient use of government resources. Furthermore, off-base housing is not as accessible to base services as the on-base alternatives.

6.0 SENSITIVITY ANALYSIS

For a sensitivity analysis, the cost of renovating the old training complex's 3,000 SF kitchen/dining area was estimated. This additional cost is estimated at $110 per square foot inflated by an area cost factor of 1.04 with a 10 percent contingency factor and SIOH costs of 5.5 percent. The cost of renovating the kitchen/dining facility was added to the cost of renovating the dormitories in the old training complex, for a total of $4,067,000. The difference in the amount of capital investment required for renovating the kitchen/dining area is $165,000 greater than the renovation of the area for use as a lounge.

The kitchen/dining facilities in the old training complex would be a self-serve operation. If personnel used these facilities, The number of meals served in the dining complex in the main cantonment area would be reduced. If an average of 50 percent of the 200 personnel housed in the old training complex were to use the self-serve kitchen/dining facility on a daily basis, there would be a decrease in meals served in the main dining complex of about 300 per day.

The main dining complex manager has indicated that this decrease in the number of meals served per day would allow him to reduce the hours for several of the personnel in the kitchen and on the serving line. Many of the workers currently work nine or ten hours per day. Based on the number of man-hours worked by the existing staff and the average number of meals served per day, a decrease of 300 meals served each day would result in savings of 23 man-hours each day. These labor savings, accumulated 365 days a year, are equal to four full-time equivalent personnel.

The main dining complex manager pointed out that he would need to have one full-time person in the old training complex kitchen/dining area to stock food items and oversee the operation. Those personnel using the self-serve facilities would be responsible for cleaning up, under the supervision of person from the main dining complex. The net savings in labor would therefore be equivalent to three full-time personnel. Any additional operational costs incurred in the self-

serve kitchen/dining facility are assumed to be offset by a corresponding decrease in costs at the main dining complex.

The purpose of this sensitivity analysis is to determine whether the reduction in labor hours would compensate for the increased capital investment and operation costs of providing a kitchen/dining facility in the old training complex. A comparison of the two renovation alternatives is shown below.

Criterion	*Renovation with Lounge Area*	*Renovation with Kitchen/Dining Area*
BCR	1.82	1.87
Payback Period	5-6 years	5-6 years
SIR	2.47	2.37
EPIR	N/A	.16

The life-style costs of the renovation alternative increased in the sensitivity analysis ($20,892,808 in constant dollars and $7,196,039 in present value), but labor savings benefits ($3,350,880 in constant dollars and $664,467 in present value) would offset the additional cost. The BCR of the renovation alternative in the sensitivity analyses is slightly lower than in the primary analyses (1.82 compared to 1.87), although still far better that the status quo. This indicates that the increased costs of renovating the kitchen/dining facility outweigh the benefits. Although providing kitchen services would improve accessibility and morale slightly, the analysis indicates that the new construction alternative is clearly more cost-effective.

7.0 CONCLUSIONS AND RECOMMENDATION

The recommended alternative is construction of a new 200-person dormitory, based on considerations of costs and benefits. The renovation alternative is acceptable in terms of meeting the objectives, but it is more costly than the new construction alternative and has fewer benefits. The life-cycle costs in present value of the status quo are more than double those of the renovation or new construction alternatives. The qualitative benefits of the status quo are also very low. Thus, the new construction alternative is the best overall approach to meeting the base's needs for unaccompanied enlisted personnel quarters.

FORM S-3
Ranking of Alternatives

	Status Quo	Alternative: Build New UEPH	Alternative: Renovate Existing UEPH	Alternative:	Alternative: Renovate Existing UEPH SENSITIVITY ANALYSIS	Alternative:
Life-Cycle Benefits (from FORM S-2)	N/A	N/A	N/A		$664,467	
Life-Cycle Costs of Status Quo (from FORM S-1)	N/A	(+) $12,784,162	(+) $12,784,162	(+)	(+) $12,784,162	(+)
Total Life-Cycle Benefit (including Status Quo cost avoidance)	N/A	(=) $12,784,162	(=) $12,784,162	(=)	(=) $13,448,629	(=)
Total Life-Cycle Costs (from FORM S-1)	N/A	(/) $5,847,620	(/) $7,031,039	(/)	(/) $7,196,039	(/)
Benefit-Cost Ratio (BCR) *	1	(=) 2.19	(=) 1.82	(=)	(=) 1.87	(=)
Payback Period (if applicable)	N/A	4-5 years	5-6 years		5-6 years	
Savings-Investment Ratio (SIR)	N/A	2.93	2.47		2.37	
Eff/Prod-Investment Ratio (EPIR)	N/A	N/A	N/A		.16	
Qualitative Benefit Score	13	80	51		53	
Rank	4	1	3		2	

* If BCR > 1, then that alternative is **more cost-effective** than the status quo.
If BCR < 1, then that alternative is **less cost-effective** than the status quo.
The alternative with the largest BCR is the **most cost-effective** alternative.

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0 *	1.000	$0	$0
**1991	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.909	$1,172,182	$1,172,182
1992	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.826	$1,065,620	$2,237,802
1993	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.751	$968,745	$3,206,547
1994	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.683	$880,678	$4,087,225
1995	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.621	$800,616	$4,887,840
1996	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.564	$727,833	$5,615,673
1997	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.513	$661,666	$6,277,339
1998	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.467	$601,515	$6,878,854
1999	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.424	$546,831	$7,425,685
2000	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.386	$497,120	$7,922,805
2001	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.350	$451,927	$8,374,732
2002	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.319	$410,843	$8,785,574
2003	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.290	$373,493	$9,159,067
2004	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.263	$339,539	$9,498,607
2005	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.239	$308,672	$9,807,279
2006	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.218	$280,611	$10,087,890
2007	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.198	$255,101	$10,342,991
2008	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.180	$231,910	$10,574,901
2009	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.164	$210,827	$10,785,728
2010	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.149	$191,661	$10,977,389
2011	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.135	$174,237	$11,151,626
2012	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.123	$158,398	$11,310,024
2013	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.112	$143,998	$11,454,022
2014	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.102	$130,907	$11,584,929
2015	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.092	$119,006	$11,703,935

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.084	$108,188	$11,812,123
2017	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.076	$98,352	$11,910,476
2018	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.069	$89,411	$11,999,887
2019	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.063	$81,283	$12,081,170
2020	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.057	$73,894	$12,155,064
2021	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.052	$67,176	$12,222,240
2022	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.047	$61,069	$12,283,309
2023	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.043	$55,517	$12,338,826
2024	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.039	$50,470	$12,389,296
2025	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.036	$45,882	$12,435,179
2026	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.032	$41,711	$12,476,890
2027	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.029	$37,919	$12,514,809
2028	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.027	$34,472	$12,549,281
2029	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.024	$31,338	$12,580,619
2030	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.022	$28,489	$12,609,108
2031	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.020	$25,899	$12,635,007
2032	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.018	$23,545	$12,658,552
2033	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.017	$21,404	$12,679,956
2034	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.015	$19,459	$12,699,415
2035	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.014	$17,690	$12,717,104
2036	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.012	$16,081	$12,733,186
2037	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.011	$14,619	$12,747,805
2038	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.010	$13,290	$12,761,096
2039	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.009	$12,082	$12,773,178
2040	$0	$0	$0	$0	$0	$1,289,400	$1,289,400	.009	$10,984	$12,784,162
Total	$0	$0	$0	$0	$0	$64,470,000	$64,470,000		$12,784,162	

FORM S-1
Total Life-Cycle Costs
Alternative: BUILD NEW UEPH

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$3,586,000 *	1.000	$3,586,000	$3,586,000
**1991	$25,840	$0	$50,105	$54,554	$310,617	$0	$441,116	.909	$401,014	$3,987,014
1992	$25,969	$0	$50,105	$54,554	$0	$0	$130,628	.826	$107,957	$4,094,971
1993	$26,099	$0	$50,105	$54,554	$0	$0	$130,758	.751	$98,240	$4,193,212
1994	$26,230	$0	$50,105	$54,554	$0	$0	$130,888	.683	$89,398	$4,282,610
1995	$26,361	$0	$50,105	$54,554	$0	$0	$131,019	.621	$81,353	$4,363,963
1996	$26,624	$0	$50,105	$54,554	$310,617	$0	$441,900	.564	$249,441	$4,613,404
1997	$26,891	$0	$50,105	$54,554	$0	$0	$131,549	.513	$67,506	$4,680,909
1998	$27,159	$0	$50,105	$54,554	$0	$0	$131,818	.467	$61,494	$4,742,404
1999	$27,431	$0	$50,105	$54,554	$0	$0	$132,090	.424	$56,019	$4,798,422
2000	$27,705	$127,201	$50,105	$54,554	$0	$0	$259,565	.386	$100,074	$4,898,496
2001	$28,259	$0	$50,105	$54,554	$310,617	$0	$443,535	.350	$155,456	$5,053,952
2002	$28,825	$0	$50,105	$54,554	$0	$0	$133,483	.319	$42,532	$5,096,484
2003	$29,401	$0	$50,105	$54,554	$0	$0	$134,060	.290	$38,832	$5,135,317
2004	$29,989	$0	$50,105	$54,554	$0	$0	$134,648	.263	$35,457	$5,170,774
2005	$30,589	$284,240	$50,105	$54,554	$0	$0	$419,488	.239	$100,422	$5,271,196
2006	$31,201	$0	$50,105	$54,554	$310,617	$0	$446,476	.218	$97,166	$5,368,362
2007	$31,825	$0	$50,105	$54,554	$0	$0	$136,483	.198	$27,003	$5,395,365
2008	$32,461	$0	$50,105	$54,554	$0	$0	$137,120	.180	$24,662	$5,420,027
2009	$33,110	$0	$50,105	$54,554	$0	$0	$137,769	.164	$22,526	$5,442,553
2010	$33,773	$127,201	$50,105	$54,554	$0	$0	$265,633	.149	$39,485	$5,482,038
2011	$34,448	$0	$50,105	$54,554	$310,617	$0	$449,724	.135	$60,771	$5,542,809
2012	$35,137	$0	$50,105	$54,554	$0	$0	$139,796	.123	$17,173	$5,559,983
2013	$35,840	$0	$50,105	$54,554	$0	$0	$140,499	.112	$15,691	$5,575,673
2014	$36,557	$0	$50,105	$54,554	$0	$0	$141,215	.102	$14,337	$5,590,010
2015	$37,288	$0	$50,105	$54,554	$0	$0	$141,947	.092	$13,101	$5,603,111

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: BUILD NEW UEPH

Fiscal Year	(1) Annual Maintenance ((Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$38,779	$0	$50,105	$54,554	$310,617	$0	$454,055	.084	$38,098	$5,641,209
2017	$40,330	$0	$50,105	$54,554	$0	$0	$144,989	.076	$11,059	$5,652,268
2018	$41,944	$0	$50,105	$54,554	$0	$0	$146,602	.069	$10,166	$5,662,434
2019	$43,621	$0	$50,105	$54,554	$0	$0	$148,280	.063	$9,347	$5,671,782
2020	$45,366	$726,815	$50,105	$54,554	$0	$0	$876,840	.057	$50,250	$5,722,032
2021	$47,181	$0	$50,105	$54,554	$310,617	$0	$462,457	.052	$24,093	$5,746,126
2022	$49,068	$0	$50,105	$54,554	$0	$0	$153,727	.047	$7,281	$5,753,407
2023	$51,031	$0	$50,105	$54,554	$0	$0	$155,690	.043	$6,703	$5,760,110
2024	$53,072	$0	$50,105	$54,554	$0	$0	$157,731	.039	$6,174	$5,766,284
2025	$55,195	$0	$50,105	$54,554	$0	$0	$159,854	.036	$5,688	$5,771,972
2026	$57,403	$0	$50,105	$54,554	$310,617	$0	$472,678	.032	$15,291	$5,787,263
2027	$59,699	$0	$50,105	$54,554	$0	$0	$164,358	.029	$4,833	$5,792,097
2028	$62,087	$0	$50,105	$54,554	$0	$0	$166,746	.027	$4,458	$5,796,554
2029	$64,570	$0	$50,105	$54,554	$0	$0	$169,229	.024	$4,113	$5,800,667
2030	$67,153	$127,201	$50,105	$54,554	$0	$0	$299,013	.022	$6,607	$5,807,274
2031	$69,839	$0	$50,105	$54,554	$310,617	$0	$485,115	.020	$9,744	$5,817,018
2032	$72,633	$0	$50,105	$54,554	$0	$0	$177,292	.018	$3,237	$5,820,256
2033	$75,538	$0	$50,105	$54,554	$0	$0	$180,197	.017	$2,991	$5,823,247
2034	$78,560	$0	$50,105	$54,554	$0	$0	$183,218	.015	$2,765	$5,826,012
2035	$81,702	$284,240	$50,105	$54,554	$0	$0	$470,601	.014	$6,456	$5,832,468
2036	$84,970	$0	$50,105	$54,554	$310,617	$0	$500,246	.012	$6,239	$5,838,707
2037	$88,369	$0	$50,105	$54,554	$0	$0	$193,028	.011	$2,189	$5,840,896
2038	$91,904	$0	$50,105	$54,554	$0	$0	$196,562	.010	$2,026	$5,842,922
2039	$95,580	$0	$50,105	$54,554	$0	$0	$200,239	.009	$1,876	$5,844,798
2040	$99,403	$127,201	$50,105	$54,554	$0	$0	$331,263	.009	$2,822	$5,847,620
Total	$2,370,009	$1,804,100	$2,505,238	$2,727,700	$3,106,169	$0	$16,099,216		$5,847,620	

FORM S-1

Total Life-Cycle Costs

Alternative: RENOVATE EXISTING UEPH

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$3,902,000 *	1.000	$3,902,000	$3,902,000
**1991	$27,676	$0	$52,618	$58,111	$389,084	$0	$527,488	.909	$479,535	$4,381,535
1992	$27,953	$0	$52,618	$58,111	$78,467	$0	$217,148	.826	$179,461	$4,560,996
1993	$28,232	$0	$52,618	$58,111	$78,467	$0	$217,428	.751	$163,357	$4,724,353
1994	$28,515	$0	$52,618	$58,111	$78,467	$0	$217,710	.683	$148,699	$4,873,052
1995	$28,800	$0	$52,618	$58,111	$78,467	$0	$217,995	.621	$135,358	$5,008,409
1996	$29,088	$0	$52,618	$58,111	$389,084	$0	$528,900	.564	$298,550	$5,306,960
1997	$29,379	$0	$52,618	$58,111	$78,467	$0	$218,574	.513	$112,163	$5,419,123
1998	$29,672	$0	$52,618	$58,111	$78,467	$0	$218,868	.467	$102,103	$5,521,226
1999	$29,969	$0	$52,618	$58,111	$78,467	$0	$219,165	.424	$92,947	$5,614,173
2000	$30,269	$135,557	$52,618	$58,111	$78,467	$0	$355,021	.386	$136,876	$5,751,049
2001	$30,572	$0	$52,618	$58,111	$389,084	$0	$530,384	.350	$185,896	$5,936,945
2002	$30,877	$0	$52,618	$58,111	$78,467	$0	$220,073	.319	$70,122	$6,007,067
2003	$31,186	$0	$52,618	$58,111	$78,467	$0	$220,381	.290	$63,837	$6,070,904
2004	$31,498	$0	$52,618	$58,111	$78,467	$0	$220,693	.263	$58,115	$6,129,019
2005	$31,813	$304,436	$52,618	$58,111	$78,467	$0	$525,444	.239	$125,787	$6,254,807
2006	$32,449	$0	$52,618	$58,111	$389,084	$0	$532,261	.218	$115,836	$6,370,642
2007	$33,098	$0	$52,618	$58,111	$78,467	$0	$222,293	.198	$43,980	$6,414,622
2008	$33,760	$0	$52,618	$58,111	$78,467	$0	$222,955	.180	$40,100	$6,454,722
2009	$34,435	$0	$52,618	$58,111	$78,467	$0	$223,631	.164	$36,565	$6,491,288
2010	$35,124	$135,557	$52,618	$58,111	$78,467	$0	$359,876	.149	$53,493	$6,544,781
2011	$35,826	$0	$52,618	$58,111	$389,084	$0	$535,639	.135	$72,381	$6,617,162
2012	$36,543	$0	$52,618	$58,111	$78,467	$0	$225,738	.123	$27,731	$6,644,893
2013	$37,274	$0	$52,618	$58,111	$78,467	$0	$226,469	.112	$25,292	$6,670,185
2014	$38,019	$0	$52,618	$58,111	$78,467	$0	$227,215	.102	$23,068	$6,693,253
2015	$38,780	$0	$52,618	$58,111	$78,467	$0	$227,975	.092	$21,041	$6,714,294

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: RENOVATE EXISTING UEPH

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$39,555	$0	$52,618	$58,111	$389,084	$0	$539,368	.084	$45,256	$6,759,550
2017	$40,346	$0	$52,618	$58,111	$78,467	$0	$229,542	.076	$17,509	$6,777,059
2018	$41,153	$0	$52,618	$58,111	$78,467	$0	$230,349	.069	$15,973	$6,793,032
2019	$41,976	$0	$52,618	$58,111	$78,467	$0	$231,172	.063	$14,573	$6,807,605
2020	$42,816	$776,143	$52,618	$58,111	$78,467	$0	$1,008,155	.057	$57,776	$6,865,381
2021	$44,529	$0	$52,618	$58,111	$389,084	$0	$544,341	.052	$28,359	$6,893,740
2022	$46,310	$0	$52,618	$58,111	$78,467	$0	$235,505	.047	$11,154	$6,904,894
2023	$48,162	$0	$52,618	$58,111	$78,467	$0	$237,357	.043	$10,220	$6,915,114
2024	$50,089	$0	$52,618	$58,111	$78,467	$0	$239,284	.039	$9,366	$6,924,480
2025	$52,092	$0	$52,618	$58,111	$78,467	$0	$241,287	.036	$8,586	$6,933,066
2026	$54,176	$0	$52,618	$58,111	$389,084	$0	$553,988	.032	$17,921	$6,950,987
2027	$56,343	$0	$52,618	$58,111	$78,467	$0	$245,538	.029	$7,221	$6,958,208
2028	$58,597	$0	$52,618	$58,111	$78,467	$0	$247,792	.027	$6,625	$6,964,833
2029	$60,940	$0	$52,618	$58,111	$78,467	$0	$250,136	.024	$6,079	$6,970,912
2030	$63,378	$135,557	$52,618	$58,111	$78,467	$0	$388,130	.022	$8,576	$6,979,488
2031	$65,913	$0	$52,618	$58,111	$389,084	$0	$565,725	.020	$11,363	$6,990,851
2032	$68,550	$0	$52,618	$58,111	$78,467	$0	$257,745	.018	$4,706	$6,995,558
2033	$71,292	$0	$52,618	$58,111	$78,467	$0	$260,487	.017	$4,324	$6,999,882
2034	$74,143	$0	$52,618	$58,111	$78,467	$0	$263,339	.015	$3,974	$7,003,856
2035	$77,109	$304,436	$52,618	$58,111	$78,467	$0	$570,740	.014	$7,830	$7,011,686
2036	$80,193	$0	$52,618	$58,111	$389,084	$0	$580,006	.012	$7,234	$7,018,920
2037	$83,401	$0	$52,618	$58,111	$78,467	$0	$272,596	.011	$3,091	$7,022,011
2038	$86,737	$0	$52,618	$58,111	$78,467	$0	$275,933	.010	$2,844	$7,024,855
2039	$90,207	$0	$52,618	$58,111	$78,467	$0	$279,402	.009	$2,618	$7,027,473
2040	$93,815	$135,557	$52,618	$58,111	$78,467	$0	$418,567	.009	$3,566	$7,031,039
Total	$2,332,628	$1,927,242	$2,630,885	$2,905,550	$7,029,502	$0	$20,727,808		$7,031,039	

Worksheets

(These forms are not required by HQ USAF but may be required by MAJCOM. Check with your MAJCOM/ACC before forwarding the completed analysis.)

WORKSHEET 1
Annual Maintenance Costs
(In Program Year Dollars)
Alternative: BUILD NEW UEPH

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.68
Number of Square Feet of Building Space	(X)	38,000
Total Annual Maintenance Cost	(=)	$25,840

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:		
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction of Facility:	1990	
Average Annual Change in Maintenance Costs During Years:	1991-1995	.5%
Average Annual Change in Maintenance Costs During Years:	1996-2000	1%
Average Annual Change in Maintenance Costs During Years:	2001-2015	2%
Average Annual Change in Maintenance Costs During Years:	2016-2040	4%
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $.57 * 1.04 * 1.151 = $.68 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System. Historic data indicate that UEPH annual maintenance costs increase at the percentages shown above.

Source: DEMU Survey of existing UEPH maintenance records.

WORKSHEET 1
Annual Maintenance Costs
(In Program Year Dollars)
Alternative: RENOVATE EXISTING UEPH

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.68
Number of Square Feet of Building Space	(X)	40,700
Total Annual Maintenance Cost	(=)	$27,676

Escalation Factor (Method 1-Building Age Multiplier)

Year of Construction of Facility:		
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2-Average Annual Change)

Year of Construction of Facility:	1953	
Average Annual Change in Maintenance Costs During Years:	1991-2005	1%
Average Annual Change in Maintenance Costs During Years:	2006-2020	2%
Average Annual Change in Maintenance Costs During Years:	2021-2040	4%
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $.57 * 1.04 * 1.151 = $.68 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System. Historic data indicate that UEPH annual maintenance costs increase at the percentages shown above. Source: DEMU Survey of existing UEPH maintenance records.

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: BUILD NEW UEPH

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Roofing

M&R Cost per Square Foot		$4.60
Number of Square Feet of Roof Space	(X)	38,000
Subtotal M&R Cost	(=)	$174,800
Life Expectancy: 15 **Years**		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$4.83
Number of Square Feet of Ext. Wall Space	(X)	9,357
Subtotal M&R Cost	(=)	$45,194
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

	Exterior Finish		Interior Finish		Carpeting
M&R Cost per Square Foot	$1.08		$.94		$1.91
Number of Square Feet of Applicable Space	(X) 9,357	(X)	47,357	(X)	38,000
Subtotal M&R Cost	(=) $10,106	(=)	$44,516	(=)	$72,580
Life Expectancy: 10 **Years**					
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040					

Ceiling Finishes

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: BUILD NEW UEPH

Fire Protection Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

HVAC

M&R Cost per Square Foot		$2.88
Number of Square Feet of Building Space	(X)	38,000
Subtotal M&R Cost	(=)	$109,440
Life Expectancy: 15 **Years**		
Years M&R Would Be Required 2005, 2020, 2035		

Plumbing

M&R Cost per Square Foot		$3.52
Number of Square Feet of Building Space	(X)	38,000
Subtotal M&R Cost	(=)	$133,760
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Electrical

M&R Cost per Square Foot		$3.59
Number of Square Feet of Building Space	(X)	38,000
Subtotal M&R Cost	(=)	$136,420
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Assumptions, Additional Calculations, and Data Sources:
Exterior wall space is 80% of total exterior square footage to account for windows and doors; Interior wallspace (including ceilings) is exterior wallspace plus 90% of total square footage; All square foot costs are from Means Construction Cost Manual 1986 and are converted to FY 1990 dollars using the OSD inflator (15.1%).

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Roofing

M&R Cost per Square Foot		$4.60
Number of Square Feet of Roof Space	(X)	40,700
Subtotal M&R Cost	(=)	$187,220
Life Expectancy: 15 **Years**		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$4.83
Number of Square Feet of Ext. Wall Space	(X)	9,684
Subtotal M&R Cost	(=)	$46,774
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

		Exterior Finish		Interior Finish		Carpeting
M&R Cost per Square Foot		$1.08		$.94		$1.91
Number of Square Feet of Applicable Space	(X)	9,684	(X)	50,384	(X)	40,700
Subtotal M&R Cost	(=)	$10,459	(=)	$47,361	(=)	$77,737
Life Expectancy: 10 **Years**						
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040						

Ceiling Finishes

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH

Fire Protection Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

HVAC

M&R Cost per Square Foot		$2.88
Number of Square Feet of Building Space	(X)	40,700
Subtotal M&R Cost	(=)	$117,216
Life Expectancy: 15 **Years**		
Years M&R Would Be Required 2005, 2020, 2035		

Plumbing

M&R Cost per Square Foot		$3.52
Number of Square Feet of Building Space	(X)	40,700
Subtotal M&R Cost	(=)	$143,264
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Electrical

M&R Cost per Square Foot		$3.59
Number of Square Feet of Building Space	(X)	40,700
Subtotal M&R Cost	(=)	$146,113
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Assumptions, Additional Calculations, and Data Sources:
Exterior wall space is 80% of total exterior square footage to account for windows and doors; Interior wallspace (including ceilings) is exterior wallspace plus 90% of total square footage; All square foot costs are from Means Construction Cost Manual 1986 and are converted to FY 1990 dollars using the OSD inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: BUILD NEW UEPH

Electricity		
Consumption per Square Foot (in thousands of Btus)		29.3
Number of Square Feet of Building Space	(X)	38,000
Annual Electricity Consumption (in thousands of Btus)	(=)	1,113,400
Cost per Thousand Btus	(X)	$.02046
Total Annual Electricity Cost	(=)	$22,780
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		15.8
Number of Square Feet of Building Space	(X)	38,000
Annual Natural Gas Consumption (in thousands of Btus)	(=)	600,400
Cost per Thousand Btus	(X)	$.00574
Total Annual Natural Gas Cost	(=)	$3,446
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: BUILD NEW UEPH

Water		
Number of Units (e.g., square feet, personnel, equipment)		200
Annual Water Use per Unit (in thousands of gallons)	(X)	36.5
Total Annual Water Use	(=)	7,300
Cost per Thousand Gallons of Water	(X)	$1.99
Total Annual Water Cost	(=)	$14,527
Sewage Treatment		
Total Annual Water Use (from water calculations above)		7,300
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	5,110
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.83
Total Annual Sewage Treatment Cost	(=)	$9,351
TOTAL ANNUAL UTILITY COST	(=)	$50,105

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentage breakdown between electricity and fuel oil usage was based on "Community Type Facilities" since a housing breakdown of energy usage was not presented in ETL 86-1; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water consumption (100 gallons per day per person, 365 days per year) and cost and sewage percentage are basewide averages as reported by the Base Utilities Office; All costs were in FY86 dollars and are converted to FY90 dollars using the OSD price inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH

Electricity		
Consumption per Square Foot (in thousands of Btus)		29.3
Number of Square Feet of Building Space	(X)	40,700
Annual Electricity Consumption (in thousands of Btus)	(=)	1,192,510
Cost per Thousand Btus	(X)	$.02046
Total Annual Electricity Cost	(=)	$24,399
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Natural Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Natural Gas Cost	(=)	N/A
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		15.8
Number of Square Feet of Building Space	(X)	40,700
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	643,060
Cost per Thousand Btus	(X)	$.00675
Total Annual Coal Cost	(=)	$4,341
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH

Water		
Number of Units (e.g., square feet, personnel, equipment)		200
Annual Water Use per Unit (in thousands of gallons)	(X)	36.5
Total Annual Water Use	(=)	7,300
Cost per Thousand Gallons of Water	(X)	$1.99
Total Annual Water Cost	(=)	$14,527
Sewage Treatment		
Total Annual Water Use (from water calculations above)		7,300
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	5,110
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.83
Total Annual Sewage Treatment Cost	(=)	$9,351
TOTAL ANNUAL UTILITY COST	(=)	$52,618

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentage breakdown between electricity and fuel oil usage was based on "Community Type Facilities" since a housing breakdown of energy usage was not presented in ETL 86-1; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water consumption (100 gallons per day per person, 365 days per year) and cost and sewage percentage are basewide averages as reported by the Base Utilities Office; All costs were in FY86 dollars and are converted to FY90 dollars using the OSD price inflator (15.1%).

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: BUILD NEW UEPH

Protective Storage		
Initial One-Time Costs		
Board Up Doors and Windows		N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(+)	N/A
Total One-Time Cost	(=)	N/A
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.0804
Cost per Ton For Removal	(X)	$5.67
Annual Cost per Unit	(=)	$.46
Number of Units	(X)	38,000
Total Annual Cost	(=)	$17,314
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		38,000
Custodial Cost per Unit	(X)	$.98
Subtotal Annual Cost	(=)	$37,240
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$37,240
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Trash generated per square foot in UEPH was obtained from Service Contract Monitor. Trash removal cost per ton and custodial cost per square foot are averages for the existing UEPH spaces on Gen Eric AFB.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH

Protective Storage		
Initial One-Time Costs		
Board Up Doors and Windows		N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(+)	N/A
Total One-Time Cost	(=)	N/A
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.0804
Cost per Ton For Removal	(X)	$5.67
Annual Cost per Unit	(=)	$.46
Number of Units	(X)	40,700
Total Annual Cost	(=)	$18,225
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		40,700
Custodial Cost per Unit	(X)	$.98
Subtotal Annual Cost	(=)	$39,886
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$39,886
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Trash generated per square foot in UEPH was obtained from Service Contract Monitor. Trash removal cost per ton and custodial cost per square foot are averages for the existing UEPH spaces on Gen Eric AFB.

WORKSHEET 5 (OPTIONAL)
Miscellaneous User Costs
(In Program-Year Dollars)
Alternative: BUILD NEW UEPH

Transportation

Annual Amount of Vehicle or Equipment Use (in miles or hours)		N/A
Cost per Mile or Hour	(X)	N/A
Total Annual Cost	(=)	N/A

Furniture, Fixtures and Equipment (Method 1 - Average Cost per Unit)

Number of Units (e.g., rooms, offices or personnel)		N/A
Annual Furniture, Fixtures and Equipment Cost per Unit	(X)	N/A
Total Annual Cost	(=)	N/A

Furniture, Fixtures and Equipment (Method 2 - Itemized Costs)

Items Required	Life Expectancy	Years Required	Cost
Furnishings	5 Years	1991,1996,2001,2006,2011,	$310,617
	____ Years	2016,2021,2026,2031,2036,	
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		

Other (_____)

Number of Units (e.g., rooms, offices, or personnel)		N/A
Cost per Unit	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Furniture life expectancy and costs are based on the average of 5 years and $2698.67 per room. All costs were in FY86 dollars and are converted to FY90 dollars using the OSD inflator (12.5%).

WORKSHEET 6
Lease Costs
(In Program-Year Dollars)
Alternative: STATUS QUO

Lease			
~~Annual Lease Cost per Square Foot~~ *	Housing Allowance		$6,447
~~Number of Square Feet~~	Number of Personnel	(X)	200
Total Annual Cost		(=)	$1,289,400
Temporary Quarters			
On Base			N/A
Number of Personnel Housed in On Base Quarters per Year		(X)	N/A
Average Room Rate Plus per Diem		(=)	N/A
Total Annual Cost **			
Contract Quarters			N/A
Number of Personnel Housed in Contract Quarters per Year		(X)	N/A
Average Room Rate Plus per Diem		(=)	N/A
Total Annual Cost **			
Other Quarters (personnel issued nonavailablity certificates)			N/A
Number of Personnel Housed in Other Quarters per Year		(X)	N/A
Average Room Rate Plus per Diem		(=)	N/A
Total Annual Cost **			

* If the Annual Cost per Square Foot is the gross lease cost, then maintenance and repair, custodial services, and utilities costs can be assumed to be included in the price of the lease; if the Annual Cost Per Square Foot is the triple-net lease then maintenance and repair, custodial services, and utilities costs must be estimated separately on the appropriate cost forms.

** Any transportation costs (car rental, pickup service, etc.) should be included in the Transportation cost category on Worksheet 5.

Assumptions, Additional Calculations, and Data Sources:
The housing allowance for the personnel currently residing in the facility would be $452.20 per month, including BAQ and VHA. Data source for housing allowance is AFR, FY85 dollars converted to FY90 dollars using the OSD inflator (18.8%).

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: STATUS QUO

Criteria (Specify)	Score	Weight	Weighted Score
Morale	2	5	10
Accessibility	1	3	3
		Total	13

Assumptions and Data Sources:

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.68
Number of Square Feet of Building Space	(X)	40,700
Total Annual Maintenance Cost	(=)	$27,676

Escalation Factor (Method 1-Building Age Multiplier)

Year of Construction of Facility:		
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2-Average Annual Change)

Year of Construction of Facility:	1953	
Average Annual Change in Maintenance Costs During Years:	1991-2005	1%
Average Annual Change in Maintenance Costs During Years:	2006-2020	2%
Average Annual Change in Maintenance Costs During Years:	2021-2040	4%
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $.57 * 1.04 * 1.151 = $.68 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System. Historic data indicate that UEPH annual maintenance costs increase at the percentages shown above.

Source: DEMU Survey of existing UEPH maintenance records.

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: RENOVATE EXISTING UEPH

Criteria (Specify)	Score	Weight	Weighted Score
Morale	6	5	30
Accessibility	7	3	21
		Total	51

Assumptions and Data Sources:

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: BUILD NEW UEPH

Criteria (Specify)	Score	Weight	Weighted Score
Morale	10	5	50
Accessibility	10	3	30
		Total	80

Assumptions and Data Sources:

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Roofing

M&R Cost per Square Foot		$4.60
Number of Square Feet of Roof Space	(X)	40,700
Subtotal M&R Cost	(=)	$187,220
Life Expectancy: 15 **Years**		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$4.83
Number of Square Feet of Ext. Wall Space	(X)	9,684
Subtotal M&R Cost	(=)	$46,774
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

	Exterior Finish		Interior Finish		Carpeting
M&R Cost per Square Foot	$1.08		$.94		$1.91
Number of Square Feet of Applicable Space	(X) 9,684	(X)	50,384	(X)	40,700
Subtotal M&R Cost	(=) $10,459	(=)	$47,361	(=)	$77,737
Life Expectancy: 10 **Years**					
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040					

Ceiling Finishes

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Fire Protection Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

HVAC

M&R Cost per Square Foot		$2.88
Number of Square Feet of Building Space	(X)	40,700
Subtotal M&R Cost	(=)	$117,216
Life Expectancy: 15 **Years**		
Years M&R Would Be Required 2005, 2020, 2035		

Plumbing

M&R Cost per Square Foot		$3.52
Number of Square Feet of Building Space	(X)	40,700
Subtotal M&R Cost	(=)	$143,264
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Electrical

M&R Cost per Square Foot		$3.59
Number of Square Feet of Building Space	(X)	40,700
Subtotal M&R Cost	(=)	$146,113
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Assumptions, Additional Calculations, and Data Sources:
Exterior wall space is 80% of total exterior square footage to account for windows and doors; Interior wallspace (including ceilings) is exterior wallspace plus 90% of total square footage; All square foot costs are from Means Construction Cost Manual 1986 and are converted to FY 1990 dollars using the OSD inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Electricity		
Consumption per Square Foot (in thousands of Btus)		29.3
Number of Square Feet of Building Space	(X)	40,700
Annual Electricity Consumption (in thousands of Btus)	(=)	1,192,510
Cost per Thousand Btus	(X)	$.02046
Total Annual Electricity Cost	(=)	$24,399
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Natural Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Natural Gas Cost	(=)	N/A
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		15.8
Number of Square Feet of Building Space	(X)	40,700
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	643,060
Cost per Thousand Btus	(X)	$.00675
Total Annual Coal Cost	(=)	$4,341
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Water		
Number of Units (e.g., square feet, personnel, equipment)		200
Annual Water Use per Unit (in thousands of gallons)	(X)	36.5
Total Annual Water Use	(=)	7,300
Cost per Thousand Gallons of Water	(X)	$1.99
Total Annual Water Cost	(=)	$14,527
Sewage Treatment		
Total Annual Water Use (from water calculations above)		7,300
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	5,110
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.83
Total Annual Sewage Treatment Cost	(=)	$9,351
TOTAL ANNUAL UTILITY COST	(=)	$52,618

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentage breakdown between electricity and fuel oil usage was based on "Community Type Facilities" since a housing breakdown of energy usage was not presented in ETL 86-1; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water consumption (100 gallons per day per person, 365 days per year) and cost and sewage percentage are basewide averages as reported by the Base Utilities Office; All costs were in FY86 dollars and are converted to FY90 dollars using the OSD price inflator (15.1%).

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Protective Storage		
Initial One-Time Costs		
Board Up Doors and Windows		N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(+)	N/A
Total One-Time Cost	(=)	N/A
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.0804
Cost per Ton For Removal	(X)	$5.67
Annual Cost per Unit	(=)	$.46
Number of Units	(X)	40,700
Total Annual Cost	(=)	$18,225
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		40,700
Custodial Cost per Unit	(X)	$.98
Subtotal Annual Cost	(=)	$39,886
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$39,886
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:

Trash generated per square foot in UEPH was obtained from Service Contract Monitor. Trash removal cost per ton and custodial cost per square foot are averages for the existing UEPH spaces on Gen Eric AFB.

WORKSHEET 5 (OPTIONAL)
Miscellaneous User Costs
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Transportation

Annual Amount of Vehicle or Equipment Use (in miles or hours)		79,259
Cost per Mile or Hour	(X)	$.99
Total Annual Cost	(=)	$78,467

Furniture, Fixtures and Equipment (Method 1 - Average Cost per Unit)

Number of Units (e.g., rooms, offices or personnel)		N/A
Annual Furniture, Fixtures and Equipment Cost per Unit	(X)	N/A
Total Annual Cost	(=)	N/A

Furniture, Fixtures and Equipment (Method 2 - Itemized Costs)

Items Required	Life Expectancy	Years Required	Cost
Furnishings	5 Years	1991,1996,2001,2006,2011,	$310,617
	____ Years	2016,2021,2026,2031,2036,	
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		
	____ Years		

Other (_____)

Number of Units (e.g., rooms, offices, or personnel)		N/A
Cost per Unit	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:

Transportation costs based on average cost (including fuel, maintenance and repair, and the annual burdened salary of $22,761 for an E-4 operator) of $0.88 per mile for a 28-passenger bus. Furnishings life expectancy and costs are based on the average of 5 years and $2698.67 per room. All costs were in FY86 dollars and are converted to FY90 dollars using the OSD inflator (15.1%).

WORKSHEET 7 (OPTIONAL)
Benefit From User Cost Savings
(In Program-Year Dollars)
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Increase in Productivity		
Annual Labor Cost of Alternative		N/A
Annual Output of Alternative	(/)	N/A
Average Labor Cost per Unit of Output of Alternative	(=)	N/A
Annual Labor Cost of Status Quo		N/A
Annual Output of Status Quo	(/)	N/A
Average Labor Cost per Unit of Output of Status Quo	(=)	N/A
Average Labor Cost per Unit of Output of Alternative (from above)	(-)	N/A
Average Labor Cost per Unit of Increased Output	(=)	N/A
Annual Output of Alternative (from above)	(X)	N/A
Total Annual Benefit from Increase in Productivity	(=)	N/A
Personnel Cost Savings		
Number of Personnel Affected		3
Annual Labor Savings per Person Over Status Quo (in hours)	(X)	2,080
Total Annual Labor Savings (in hours)	(=)	6,240
Average Hourly Burdened Rate of Pay	(X)	$10.74
Total Annual Benefit From Personnel Cost Savings	(=)	$67,018
Fuel Cost Savings		
Annual Reduction in Equipment or Vehicle Use (in miles or hours)		N/A
Average Fuel Consumption per Mile or Hour (in gallons)	(X)	N/A
Total Annual Fuel Savings (in gallons)	(=)	N/A
Price per Gallon	(X)	N/A
Total Annual Benefit From Fuel Cost Savings *	(=)	N/A
Other Cost Savings		
Number of Units Receiving Other Savings		N/A
Annual Savings per Unit Over Status Quo (in _____)	(X)	N/A
Total Annual Savings (in _____)	(=)	N/A
Price per _____	(X)	N/A
Total Annual Benefit From Other Cost Savings	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Assumptions regarding the number of labor hours saved are based on the number of workers in the existing mess and the average number of meals served daily. Average hourly burdened rates estimated by the Office of Cost and Management.

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Criteria (Specify)	Score	Weight	Weighted Score
Morale	7	5	35
Accessibility	6	3	18
		Total	53

Assumptions and Data Sources:

FORM S-1
Total Life-Cycle Costs
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$4,067,000 *	1.000	$4,067,000	$4,067,000
**1991	$27,676	$0	$52,618	$58,111	$389,084	$0	$527,488	.909	$479,535	$4,546,535
1992	$27,953	$0	$52,618	$58,111	$78,467	$0	$217,148	.826	$179,461	$4,725,996
1993	$28,232	$0	$52,618	$58,111	$78,467	$0	$217,428	.751	$163,357	$4,889,353
1994	$28,515	$0	$52,618	$58,111	$78,467	$0	$217,710	.683	$148,699	$5,038,052
1995	$28,800	$0	$52,618	$58,111	$78,467	$0	$217,995	.621	$135,358	$5,173,409
1996	$29,088	$0	$52,618	$58,111	$389,084	$0	$528,900	.564	$298,550	$5,471,960
1997	$29,379	$0	$52,618	$58,111	$78,467	$0	$218,574	.513	$112,163	$5,584,123
1998	$29,672	$0	$52,618	$58,111	$78,467	$0	$218,868	.467	$102,103	$5,686,226
1999	$29,969	$0	$52,618	$58,111	$78,467	$0	$219,165	.424	$92,947	$5,779,173
2000	$30,269	$135,557	$52,618	$58,111	$78,467	$0	$355,021	.386	$136,876	$5,916,049
2001	$30,572	$0	$52,618	$58,111	$389,084	$0	$530,384	.350	$185,896	$6,101,945
2002	$30,877	$0	$52,618	$58,111	$78,467	$0	$220,073	.319	$70,122	$6,172,067
2003	$31,186	$0	$52,618	$58,111	$78,467	$0	$220,381	.290	$63,837	$6,235,904
2004	$31,498	$0	$52,618	$58,111	$78,467	$0	$220,693	.263	$58,115	$6,294,019
2005	$31,813	$304,436	$52,618	$58,111	$78,467	$0	$525,444	.239	$125,787	$6,419,807
2006	$32,449	$0	$52,618	$58,111	$389,084	$0	$532,261	.218	$115,836	$6,535,642
2007	$33,098	$0	$52,618	$58,111	$78,467	$0	$222,293	.198	$43,980	$6,579,622
2008	$33,760	$0	$52,618	$58,111	$78,467	$0	$222,955	.180	$40,100	$6,619,722
2009	$34,435	$0	$52,618	$58,111	$78,467	$0	$223,631	.164	$36,565	$6,656,288
2010	$35,124	$135,557	$52,618	$58,111	$78,467	$0	$359,876	.149	$53,493	$6,709,781
2011	$35,826	$0	$52,618	$58,111	$389,084	$0	$535,639	.135	$72,381	$6,782,162
2012	$36,543	$0	$52,618	$58,111	$78,467	$0	$225,738	.123	$27,731	$6,809,893
2013	$37,274	$0	$52,618	$58,111	$78,467	$0	$226,469	.112	$25,292	$6,835,185
2014	$38,019	$0	$52,618	$58,111	$78,467	$0	$227,215	.102	$23,068	$6,858,253
2015	$38,780	$0	$52,618	$58,111	$78,467	$0	$227,975	.092	$21,041	$6,879,294

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$39,555	$0	$52,618	$58,111	$389,084	$0	$539,368	.084	$45,256	$6,924,550
2017	$40,346	$0	$52,618	$58,111	$78,467	$0	$229,542	.076	$17,509	$6,942,059
2018	$41,153	$0	$52,618	$58,111	$78,467	$0	$230,349	.069	$15,973	$6,958,032
2019	$41,976	$0	$52,618	$58,111	$78,467	$0	$231,172	.063	$14,573	$6,972,605
2020	$42,816	$776,143	$52,618	$58,111	$78,467	$0	$1,008,155	.057	$57,776	$7,030,381
2021	$44,529	$0	$52,618	$58,111	$389,084	$0	$544,341	.052	$28,359	$7,058,740
2022	$46,310	$0	$52,618	$58,111	$78,467	$0	$235,505	.047	$11,154	$7,069,894
2023	$48,162	$0	$52,618	$58,111	$78,467	$0	$237,357	.043	$10,220	$7,080,114
2024	$50,089	$0	$52,618	$58,111	$78,467	$0	$239,284	.039	$9,366	$7,089,480
2025	$52,092	$0	$52,618	$58,111	$78,467	$0	$241,287	.036	$8,586	$7,098,066
2026	$54,176	$0	$52,618	$58,111	$389,084	$0	$553,988	.032	$17,921	$7,115,987
2027	$56,343	$0	$52,618	$58,111	$78,467	$0	$245,538	.029	$7,221	$7,123,208
2028	$58,597	$0	$52,618	$58,111	$78,467	$0	$247,792	.027	$6,625	$7,129,833
2029	$60,940	$0	$52,618	$58,111	$78,467	$0	$250,136	.024	$6,079	$7,135,912
2030	$63,378	$135,557	$52,618	$58,111	$78,467	$0	$388,130	.022	$8,576	$7,144,488
2031	$65,913	$0	$52,618	$58,111	$389,084	$0	$565,725	.020	$11,363	$7,155,851
2032	$68,550	$0	$52,618	$58,111	$78,467	$0	$257,745	.018	$4,706	$7,160,558
2033	$71,292	$0	$52,618	$58,111	$78,467	$0	$260,487	.017	$4,324	$7,164,882
2034	$74,143	$0	$52,618	$58,111	$78,467	$0	$263,339	.015	$3,974	$7,168,856
2035	$77,109	$304,436	$52,618	$58,111	$78,467	$0	$570,740	.014	$7,830	$7,176,686
2036	$80,193	$0	$52,618	$58,111	$389,084	$0	$580,006	.012	$7,234	$7,183,920
2037	$83,401	$0	$52,618	$58,111	$78,467	$0	$272,596	.011	$3,091	$7,187,011
2038	$86,737	$0	$52,618	$58,111	$78,467	$0	$275,933	.010	$2,844	$7,189,855
2039	$90,207	$0	$52,618	$58,111	$78,467	$0	$279,402	.009	$2,618	$7,192,473
2040	$93,815	$135,557	$52,618	$58,111	$78,467	$0	$418,567	.009	$3,566	$7,196,039
Total	$2,332,628	$1,927,242	$2,630,885	$2,905,550	$7,029,502	$0	$20,892,808		$7,196,039	

FORM S-2
Total Life-Cycle Benefits
Alternative: RENOVATE EXISTING UEPH
SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$67,018	N/A	N/A	$67,018	.909	$60,925	$60,925
1992	N/A	$67,018	N/A	N/A	$67,018	.826	$55,386	$116,312
1993	N/A	$67,018	N/A	N/A	$67,018	.751	$50,351	$166,663
1994	N/A	$67,018	N/A	N/A	$67,018	.683	$45,774	$212,437
1995	N/A	$67,018	N/A	N/A	$67,018	.621	$41,613	$254,049
1996	N/A	$67,018	N/A	N/A	$67,018	.564	$37,830	$291,879
1997	N/A	$67,018	N/A	N/A	$67,018	.513	$34,391	$326,270
1998	N/A	$67,018	N/A	N/A	$67,018	.467	$31,264	$357,534
1999	N/A	$67,018	N/A	N/A	$67,018	.424	$28,422	$385,956
2000	N/A	$67,018	N/A	N/A	$67,018	.386	$25,838	$411,794
2001	N/A	$67,018	N/A	N/A	$67,018	.350	$23,489	$435,283
2002	N/A	$67,018	N/A	N/A	$67,018	.319	$21,354	$456,637
2003	N/A	$67,018	N/A	N/A	$67,018	.290	$19,413	$476,050
2004	N/A	$67,018	N/A	N/A	$67,018	.263	$17,648	$493,698
2005	N/A	$67,018	N/A	N/A	$67,018	.239	$16,043	$509,741
2006	N/A	$67,018	N/A	N/A	$67,018	.218	$14,585	$524,326
2007	N/A	$67,018	N/A	N/A	$67,018	.198	$13,259	$537,585
2008	N/A	$67,018	N/A	N/A	$67,018	.180	$12,054	$549,639
2009	N/A	$67,018	N/A	N/A	$67,018	.164	$10,958	$560,597
2010	N/A	$67,018	N/A	N/A	$67,018	.149	$9,962	$570,559
2011	N/A	$67,018	N/A	N/A	$67,018	.135	$9,056	$579,615
2012	N/A	$67,018	N/A	N/A	$67,018	.123	$8,233	$587,848
2013	N/A	$67,018	N/A	N/A	$67,018	.112	$7,484	$595,332
2014	N/A	$67,018	N/A	N/A	$67,018	.102	$6,804	$602,136
2015	N/A	$67,018	N/A	N/A	$67,018	.092	$6,185	$608,321

** First year of occupancy.

FORM S-2

Total Life-Cycle Benefits

Alternative: RENOVATE EXISTING UEPH

SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$67,018	N/A	N/A	$67,018	.084	$5,623	$613,945
2017	N/A	$67,018	N/A	N/A	$67,018	.076	$5,112	$619,057
2018	N/A	$67,018	N/A	N/A	$67,018	.069	$4,647	$623,704
2019	N/A	$67,018	N/A	N/A	$67,018	.063	$4,225	$627,929
2020	N/A	$67,018	N/A	N/A	$67,018	.057	$3,841	$631,769
2021	N/A	$67,018	N/A	N/A	$67,018	.052	$3,492	$635,261
2022	N/A	$67,018	N/A	N/A	$67,018	.047	$3,174	$638,435
2023	N/A	$67,018	N/A	N/A	$67,018	.043	$2,886	$641,320
2024	N/A	$67,018	N/A	N/A	$67,018	.039	$2,623	$643,944
2025	N/A	$67,018	N/A	N/A	$67,018	.036	$2,385	$646,328
2026	N/A	$67,018	N/A	N/A	$67,018	.032	$2,168	$648,496
2027	N/A	$67,018	N/A	N/A	$67,018	.029	$1,971	$650,467
2028	N/A	$67,018	N/A	N/A	$67,018	.027	$1,792	$652,259
2029	N/A	$67,018	N/A	N/A	$67,018	.024	$1,629	$653,888
2030	N/A	$67,018	N/A	N/A	$67,018	.022	$1,481	$655,369
2031	N/A	$67,018	N/A	N/A	$67,018	.020	$1,346	$656,715
2032	N/A	$67,018	N/A	N/A	$67,018	.018	$1,224	$657,938
2033	N/A	$67,018	N/A	N/A	$67,018	.017	$1,113	$659,051
2034	N/A	$67,018	N/A	N/A	$67,018	.015	$1,011	$660,062
2035	N/A	$67,018	N/A	N/A	$67,018	.014	$919	$660,982
2036	N/A	$67,018	N/A	N/A	$67,018	.012	$836	$661,818
2037	N/A	$67,018	N/A	N/A	$67,018	.011	$760	$662,577
2038	N/A	$67,018	N/A	N/A	$67,018	.010	$691	$663,268
2039	N/A	$67,018	N/A	N/A	$67,018	.009	$628	$663,896
2040	N/A	$67,018	N/A	N/A	$67,018	.009	$571	$664,467
Total	N/A	$3,350,880	N/A	N/A	$3,350,880		$664,467	

ECONOMIC ANALYSIS

CONSOLIDATED SUPPLY FACILITY
FY 1990 MCP

Alpha AFB

Betatown, US

CERTIFICATE OF SATISFACTORY ECONOMIC ANALYSIS

Installation/MAJCOM: Alpha AFB

Project Title: Consolidated Supply Facility

Project Number: ABCD900124

Alternatives Considered:

Status Quo

Renovate Existing Supply Facilities

Construct New Consolidated Supply Facility

Summary of Analysis Results:

The economic analysis concluded that the new construction alternative would be the most cost-effective approach to meeting supply needs at Alpha AFB, based on a consideration of both life-cycle costs and benefits. The life-cycle costs of the renovation and status quo alternatives would be lower than those of new construction, but those alternatives would provide fewer benefits. The new construction alternative has the highest benefit-cost ratio and is recommended for implementation.

Base-level ACC Evaluation: _____ *(signature)*

Concurrence (AC): _____ *(signature)*

Concurrence (DE): _____ *(signature)*

Evaluation by MAJCOM ACC:

Concur with the selection of new construction as the most cost-effective alternative for meeting base supply needs. It has the most benefits and the greatest benefit-cost ratio of all the alternatives considered.

MAJCOM ACC Evaluation: _____ *(signature)*

Contents

Section		*Page*
1.0	Introduction	1
1.1	Requirement	1
1.2	Background	1
1.3	Objectives	3
2.0	Alternatives	3
2.1	Alternatives Evaluated	3
2.2	Alternatives Determined to be Infeasible	4
3.0	Life-Cycle Cost Analysis	4
3.1	Constraints and Assumptions	4
3.2	Life-Cycle Costs	10
4.0	Benefits Analysis	10
4.1	Constraints and Assumptions	10
4.2	Benefits	11
5.0	Comparison of Alternatives	12
6.0	Sensitivity Analysis	14
7.0	Conclusions and Recommendation	15

List of Figures

Figure		*Page*
1	Break-Even Graph (10 percent discount rate)	14

1.0 INTRODUCTION

1.1 Requirement

Alpha AFB has a requirement to provide efficient base supply services. This has become increasingly difficult due to the scattered locations and inefficient configuration of the facilities that are currently being used. Supply personnel are presently meeting only 81% of the base's demands. Their work is increasingly labor-intensive and inefficient. None of their buildings were originally designed as warehouses, and they lack proper loading and unloading platforms and doors. As a result, the supply organization is not currently filling all supply requests within priority time requirements. Improved facilities are needed to increase the efficiency of supply operations so priority requirements are met.

1.2 Background

The supply function on base receives shipments from various suppliers and distributes them to base personnel. It also records retail sales from the base exchange and is responsible for keeping that service stocked. Supply receives an average of 300 requests a day. Each request is given a priority code: Code 01 and Code 02 requests are required to be filled within fifteen minutes; Code 03 requests must be filled within 30 minutes; Code 04 through 08 requests must be filled within 24 hours; and Code 09 through 15 requests must be filled within 4 days.

The supply operation is also responsible for shipping and receiving. They handle government bills of lading and LOGAIR, a network that connects Air Force logistics centers nationwide.

Presently, supply operations are carried out in eight separate facilities. The main supply warehouse, which has the most square footage, is a Condition Code 1 building that was originally constructed in 1959. This facility was not designed as a warehouse, but was partially altered in 1975 to serve that function (the alteration consisted of removing interior walls and installing large exterior loading doors). A second building is used for shipping and receiving operations. Is it located 2 miles from the main warehouse. All of the other buildings are Condition Code 3 wooden structures built in 1942. The square footage, condition code, age, and use of each of the facilities are shown below.

Building No.	*Square Feet*	*Year Built*	*Current Use*	*Condition Code*
8317	47,000	1959	warehouse	1
9111	27,000	1942	shipping/receiving	2
11166	7,473	1942	storage	3
11167	7,473	1942	storage	3
11170	7,473	1942	storage	3
11180	7,473	1942	storage	3
11181	5,927	1942	storage	3
11183	14,408	1942	storage	3

The annual maintenance costs for these facilities are approximately $174,787, which is about twice the average cost for a comparable newer building. The utility costs for these facilities are estimated at $90,043 annually, which is double the design energy budget figures (EBF) for warehouses in Region 4 (the energy region in which Alpha AFB is located), based on information in Engineering Technical Letter (ETL) 86-1.

The Chief Supply Officer indicates that, of the average 165 tons of cargo received every month, 120 tons must be transferred to one of the warehouses for temporary storage. Since the six small supply buildings are approximately 2 miles from the main warehouse, it is necessary to make special runs several times a day. An average of two tractor/trailer runs, two 1 1/2 ton truck runs, and about 10 pickup truck runs are required per day. Two of the buildings, 11166 and 11167, have wooden floors that are structurally unsafe for forklifts. Therefore, goods must be moved out of the vehicles and around the warehouses by hand jack, which is extremely labor-intensive. The loading bays are inefficiently designed; the doors are too narrow and the platforms are not tall enough for the new trucks. This requires the use of portable dock plates, which cost $1,000 each, to load and unload the trucks.

Items that are shipped out must be packaged in the main supply warehouse and then processed in the shipping and receiving building. It usually takes 4 hours of preparation for items to be shipped. The 2-mile distance between the two buildings increases the time it takes to prepare an item to be shipped out, often by as much as 2 hours. The shipping and receiving building also has a wooden floor that is unsafe for a forklift and an inadequate loading bay. Much of this floorspace is condemned for regular use, and only empty packing crates can be stored there. Cargo is often unloaded at an off-site platform used by trains and then transported to the warehouses. Long-bed trucks cannot maneuver flush to the shipping and receiving building platform because the facility across the street is too close to the road. In addition, supply is required to process sensitive material within one day because there is no adequate security holding cage in the existing receiving building, and the material must be transported to the cage in the main supply warehouse.

The warehouses are not compatible with surrounding land uses in their locations. Base housing is expanding closer and closer to these buildings, creating a land use conflict. Traffic problems have also been reported, because large tractor trailers block the streets while trying to maneuver near cramped loading docks. The loading docks could be moved to the other side of the main warehouse where there is more maneuvering space, but trucks would then need to travel through base housing to reach the facility. This would alleviate the traffic problem, but create a severe safety hazard.

Supply's administrative functions are located in a ninth building near the main warehouse. The administrative function will remain in the present location, so this space is not included in any of the alternatives studied in this analysis.

1.3 Objectives

The overall objective of this analysis is to identify the most effective means of providing efficient supply services to Alpha AFB. Objectives considered in evaluating potential alternatives include the following:

1. Ensure a faster response time in filling requests.
2. Reduce the backlog of supply requests to a manageable level.
3. Improve the accountability of cargo transfers.
4. Ensure proper handling and reduce cargo damage.
5. Improve the handling of sensitive (secure) material.
6. Raise the morale of supply personnel by making the optimum use of labor hours.
7. Improve the maintainability of supply facilities.
8. Resolve land use conflicts.
9. Reduce congestion between supply vehicles and on-base personnel traffic.

2.0 ALTERNATIVES

2.1 Alternatives Evaluated

STATUS QUO. This alternative involves continuing current operations in the existing facilities for the next 50 years. The buildings would receive routine maintenance and repair. Excessive labor hours would continue to be expended on inefficient loading and unloading procedures, because forklifts cannot be used in three of the buildings, and on traveling between warehouses. The Condition Code 3 wooden buildings would remain considerably below design energy targets. Conflicts between encroaching base housing and the supply functions would continue to exist.

RENOVATE THE EXISTING FACILITIES. The seven Condition Code 3 buildings would be stripped to their struts and rebuilt, replacing the roofs, floors, siding, electrical systems, HVAC systems, and plumbing. Thirty sunken concrete loading ramps with drainage systems (10 for the shipping and receiving building and 20 for the main supply warehouse) would be constructed. The weak wooden floors in three of the buildings would be replaced with concrete to enable forklifts to operate. The existing land use conflicts and the manpower inefficiencies associated with dispersed facilities would remain.

CONSTRUCT NEW CONSOLIDATED FACILITY. This alternative involves constructing a new 105,000 square-foot (SF) consolidated facility to house supply's warehousing, shipping, and receiving functions. The new facility would be sited in an industrial area of the base away from base housing. It would include minimal office space because most of the administrative functions of supply would remain in their

present location. Traffic and land use conflicts would be greatly reduced. Improved loading bays would increase efficiency and decrease cargo damage. The existing Condition Code 3 buildings would be demolished. The siding of the wooden buildings has a commercial value which would offset the expense of removing the old foundations and restoring the land for other uses. The main warehouse, Building 8317, would be converted for use by another function on base that needs additional space.

2.2 Alternatives Determined to be Infeasible

CONVERT OLD COMMISSARY TO A SUPPLY WAREHOUSE. The old commissary was considered because it already has a concrete floor, but it contains only 53,270 square feet, which is about half of the mission requirement. In addition, it is also located near family housing which would be disturbed by the increased vehicular traffic. Although the building is adequately wired to provide electricity, the additional cost of installing adequate plumbing, office space, and phones would be substantial.

LEASE A FACILITY OFF BASE. Another alternative considered was to lease a facility off base. The only available facilities are located 10 miles away in Betatown, too far from the base to be responsive to mission needs.

CONSTRUCT A SMALL NEW FACILITY ADJACENT TO BUILDING 8317. Constructing a 78,000 SF building near Building 8317 and using both facilities was also considered, but there is not enough vacant land available, the area has no railroad access, and the land use would continue to be incompatible with encroaching family housing.

3.0 LIFE-CYCLE COST ANALYSIS

3.1 Constraints and Assumptions

In the life-cycle cost analysis, all costs are in program year FY 1990 dollars. Historic costs are inflated to FY 1990 dollars using the Office of the Secretary of Defense (OSD) inflation index (date of ACC issue: 24 February 1986). FY 1985 dollars are inflated by 18.8% and FY 1986 dollars by 15.1% to obtain FY 1990 costs.

Capital Investment

No capital investment costs would be required for the status quo alternative. Capital investment costs for new construction and renovation are shown below.

		Renovation		
	New Construction	*(Total)*	*(Phase 1- FY 1990)*	*(Phase II- FY 1999)*
Square Feet	105,000	124,227	77,227	47,000
Cost per Square Foot ($)	50	39.65	39.65	39.65
Size Adjustment Factor	.96	N/A	N/A	N/A
Demolition/Removal Factor	N/A	1.3	1.3	1.3
Renovation Factor	N/A	0.61	0.61	0.61
Area Cost Factor	1.21	1.21	1.21	1.21
SUBTOTAL ($)	6,098,400	5,938,903	3,691,981	2,246,923
Supporting Facilities Multiplier	1.135	1.135	1.135	1.135
SUBTOTAL ($)	6,921,684	6,740,655	4,190,398	2,550,257
SIOH/Contingency	1.105	1.155	1.155	1.155
TOTAL ($)	7,648,461	7,785,457	4,839,910	2,945,547
Programmed Amount ($)	7,600,000	7,800,000	4,850,000	2,950,000

The supporting facilities multiplier includes site improvements, utility line extensions, and improvements to roads, parking, and walks. Supervision, inspection, and overhead (SIOH) costs amount to 5.5%, and a contingency of 5% for new construction and 10% for renovation is included.

Based on *Means Square Foot Costs*, renovating the existing facilities would involve 61% of full replacement (this assumes that all items except foundations and basic structural elements would be replaced during the renovation). Renovation also requires removing the existing components that will be replaced, which increases installation costs by 30% (based on information presented in Appendix B of the *Military Construction Program Economic Analysis Manual*). Thus, the base cost of renovation would be 79% (61% x 130%) of new construction costs, or $39.65 per square foot.

The renovation project would occur in two phases. The renovation of the seven facilities built in 1942 is assumed to take place in FY 1990. The renovation of the main supply warehouse built in 1959 (47,000 SF) is assumed to take place in FY 1999. The total cost of renovating the seven older facilities would be $4,850,000

(rounded from $4,839,910), and the total cost of renovating the main warehouse would be $2,950,000 (rounded from $2,945,547).

Annual Maintenance Costs

Annual maintenance costs of $0.69 per square foot of building space were computed for warehouse/storage facilities based on Appendix B of the *Military Construction Program Economic Analysis Manual.* The factors involved in the computation are shown below.

Factor	*Cost/Multiplier*
Cost per Square Foot ($ FY 1985)	0.48
Area Cost Factor	1.21
Inflation (FY 1985 to FY 1990)	1.188
Total Cost per Square Foot ($)	0.69

This maintenance cost is modified further based on the age of the facility. Building age multipliers and the annual cost of maintenance for each alternative are shown in Table 1.

Periodic Maintenance, Repair, and Replacement Costs

Periodic maintenance, repair, and replacement (M&R) costs for all alternatives were calculated based on the assumptions on frequency and costs for major repair items shown in Table 2.

The periodic M&R cost per square foot of building space is based on a combination of *Means Square Foot Costs* and the Air Force *Annual Construction Pricing Guide*, and the percentage of total costs required to replace each subsystem was obtained from the *Means* guide. An additional demolition/removal factor was applied to the cost per square foot for each subsystem based on information in Appendix B of the *Military Construction Program Economic Analysis Manual.*

Utilities

Energy consumption rates were taken from ETL 86-1 targets for "Storage Type Facilities & Maintenance Facilities." These rates were doubled for the status quo alternative, based on section 1e of ETL 86-1, which states, "the Air Force EBF's that are provided in this ETL represent an energy consumption of 50% less than for similar facilities designed in 1975." Doubling the design energy targets for new buildings provides a conservative estimate of utility costs for older structures. Energy costs are basewide average annual costs as reported by the utilities engineer. Annual water use per person was calculated from a basewide average consumption of 50 gallons per person per shift over 255 working days per year. Sewage treatment demand was assumed to be 70% of total water usage (engineering

Table 1

ESCALATED ANNUAL MAINTENANCE COSTS

Alternative	*Age of Building (Years)*	*Building Age Multiplier*	*Annual Cost ($)*
New Construction			
1991-1999	0-9	1.00	72,450
2000-2009	10-19	1.40	101,430
2010-2019	20-29	1.90	137,655
2020-2029	30-39	2.10	152,145
2030-2040	40-50		152,145
Renovation (Outlying Wooden Buildings)			
1991-1999	0-9*	1.00	53,287
2000-2009	10-19	1.40	74,601
2010-2019	20-29	1.90	101,245
2020-2029	30-39	2.10	111,902
2030-2040	40-50	2.10	111,902
Renovation (Main Supply Warehouse)			
1991-1999	30-39	2.10	68,103
2000-2009	0-9*	1.00	32,430
2010-2019	10-19	1.40	45,402
2020-2029	20-29	1.90	61,617
2030-2040	30-40	2.10	68,103
Status Quo (Outlying Wooden Buildings)			
1991-1992	49-50	2.10	111,902
1992-2040	>50	1.65	87,923
Status Quo (Main Supply Warehouse)			
1991-1999	30-39	2.10	68,103
2000-2009	40-49	2.10	68,103
2010-2040	>50	1.65	53,510

* Major renovation is assumed to be comparable to new construction, therefore building age is brought to 0.

Table 2

SUBSYSTEM M & R

Subsystem	*Subsystem Factor** *(%)*	*Periodic M&R Cost ($ per Sq. Ft.)*	*Subsystem Life Expectancy (Years)*
Foundations, Floors, Structural Walls, Roof Structures, Stairs	39	41.00	75
Roofing	10	10.36	15
Interior Walls and Doors, Windows, Exterior Closure	13	13.07	50
Wall and Floor Finishers, Paint, Wall Coverings, Carpeting	6	6.59	10
Ceiling Finishes	1	1.17	20
Fire Protection Equipment	5	5.16	50
HVAC	10	9.96	25
Plumbing	4	4.06	40
Electrical	8	8.79	30
Special Equipment	4	4.39	25

* The periodic M&R cost per square foot for each subsystem is equal to the subsystem percentage factor from Means multiplied by the renovation cost per square foot, further multiplied by the demolition/removal factor of 1.3, the area cost factor of 1.21, and an additional 15.5% for SIOH and contingency.

standard); the cost per thousand gallons of sewage treatment, $1.05, was obtained from the BCE cost report.

Miscellaneous Operations and Maintenance Costs

A cost of $5.39 per container for trash removal was obtained from the service contract monitor. The new facility would have six trash containers. The existing facilities have a total of 12 trash containers which are emptied daily. Currently, the trash containers are not always full when they are emptied, but because at least one container is needed at each of the eight existing facilities, there are more containers than necessary for the trash generated by the operation. All containers must be emptied on a daily basis.

Custodial costs were calculated using a basewide average of $0.82 per square foot (obtained from the service contract monitor). It is assumed that only 10% of the building space for each alternative is provided such custodial service. The remaining 90% of building space is warehouse and storage space that is cleaned by the supply staff.

Miscellaneous User Costs

Currently, 14 forklifts are used in five of the eight facilities for the supply operation. There are also 12 hand jacks that are used in the other three of the existing facilities. Hand jacks are used in those facilities because they have wooden floors that cannot support the weight of fork lifts. In the new facility, 10 fork lifts would be used; fewer forklifts would be required because supplies would not be moved as frequently in the consolidated facility.

The cost to operate a fork lift was estimated at $421.50 per year, based on an average of 6 operating hours per day per forklift, 250 working days per year, at a cost of $0.281 per hour for fuel and maintenance (from the Vehicle Information Management System [VIMS] available from the base transportation office). The cost of purchasing replacement forklifts is also included. The cost per fork lift is estimated at $21,000, and the life expectancy of a fork lift is estimated at 20 years. The cost of 12 hand jacks ($6,250 each) is included for the status quo alternative; the life expectancy of a hand jack is 10 years. Operating costs are negligible and not included in the analysis.

3.2 Life-Cycle Costs

All costs were totaled on Form S-1 (attached for each alternative) and discounted to present value using a discount rate of 10%. The total program-year dollars and present value of each alternative are presented below.

	Life-Cycle Costs ($ FY 1990)	
	Constant Dollars	*Present Value*
Status Quo	34,997,464	8,368,989
Renovation	38,366,051	9,797,569
New Construction	28,581,890	10,193,943

4.0 BENEFITS ANALYSIS

4.1 Constraints and Assumptions

The supply function receives an average of 300 per day (76,500 requests annually) but processes an average of only 243 requests per day. The backlog of requests is such that the majority of the Code 04 through 15 requests are not met in the required time. In a consolidated facility, the amount of handling of supplies would be reduced considerably. Supplies are often received at the main supply warehouse and then later moved to one of the outlying wooden buildings until they are needed. The Chief Supply Officer estimates that in a new consolidated facility with the same staff level, the operation could fill 300 requests per day in the required time.

The average burdened salary of the 46 supply personnel is approximately $20,000 per year; therefore, the annual labor cost of the supply operation is $920,000. Dividing the annual labor cost by the average number of supply requests filled results in a cost of $12.03 per request in a consolidated facility. Under the status quo, each filled request costs $14.85. This reduction in cost of $2.82 per filled request would provide an annual benefit to the operation of $215,802.

Supply supervisors also indicated that the new construction alternative would result in a reduction in damages. The current annual cargo damage cost of $10,000 could be cut in half with improved loading bays and less shuffling between warehouses. Additional annual savings of $2,576 are expected for reduced vehicle use, based on the "1985 Project Image Base Civil Engineering General Purpose Vehicle Requirements."

It is anticipated that the renovation alternative would also increase the efficiency of the operation, but not to the same degree as a consolidated facility. The Chief Supply Officer estimated that 250 requests per day could be met in the required time (63,750 filled requests annually) in the renovated facility. This

would reduce the average labor cost per filled request to $14.43, for a productivity benefit of $0.42 per request or $26,502 annually.

Qualitative factors evaluated include response time, accountability, morale, land use compatibility, and service and maintainability. Response time could not be quantified, but a faster response to requests is considered a benefit of consolidation. Better accountability could also be achieved if cargo is moved less and located in one place. Also, documentation would be less likely to be lost while traveling among the warehouses and shipping and receiving. Faster response was given the highest priority in the evaluation because responsiveness is a major objective of the supply organization.

Morale was also examined as a qualitative benefit. Morale would improve with consolidation because fewer labor hours would be expended traveling between facilities, increasing the availability of personnel for other tasks. Also, personnel would not have to contend with inadequate loading bays and crumbling Condition Code 3 buildings. The expanded use of forklifts would ease the physical workload of personnel and, thus, raise morale.

Land use compatibility and traffic are also important considerations because they affect not only supply personnel and facilities but also the surrounding housing and administrative functions. Service and maintainability were also considered.

4.2 Benefits

The new construction alternative is anticipated to have an annual benefit of $223,378, including $215,802 in increased productivity benefits, $2,576 in fuel savings, and a $5,000 reduction in cargo damages. Total annual quantitative benefits for the renovation alternative are estimated at $26,502 in increased productivity. Form S-2 is attached for each of those alternatives. The total benefit for each alternative is shown below.

	Life-Cycle Benefits ($ FY 1990)	
Alternative	*Constant Dollars*	*Present Value*
Renovation	1,325,103	262,763
New Construction	10,790,123	2,214,752

A summary of qualitative scores for all three alternatives is shown below. The priority given to each criterion is reflected in the weight; the most important criteria were given the greatest weight.

Criterion	*Weight*	*Alternatives*		
		Status Quo	*Renovation*	*New Const.*
Faster Response	3	6	18	30
Better Accountability	2	2	6	16
Sensitive Material Handling	2	4	4	14
Moral	1	2	5	10
Service & Maintainability	2	2	14	20
Land Use Compatibility	1	2	2	10
Traffic Considerations	2	4	4	14
TOTAL		22	53	114

The qualitative benefit of new construction is more than twice the benefit of renovation and five times that of the status quo.

5.0 COMPARISON OF ALTERNATIVES

The table below summarizes the overall performance of the three alternatives, based on total life-cycle benefits and costs, benefit-cost ratio (BCR), savings-investment ratio (SIR), and qualitative benefits scores. These performance measurements are also provided on the attached Form S-3.

	Alternatives		
	Status Quo	*Renovation*	*New Construction*
Life-Cycle Benefits ($)	N/A	8,631,752	10,583,741
Life-Cycle Costs ($)	8,368,989	9,797,569	10,193,943
BCR	1	0.88	1.04
SIR	N/A	0.71	0.76
EPIR	N/A	0.05	0.29
Qualitative Scores	22	53	114

The status quo alternative is the least-cost alternative in present value. Because of the large up-front investment, the new construction and renovation alternatives have greater life-cycle costs than the status quo, even though annual operating costs are much lower. A break-even graph is attached. In all areas except capital investment, the new construction alternative was the most economical. Annual maintenance costs for the new construction alternative are 21% less that those of status quo and 18% less than those of the renovation alternative. The periodic maintenance and repair costs for the new construction alternative are 62% less than those of the renovation alternative and 79% less than those of the status quo. Annual utility costs in the new facility would be 18% less than in the renovated facilities and 135% less than in the status quo facilities. New construction would reduce annual trash and custodial costs by 76%, and miscellaneous user costs would be reduced by 70% over the renovation alternative and 85% over the status quo alternative. (All of the aforementioned percentages are in constant dollars).

The BCRs for the renovation and new construction alternatives indicate that new construction would be the most cost-effective development option. The savings-investment ratios (SIR) and efficiency/productivity-investment ratios (EPIR) indicate that the new construction alternative would provide a positive monetary return on the money invested.

The qualitative benefits also favor the new construction alternative, which meets all of the project's objectives. Since faster response time was the highest priority, removing the need to travel between facilities made the new construction alternative score very high in this area. The new construction alternative also scored well on land use compatibility, on which both the status quo and the renovation alternative performed badly.

6.0 SENSITIVITY ANALYSIS

Since interest rates have recently declined to well below 10%, a sensitivity analysis was performed using a 6% discount rate to convert constant-year dollars to present value. The lower discount rate places a greater value on dollars spent in the future. This caused the present value of each alternative to increase and the difference between the status quo and the new construction alternative to decrease. It also raised the BCR of the new construction alternative to 1.26. With the lower discount rate, the BCR of the renovation alternative improved slightly, although this alternative remains the least cost-effective of the three choices (see the attached Form S-3, Sensitivity Analysis).

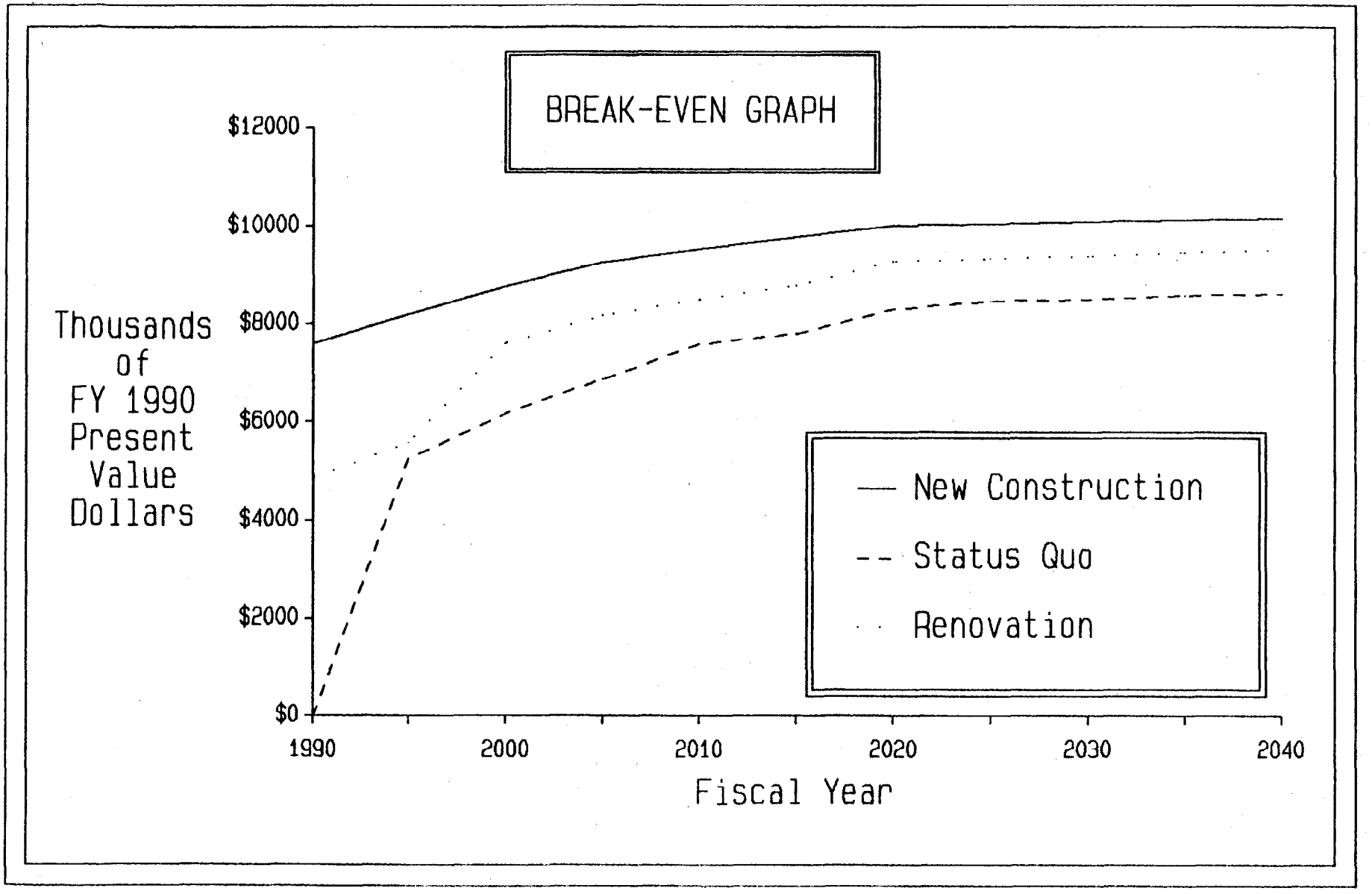


Figure 1

BREAK-EVEN GRAPH
(10 percent discount rate)

The table below summarizes the overall performance of the three alternatives in the sensitivity analysis.

	Alternatives		
	Status Quo	*Renovation*	*New Construction*
Life-Cycle Benefits($)	N/A	12,594,866	15,697,998
Life-Cycle Costs ($)	12,177,144	13,491,283	12,413,046
BCR	1	0.93	1.26
SIR	N/A	0.73	0.97
EPIR	N/A	0.09	0.46

7.0 CONCLUSIONS AND RECOMMENDATION

The renovation and status quo alternatives both have lower life-cycle costs than new construction. However, the status quo performed poorly in the benefits portion of the analysis, meeting the fewest objectives among the three alternatives, and the renovation alternative had a BCR of less than 1. The new construction alternative had a BCR of 1.04 using a 10% discount rate and a BCR of 1.26 with a 6% discount rate. This indicates that new construction is the most cost-effective alternative when quantitative benefits and costs are calculated. It also scores highest in the qualitative benefit analysis. Therefore, construction of a new consolidated supply complex is recommended.

FORM S-3
Ranking Alternatives

	Status Quo	Alternative: Renovation	Alternative: New Construction	Alternative:	Alternative:	Alternative:
Life-Cycle Benefits (from FORM S-2)	N/A	$262,763	$2,214,752			
Life-Cycle Costs of Status Quo (from FORM S-1)	N/A	(+) $8,368,989	(+) $8,368,989	(+)	(+)	(+)
Total Life-Cycle Benefit (Including Status Quo Cost Avoidance)	N/A	(=) $8,631,752	(=) $10,583,741	(=)	(=)	(=)
Total Life-Cycle Costs (from FORM S-1)	N/A	(/) $9,797,569	(/) $10,193,943	(/)	(/)	(/)
Benefit-Cost Ratio (BCR) *	1	(=) .88	(=) 1.04	(=)	(=)	(=)
Payback Period (if applicable)	N/A	N/A	N/A			
Savings-Investment Ratio (SIR)	N/A	.71	.76			
Eff/Prod-Investment Ratio (EPIR)	N/A	.05	.29			
Qualitative Benefit Scores	22	53	114			
Rank	3	2	1			

* - If BCR > 1, then that alternative is **more cost-effective** than the status quo.
If BCR < 1, then that alternative is **less cost-effective** than the status quo.
The alternative with the largest BCR is the **most cost-effective** alternative.

FORM S-3
Ranking Alternatives
SENSITIVITY ANALYSIS

	Status Quo	Alternative: Renovation	Alternative: New Construction	Alternative:	Alternative:	Alternative:
Life-Cycle Benefits (from FORM S-2)	N/A	$417,722	$3,520,854			
Life-Cycle Costs of Status Quo (from FORM S-1)	N/A	(+) $12,177,144	(+) $12,177,144	(+)	(+)	(+)
Total Life-Cycle Benefit (Including Status Quo Cost Avoidance)	N/A	(=) $12,594,866	(=) $15,697,998	(=)	(=)	(=)
Total Life-Cycle Costs (from FORM S-1)	N/A	(/) $13,491,283	(/) $12,413,046	(/)	(/)	(/)
Benefit-Cost Ratio (BCR) *	1	(=) .93	(=) 1.26	(=)	(=)	(=)
Payback Period (if applicable)	N/A	N/A	N/A			
Savings-Investment Ratio (SIR)	N/A	.73	.97			
Eff/Prod-Investment Ratio (EPIR)	N/A	.09	.46			
Qualitative Benefit Scores	22	53	114			
Rank	2	3	1			

* - If BCR > 1, then that alternative is **more cost-effective** than the status quo.
If BCR < 1, then that alternative is **less cost-effective** than the status quo.
The alternative with the largest BCR is the **most cost-effective** alternative.

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0	1.000	$0	$0
**1991	$180,005	$1,383,136	$90,043	$29,701	$374,901	$0	$2,057,786	.909	$1,870,714	$1,870,714
1992	$180,005	$2,213,326	$90,043	$29,701	$5,901	$0	$2,518,976	.826	$2,081,798	$3,952,513
1993	$180,005	$668,014	$90,043	$29,701	$5,901	$0	$973,664	.751	$731,528	$4,684,041
1994	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.683	$208,763	$4,892,804
1995	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.621	$189,785	$5,082,589
1996	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.564	$172,532	$5,255,120
1997	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.513	$156,847	$5,411,967
1998	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.467	$142,588	$5,554,555
1999	$180,005	$483,160	$90,043	$29,701	$5,901	$0	$788,810	.424	$334,533	$5,889,088
2000	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.386	$108,596	$5,997,684
2001	$156,026	$442,511	$90,043	$29,701	$80,901	$0	$799,182	.350	$280,108	$6,277,793
2002	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.319	$89,749	$6,367,542
2003	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.290	$81,590	$6,449,132
2004	$156,026	$423,000	$90,043	$29,701	$5,901	$0	$704,671	.263	$185,562	$6,634,694
2005	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.239	$67,430	$6,702,124
2006	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.218	$61,300	$6,763,424
2007	$156,026	$695,043	$90,043	$29,701	$5,901	$0	$976,714	.198	$193,238	$6,956,661
2008	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.180	$50,661	$7,007,322
2009	$156,026	$1,599,880	$90,043	$29,701	$5,901	$0	$1,881,551	.164	$307,649	$7,314,971
2010	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.149	$39,699	$7,354,670
2011	$141,432	$521,282	$90,043	$29,701	$374,901	$0	$1,157,360	.135	$156,395	$7,511,065
2012	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.123	$32,809	$7,543,875
2013	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.112	$29,827	$7,573,701
2014	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.102	$27,115	$7,600,817
2015	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.092	$24,650	$7,625,467

* Program year; include capital investment in first row of Column 7.

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.084	$22,409	$7,647,876
2017	$141,432	$3,045,833	$90,043	$29,701	$5,901	$0	$3,312,911	.076	$252,701	$7,900,577
2018	$141,432	$668,014	$90,043	$29,701	$5,901	$0	$935,091	.069	$64,842	$7,965,420
2019	$141,432	$1,098,860	$90,043	$29,701	$5,901	$0	$1,365,938	.063	$86,108	$8,051,527
2020	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.057	$15,306	$8,066,833
2021	$141,432	$1,031,753	$90,043	$29,701	$80,901	$0	$1,373,830	.052	$71,575	$8,138,408
2022	$141,432	$695,043	$90,043	$29,701	$5,901	$0	$962,121	.047	$45,568	$8,183,976
2023	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.043	$11,500	$8,195,476
2024	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.039	$10,454	$8,205,930
2025	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.036	$9,504	$8,215,434
2026	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.032	$8,640	$8,224,074
2027	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.029	$7,854	$8,231,928
2028	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.027	$7,140	$8,239,068
2029	$141,432	$269,310	$90,043	$29,701	$5,901	$0	$536,388	.024	$13,037	$8,252,105
2030	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.022	$5,901	$8,258,006
2031	$141,432	$793,894	$90,043	$29,701	$374,901	$0	$1,429,971	.020	$28,723	$8,286,729
2032	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.018	$4,877	$8,291,606
2033	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.017	$4,434	$8,296,039
2034	$141,432	$2,097,140	$90,043	$29,701	$5,901	$0	$2,364,218	.015	$35,679	$8,331,718
2035	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.014	$3,664	$8,335,382
2036	$141,432	$586,090	$90,043	$29,701	$5,901	$0	$853,168	.012	$10,641	$8,346,023
2037	$141,432	$695,043	$90,043	$29,701	$5,901	$0	$962,121	.011	$10,909	$8,356,931
2038	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.010	$2,753	$8,359,684
2039	$141,432	$483,160	$90,043	$29,701	$5,901	$0	$750,238	.009	$7,030	$8,366,714
2040	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.009	$2,275	$8,368,989
Total	$7,564,709	$19,893,490	$4,502,149	$1,485,066	$1,552,050	$0	$34,997,464		$8,368,989	

FORM S-1
Total Life-Cycle Costs
Alternative: RENOVATION

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
*1990							$4,850,000 *	1.000	$4,850,000	$4,850,000
**1991	$121,390	$0	$45,408	$29,701	$364,166	$0	$560,664	.909	$509,694	$5,359,694
1992	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.826	$168,317	$5,528,012
1993	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.751	$153,016	$5,681,028
1994	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.683	$139,105	$5,820,133
1995	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.621	$126,459	$5,946,592
1996	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.564	$114,963	$6,061,555
1997	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.513	$104,512	$6,166,067
1998	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.467	$95,011	$6,261,078
1999	$121,390	$0	$45,408	$29,701	$7,166	$0	$3,153,664 *	.424	$1,337,461	$7,598,539
2000	$107,031	$711,821	$45,408	$29,701	$7,166	$0	$901,126	.386	$347,423	$7,945,962
2001	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.350	$66,350	$8,012,313
2002	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.319	$60,319	$8,072,631
2003	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.290	$54,835	$8,127,466
2004	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.263	$49,850	$8,177,316
2005	$107,031	$1,118,043	$45,408	$29,701	$7,166	$0	$1,307,349	.239	$312,969	$8,490,285
2006	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.218	$41,198	$8,531,484
2007	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.198	$37,453	$8,568,937
2008	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.180	$34,048	$8,602,985
2009	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.164	$30,953	$8,633,938
2010	$146,647	$838,532	$45,408	$29,701	$7,166	$0	$1,067,453	.149	$158,670	$8,792,608
2011	$146,647	$0	$45,408	$29,701	$364,166	$0	$585,921	.135	$79,176	$8,871,784
2012	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.123	$28,122	$8,899,906
2013	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.112	$25,565	$8,925,471
2014	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.102	$23,241	$8,948,713
2015	$146,647	$1,549,111	$45,408	$29,701	$7,166	$0	$1,778,032	.092	$164,105	$9,112,818

* Program year; include capital investment in first row of Column 7.

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: RENOVATION

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
2016	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.084	$19,208	$9,132,026
2017	$146,647	$2,750,826	$45,408	$29,701	$7,166	$0	$2,979,747	.076	$227,288	$9,359,314
2018	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.069	$15,874	$9,375,188
2019	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.063	$14,431	$9,389,619
2020	$173,519	$2,777,716	$45,408	$29,701	$7,166	$0	$3,033,509	.057	$173,846	$9,563,465
2021	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.052	$13,326	$9,576,792
2022	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.047	$12,115	$9,588,906
2023	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.043	$11,014	$9,599,920
2024	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.039	$10,012	$9,609,933
2025	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.036	$9,102	$9,619,035
2026	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.032	$8,275	$9,627,309
2027	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.029	$7,522	$9,634,832
2028	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.027	$6,839	$9,641,670
2029	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.024	$6,217	$9,647,887
2030	$180,005	$838,532	$45,408	$29,701	$7,166	$0	$1,100,811	.022	$24,322	$9,672,210
2031	$180,005	$0	$45,408	$29,701	$364,166	$0	$619,279	.020	$12,439	$9,684,649
2032	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.018	$4,789	$9,689,438
2033	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.017	$4,354	$9,693,792
2034	$180,005	$1,674,140	$45,408	$29,701	$7,166	$0	$1,936,419	.015	$29,223	$9,723,015
2035	$180,005	$1,556,564	$45,408	$29,701	$7,166	$0	$1,818,844	.014	$24,953	$9,747,968
2036	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.012	$3,271	$9,751,239
2037	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.011	$2,974	$9,754,213
2038	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.010	$2,703	$9,756,916
2039	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.009	$2,458	$9,759,374
2040	$180,005	$4,228,687	$45,408	$29,701	#REF!	$0	$4,483,801	.009	$38,195	$9,797,569
Total	$7,344,529	$18,043,972	$2,270,375	$1,485,066	$1,422,110	$0	$38,366,051		$9,797,569	

FORM S-1
Total Life-Cycle Costs
Alternative: NEW CONSTRUCTION

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$7,600,000	1.000	$7,600,000	$7,600,000
**1991	$72,450	$0	$38,397	$16,857	$214,215	$0	$341,919	.909	$310,835	$7,910,835
1992	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.826	$109,024	$8,019,859
1993	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.751	$99,113	$8,118,972
1994	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.683	$90,102	$8,209,074
1995	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.621	$81,911	$8,290,986
1996	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.564	$74,465	$8,365,450
1997	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.513	$67,695	$8,433,146
1998	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.467	$61,541	$8,494,687
1999	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.424	$55,946	$8,550,633
2000	$101,430	$601,650	$38,397	$16,857	$4,215	$0	$762,549	.386	$293,996	$8,844,629
2001	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.350	$56,394	$8,901,023
2002	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.319	$51,267	$8,952,290
2003	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.290	$46,607	$8,998,897
2004	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.263	$42,370	$9,041,267
2005	$101,430	$945,000	$38,397	$16,857	$4,215	$0	$1,105,899	.239	$264,743	$9,306,010
2006	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.218	$35,016	$9,341,026
2007	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.198	$31,833	$9,372,859
2008	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.180	$28,939	$9,401,798
2009	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.164	$26,308	$9,428,107
2010	$137,655	$708,750	$38,397	$16,857	$4,215	$0	$905,874	.149	$134,652	$9,562,759
2011	$137,655	$0	$38,397	$16,857	$214,215	$0	$407,124	.135	$55,015	$9,617,774
2012	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.123	$24,216	$9,641,990
2013	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.112	$22,014	$9,664,004
2014	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.102	$20,013	$9,684,017
2015	$137,655	$1,309,350	$38,397	$16,857	$4,215	$0	$1,506,474	.092	$139,042	$9,823,059

* Program year; include capital investment in first row of Column 7.

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: NEW CONSTRUCTION

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.084	$16,540	$9,839,599
2017	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.076	$15,036	$9,854,635
2018	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.069	$13,669	$9,868,304
2019	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.063	$12,427	$9,880,731
2020	$152,145	$2,347,800	$38,397	$16,857	$4,215	$0	$2,559,414	.057	$146,676	$10,027,407
2021	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.052	$11,025	$10,038,432
2022	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.047	$10,023	$10,048,454
2023	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.043	$9,111	$10,057,566
2024	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.039	$8,283	$10,065,849
2025	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.036	$7,530	$10,073,379
2026	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.032	$6,846	$10,080,224
2027	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.029	$6,223	$10,086,448
2028	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.027	$5,657	$10,092,105
2029	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.024	$5,143	$10,097,248
2030	$152,145	$708,750	$38,397	$16,857	$4,215	$0	$920,364	.022	$20,335	$10,117,584
2031	$152,145	$0	$38,397	$16,857	$214,215	$0	$421,614	.020	$8,469	$10,126,052
2032	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.018	$3,864	$10,129,916
2033	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.017	$3,513	$10,133,429
2034	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.015	$3,193	$10,136,623
2035	$152,145	$945,000	$38,397	$16,857	$4,215	$0	$1,156,614	.014	$15,868	$10,152,491
2036	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.012	$2,639	$10,155,130
2037	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.011	$2,399	$10,157,529
2038	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.010	$2,181	$10,159,710
2039	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.009	$1,983	$10,161,693
2040	$152,145	$3,574,200	$38,397	$16,857	$4,215	$0	$3,785,814	.009	$32,250	$10,193,943
Total	$6,237,945	$11,140,500	$1,919,860	$842,835	$840,750	$0	$28,581,890		$10,193,943	

FORM S-2
Total Life-Cycle Benefits
Alternative: RENOVATION

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	$26,502	N/A	N/A	N/A	$26,502	.909	$24,093	$24,093
1992	$26,502	N/A	N/A	N/A	$26,502	.826	$21,903	$45,995
1993	$26,502	N/A	N/A	N/A	$26,502	.751	$19,911	$65,907
1994	$26,502	N/A	N/A	N/A	$26,502	.683	$18,101	$84,008
1995	$26,502	N/A	N/A	N/A	$26,502	.621	$16,456	$100,464
1996	$26,502	N/A	N/A	N/A	$26,502	.564	$14,960	$115,423
1997	$26,502	N/A	N/A	N/A	$26,502	.513	$13,600	$129,023
1998	$26,502	N/A	N/A	N/A	$26,502	.467	$12,363	$141,387
1999	$26,502	N/A	N/A	N/A	$26,502	.424	$11,239	$152,626
2000	$26,502	N/A	N/A	N/A	$26,502	.386	$10,218	$162,844
2001	$26,502	N/A	N/A	N/A	$26,502	.350	$9,289	$172,132
2002	$26,502	N/A	N/A	N/A	$26,502	.319	$8,444	$180,577
2003	$26,502	N/A	N/A	N/A	$26,502	.290	$7,677	$188,254
2004	$26,502	N/A	N/A	N/A	$26,502	.263	$6,979	$195,232
2005	$26,502	N/A	N/A	N/A	$26,502	.239	$6,344	$201,577
2006	$26,502	N/A	N/A	N/A	$26,502	.218	$5,768	$207,344
2007	$26,502	N/A	N/A	N/A	$26,502	.198	$5,243	$212,588
2008	$26,502	N/A	N/A	N/A	$26,502	.180	$4,767	$217,354
2009	$26,502	N/A	N/A	N/A	$26,502	.164	$4,333	$221,688
2010	$26,502	N/A	N/A	N/A	$26,502	.149	$3,939	$225,627
2011	$26,502	N/A	N/A	N/A	$26,502	.135	$3,581	$229,208
2012	$26,502	N/A	N/A	N/A	$26,502	.123	$3,256	$232,464
2013	$26,502	N/A	N/A	N/A	$26,502	.112	$2,960	$235,424
2014	$26,502	N/A	N/A	N/A	$26,502	.102	$2,691	$238,114
2015	$26,502	N/A	N/A	N/A	$26,502	.092	$2,446	$240,560

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: RENOVATION

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	$26,502	N/A	N/A	N/A	$26,502	.084	$2,224	$242,784
2017	$26,502	N/A	N/A	N/A	$26,502	.076	$2,022	$244,805
2018	$26,502	N/A	N/A	N/A	$26,502	.069	$1,838	$246,643
2019	$26,502	N/A	N/A	N/A	$26,502	.063	$1,671	$248,314
2020	$26,502	N/A	N/A	N/A	$26,502	.057	$1,519	$249,833
2021	$26,502	N/A	N/A	N/A	$26,502	.052	$1,381	$251,213
2022	$26,502	N/A	N/A	N/A	$26,502	.047	$1,255	$252,469
2023	$26,502	N/A	N/A	N/A	$26,502	.043	$1,141	$253,610
2024	$26,502	N/A	N/A	N/A	$26,502	.039	$1,037	$254,647
2025	$26,502	N/A	N/A	N/A	$26,502	.036	$943	$255,590
2026	$26,502	N/A	N/A	N/A	$26,502	.032	$857	$256,447
2027	$26,502	N/A	N/A	N/A	$26,502	.029	$779	$257,227
2028	$26,502	N/A	N/A	N/A	$26,502	.027	$709	$257,935
2029	$26,502	N/A	N/A	N/A	$26,502	.024	$644	$258,579
2030	$26,502	N/A	N/A	N/A	$26,502	.022	$586	$259,165
2031	$26,502	N/A	N/A	N/A	$26,502	.020	$532	$259,697
2032	$26,502	N/A	N/A	N/A	$26,502	.018	$484	$260,181
2033	$26,502	N/A	N/A	N/A	$26,502	.017	$440	$260,621
2034	$26,502	N/A	N/A	N/A	$26,502	.015	$400	$261,021
2035	$26,502	N/A	N/A	N/A	$26,502	.014	$364	$261,385
2036	$26,502	N/A	N/A	N/A	$26,502	.012	$331	$261,715
2037	$26,502	N/A	N/A	N/A	$26,502	.011	$300	$262,016
2038	$26,502	N/A	N/A	N/A	$26,502	.010	$273	$262,289
2039	$26,502	N/A	N/A	N/A	$26,502	.009	$248	$262,537
2040	$26,502	N/A	N/A	N/A	$26,502	.009	$226	$262,763
Total	$1,325,103	N/A	N/A	N/A	$1,325,103		$262,763	

FORM S-2
Total Life-Cycle Benefits
Alternative: NEW CONSTRUCTION

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	$215,802	N/A	$2,576	$5,000	$223,378	.909	$203,071	$203,071
1992	$215,802	N/A	$2,576	$5,000	$223,378	.826	$184,610	$387,681
1993	$215,802	N/A	$2,576	$5,000	$223,378	.751	$167,827	$555,508
1994	$215,802	N/A	$2,576	$5,000	$223,378	.683	$152,570	$708,078
1995	$215,802	N/A	$2,576	$5,000	$223,378	.621	$138,700	$846,779
1996	$215,802	N/A	$2,576	$5,000	$223,378	.564	$126,091	$972,870
1997	$215,802	N/A	$2,576	$5,000	$223,378	.513	$114,628	$1,087,498
1998	$215,802	N/A	$2,576	$5,000	$223,378	.467	$104,208	$1,191,705
1999	$215,802	N/A	$2,576	$5,000	$223,378	.424	$94,734	$1,286,440
2000	$215,802	N/A	$2,576	$5,000	$223,378	.386	$86,122	$1,372,561
2001	$215,802	N/A	$2,576	$5,000	$223,378	.350	$78,293	$1,450,854
2002	$215,802	N/A	$2,576	$5,000	$223,378	.319	$71,175	$1,522,029
2003	$215,802	N/A	$2,576	$5,000	$223,378	.290	$64,705	$1,586,734
2004	$215,802	N/A	$2,576	$5,000	$223,378	.263	$58,822	$1,645,556
2005	$215,802	N/A	$2,576	$5,000	$223,378	.239	$53,475	$1,699,031
2006	$215,802	N/A	$2,576	$5,000	$223,378	.218	$48,614	$1,747,645
2007	$215,802	N/A	$2,576	$5,000	$223,378	.198	$44,194	$1,791,839
2008	$215,802	N/A	$2,576	$5,000	$223,378	.180	$40,177	$1,832,015
2009	$215,802	N/A	$2,576	$5,000	$223,378	.164	$36,524	$1,868,540
2010	$215,802	N/A	$2,576	$5,000	$223,378	.149	$33,204	$1,901,743
2011	$215,802	N/A	$2,576	$5,000	$223,378	.135	$30,185	$1,931,928
2012	$215,802	N/A	$2,576	$5,000	$223,378	.123	$27,441	$1,959,370
2013	$215,802	N/A	$2,576	$5,000	$223,378	.112	$24,946	$1,984,316
2014	$215,802	N/A	$2,576	$5,000	$223,378	.102	$22,679	$2,006,995
2015	$215,802	N/A	$2,576	$5,000	$223,378	.092	$20,617	$2,027,612

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: NEW CONSTRUCTION

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	$215,802	N/A	$2,576	$5,000	$223,378	.084	$18,743	$2,046,354
2017	$215,802	N/A	$2,576	$5,000	$223,378	.076	$17,039	$2,063,393
2018	$215,802	N/A	$2,576	$5,000	$223,378	.069	$15,490	$2,078,883
2019	$215,802	N/A	$2,576	$5,000	$223,378	.063	$14,082	$2,092,964
2020	$215,802	N/A	$2,576	$5,000	$223,378	.057	$12,801	$2,105,766
2021	$215,802	N/A	$2,576	$5,000	$223,378	.052	$11,638	$2,117,404
2022	$215,802	N/A	$2,576	$5,000	$223,378	.047	$10,580	$2,127,983
2023	$215,802	N/A	$2,576	$5,000	$223,378	.043	$9,618	$2,137,601
2024	$215,802	N/A	$2,576	$5,000	$223,378	.039	$8,744	$2,146,345
2025	$215,802	N/A	$2,576	$5,000	$223,378	.036	$7,949	$2,154,293
2026	$215,802	N/A	$2,576	$5,000	$223,378	.032	$7,226	$2,161,520
2027	$215,802	N/A	$2,576	$5,000	$223,378	.029	$6,569	$2,168,089
2028	$215,802	N/A	$2,576	$5,000	$223,378	.027	$5,972	$2,174,061
2029	$215,802	N/A	$2,576	$5,000	$223,378	.024	$5,429	$2,179,490
2030	$215,802	N/A	$2,576	$5,000	$223,378	.022	$4,936	$2,184,425
2031	$215,802	N/A	$2,576	$5,000	$223,378	.020	$4,487	$2,188,912
2032	$215,802	N/A	$2,576	$5,000	$223,378	.018	$4,079	$2,192,991
2033	$215,802	N/A	$2,576	$5,000	$223,378	.017	$3,708	$2,196,699
2034	$215,802	N/A	$2,576	$5,000	$223,378	.015	$3,371	$2,200,070
2035	$215,802	N/A	$2,576	$5,000	$223,378	.014	$3,065	$2,203,135
2036	$215,802	N/A	$2,576	$5,000	$223,378	.012	$2,786	$2,205,921
2037	$215,802	N/A	$2,576	$5,000	$223,378	.011	$2,533	$2,208,453
2038	$215,802	N/A	$2,576	$5,000	$223,378	.010	$2,302	$2,210,756
2039	$215,802	N/A	$2,576	$5,000	$223,378	.009	$2,093	$2,212,849
2040	$215,802	N/A	$2,576	$5,000	$223,378	.009	$1,903	$2,214,752
Total	$10,790,123	N/A	$128,779	$250,000	$11,168,903		$2,214,752	

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: STATUS QUO - Outlying Wooden Buildings

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.69
Number of Square Feet of Building Space	(X)	77,227
Total Annual Maintenance Cost	(=)	$53,287

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1942	
Building Age Multiplier During Years:	1991-1992	2.10
Building Age Multiplier During Years:	1992-2040	1.65
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $.48 * 1.21 * 1.188 = $.69 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: STATUS QUO - Main Supply Warehouse

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.69
Number of Square Feet of Building Space	(X)	47,000
Total Annual Maintenance Cost	(=)	$32,430

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1959	
Building Age Multiplier During Years:	1991-1999	2.10
Building Age Multiplier During Years:	2000-2009	2.10
Building Age Multiplier During Years:	2010-2040	1.65
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $.48 * 1.21 * 1.188 = $.69 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: RENOVATION - Outlying Wooden Buildings

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.69
Number of Square Feet of Building Space	(X)	77,227
Total Annual Maintenance Cost	(=)	$53,287

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1942	
Building Age Multiplier During Years:	1991-1999	1.00
Building Age Multiplier During Years:	2000-2009	1.40
Building Age Multiplier During Years:	2010-2019	1.90
Building Age Multiplier During Years:	2020-2029	2.10
Building Age Multiplier During Years:	2030-2040	2.10

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $.48 * 1.21 * 1.188 = $.69 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: RENOVATION - Main Supply Warehouse

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.69
Number of Square Feet of Building Space	(X)	47,000
Total Annual Maintenance Cost	(=)	$32,430

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1959	
Building Age Multiplier During Years:	1991-1999	2.10
Building Age Multiplier During Years:	2000-2009	1.00
Building Age Multiplier During Years:	2010-2019	1.40
Building Age Multiplier During Years:	2020-2029	1.90
Building Age Multiplier During Years:	2030-2040	2.10

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $.48 * 1.21 * 1.188 = $.69 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.69
Number of Square Feet of Building Space	(X)	105,000
Total Annual Maintenance Cost	(=)	$72,450

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1990	
Building Age Multiplier During Years:	1991-1999	1.00
Building Age Multiplier During Years:	2000-2009	1.40
Building Age Multiplier During Years:	2010-2019	1.90
Building Age Multiplier During Years:	2020-2029	2.10
Building Age Multiplier During Years:	2030-2040	2.10

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $.48 * 1.21 * 1.188 = $.69 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: STATUS QUO - Outlying Wooden Buildings

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		$35.62
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$2,750,826
Life Expectancy: 75 Years		
Years M&R Would Be Required 2017		

Roofing

M&R Cost per Square Foot		$9.00
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$695,043
Life Expectancy: 15 Years		
Years M&R Would Be Required 1992, 2007, 2022, 2037		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$11.36
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$877,299
Life Expectancy: 50 Years		
Years M&R Would Be Required 1992		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$5.73
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$442,511
Life Expectancy: 10 Years		
Years M&R Would Be Required 1991, 2001, 2011, 2021, 2031		

Ceiling Finishes

M&R Cost per Square Foot		$1.02
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$78,772
Life Expectancy: 20 Years		
Years M&R Would Be Required 1991, 2011, 2031		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2

Periodic Maintenance, Repair, and Replacement Costs

(In Program-Year Dollars)

Alternative: STATUS QUO - Outlying Wooden Buildings

Fire Protection Equipment

M&R Cost per Square Foot		$4.48
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$345,977
Life Expectancy: 50 Years		
Years M&R Would Be Required 1992		

HVAC

M&R Cost per Square Foot		$8.65
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$668,014
Life Expectancy: 25 Years		
Years M&R Would Be Required 1993, 2018		

Plumbing

M&R Cost per Square Foot		$3.53
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$272,611
Life Expectancy: 40 Years		
Years M&R Would Be Required 1991, 2031		

Electrical

M&R Cost per Square Foot		$7.63
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$589,242
Life Expectancy: 30 Years		
Years M&R Would Be Required 1991, 2021		

Special Equipment

M&R Cost per Square Foot		$3.82
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$295,007
Life Expectancy: 25 Years		
Years M&R Would Be Required 1992, 2017		

Assumptions, Additional Calculations, and Data Sources:

Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: STATUS QUO - Main Supply Warehouse

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		$35.62
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$1,674,140
Life Expectancy: 75 Years		
Years M&R Would Be Required 2034		

Roofing

M&R Cost per Square Foot		$9.00
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$423,000
Life Expectancy: 15 Years		
Years M&R Would Be Required 2004, 2019, 2034		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$11.36
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$533,920
Life Expectancy: 50 Years		
Years M&R Would Be Required 2009		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$5.73
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$269,310
Life Expectancy: 10 Years		
Years M&R Would Be Required 1999, 2009, 2019, 2029, 2039		

Ceiling Finishes

M&R Cost per Square Foot		$1.02
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$47,940
Life Expectancy: 20 Years		
Years M&R Would Be Required 1999, 2019, 2039		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: STATUS QUO - Main Supply Warehouse

Fire Protection Equipment

M&R Cost per Square Foot		$4.48
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$210,560

Life Expectancy: 50 Years
Years M&R Would Be Required 2009

HVAC

M&R Cost per Square Foot		$8.65
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$406,550

Life Expectancy: 25 Years
Years M&R Would Be Required 2009, 2036

Plumbing

M&R Cost per Square Foot		$3.53
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$165,910

Life Expectancy: 40 Years
Years M&R Would Be Required 1999, 2039

Electrical

M&R Cost per Square Foot		$7.63
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$358,610

Life Expectancy: 30 Years
Years M&R Would Be Required 1989, 2019

Special Equipment

M&R Cost per Square Foot		$3.82
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$179,540

Life Expectancy: 25 Years
Years M&R Would Be Required 2009, 2036

Assumptions, Additional Calculations, and Data Sources:
Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: RENOVATION - Outlying Wooden Buildings

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		$35.62
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$2,750,826
Life Expectancy: 75 Years		
Years M&R Would Be Required 2017		

Roofing

M&R Cost per Square Foot		$9.00
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$695,043
Life Expectancy: 15 Years		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$11.36
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$877,299
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$5.73
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$442,511
Life Expectancy: 10 Years		
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040		

Ceiling Finishes

M&R Cost per Square Foot		$1.02
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$78,772
Life Expectancy: 20 Years		
Years M&R Would Be Required 2010, 2030		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2

Periodic Maintenance, Repair, and Replacement Costs

(In Program-Year Dollars)

Alternative: RENOVATION - Outlying Wooden Buildings

Fire Protection Equipment

M&R Cost per Square Foot		$4.48
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$345,977
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

HVAC

M&R Cost per Square Foot		$8.65
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$668,014
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Plumbing

M&R Cost per Square Foot		$3.53
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$272,611
Life Expectancy: 40 Years		
Years M&R Would Be Required 2035		

Electrical

M&R Cost per Square Foot		$7.63
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$589,242
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		$3.82
Number of Square Feet of Building Space	(X)	77,227
Subtotal M&R Cost	(=)	$295,007
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Assumptions, Additional Calculations, and Data Sources:

Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: RENOVATION - Main Supply Warehouse

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		$35.62
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$1,674,140

Life Expectancy: 75 Years
Years M&R Would Be Required 2034

Roofing

M&R Cost per Square Foot		$9.00
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$423,000

Life Expectancy: 15 Years
Years M&R Would Be Required 2005, 2020, 2035

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$11.36
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$533,920

Life Expectancy: 50 Years
Years M&R Would Be Required 2040

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$5.73
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$269,310

Life Expectancy: 10 Years
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040

Ceiling Finishes

M&R Cost per Square Foot		$1.02
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$47,940

Life Expectancy: 20 Years
Years M&R Would Be Required 2010, 2030

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A

Life Expectancy: _____ Years
Years M&R Would Be Required _____

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: RENOVATION - Main Supply Warehouse

Fire Protection Equipment

M&R Cost per Square Foot		$4.48
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$210,560

Life Expectancy: 50 Years
Years M&R Would Be Required 2040

HVAC

M&R Cost per Square Foot		$8.65
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$406,550

Life Expectancy: 25 Years
Years M&R Would Be Required 2015, 2040

Plumbing

M&R Cost per Square Foot		$3.53
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$165,910

Life Expectancy: 40 Years
Years M&R Would Be Required 2035

Electrical

M&R Cost per Square Foot		$7.63
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$358,610

Life Expectancy: 30 Years
Years M&R Would Be Required 2020

Special Equipment

M&R Cost per Square Foot		$3.82
Number of Square Feet of Building Space	(X)	47,000
Subtotal M&R Cost	(=)	$179,540

Life Expectancy: 25 Years
Years M&R Would Be Required 2015, 2040

Assumptions, Additional Calculations, and Data Sources:
Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: 75 Years		
Years M&R Would Be Required _____		

Roofing

M&R Cost per Square Foot		$9.00
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$945,000
Life Expectancy: 15 Years		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$11.36
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$1,192,800
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$5.73
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$601,650
Life Expectancy: 10 Years		
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040		

Ceiling Finishes

M&R Cost per Square Foot		$1.02
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$107,100
Life Expectancy: 20 Years		
Years M&R Would Be Required 2010, 2030		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Fire Protection Equipment

M&R Cost per Square Foot		$4.48
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$470,400
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

HVAC

M&R Cost per Square Foot		$8.65
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$908,250
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Plumbing

M&R Cost per Square Foot		$3.53
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$370,650
Life Expectancy: 40 Years		
Years M&R Would Be Required 2035		

Electrical

M&R Cost per Square Foot		$7.63
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$801,150
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		$3.82
Number of Square Feet of Building Space	(X)	105,000
Subtotal M&R Cost	(=)	$401,100
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Assumptions, Additional Calculations, and Data Sources:
Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: STATUS QUO

Electricity		
Consumption per Square Foot (in thousands of Btus)		25.2
Number of Square Feet of Building Space	(X)	124,227
Annual Electricity Consumption (in thousands of Btus)	(=)	3,130,520
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$84,461
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		4.8
Number of Square Feet of Building Space	(X)	124,227
Annual Natural Gas Consumption (in thousands of Btus)	(=)	596,290
Cost per Thousand Btus	(X)	$.00806
Total Annual Natural Gas Cost	(=)	$4,806
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: STATUS QUO

Water		
Number of Units (e.g., square feet, personnel, equipment)		53
Annual Water Use per Unit (in thousands of gallons)	(X)	12.75
Total Annual Water Use	(=)	676
Cost per Thousand Gallons of Water	(X)	$.41
Total Annual Water Cost	(=)	$280
Sewage Treatment		
Total Annual Water Use (from water calculations above)		676
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	473
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.05
Total Annual Sewage Treatment Cost	(=)	$495
TOTAL ANNUAL UTILITY COST	(=)	$90,043

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentage breakdown between electricity and natural gas usage was based on "Storage Type Facilities & Maintenance Facilities" for 1000<HDD<4000 since base is in Region 4. Refering to Sec. 1e,"the Air Force EBFs that are provided in this ETL represent an energy consumption of 50% less than for similar facilities designed in 1975." Since all buildings in analysis were built before 1975, the assumption was made that they use double the energy in the same percentages. Energy costs are basewide average annual costs as reported by the Utilities Engineer; Water consumption (50 gallons per person per shift, 255 workdays per year)and sewage percentage are basewide averages as reported by the Civil Engineering Supervisor; All costs were in FY86 dollars and converted to FY90 dollars using the OSD inflation rates (1.151), Issued 2/86.

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: RENOVATION

Electricity		
Consumption per Square Foot (in thousands of Btus)		12.6
Number of Square Feet of Building Space	(X)	124,227
Annual Electricity Consumption (in thousands of Btus)	(=)	1,565,260
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$42,231
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		2.4
Number of Square Feet of Building Space	(X)	124,227
Annual Natural Gas Consumption (in thousands of Btus)	(=)	298145
Cost per Thousand Btus	(X)	$.00806
Total Annual Natural Gas Cost	(=)	$2,403
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: RENOVATION

Water		
Number of Units (e.g., square feet, personnel, equipment)		53
Annual Water Use per Unit (in thousands of gallons)	(X)	12.75
Total Annual Water Use	(=)	676
Cost per Thousand Gallons of Water	(X)	$.41
Total Annual Water Cost	(=)	$277
Sewage Treatment		
Total Annual Water Use (from water calculations above)		676
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	473
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.05
Total Annual Sewage Treatment Cost	(=)	$497
TOTAL ANNUAL UTILITY COST	(=)	$45,408

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentage breakdown between electricity and natural gas usage was based on "Storage Type Facilities & Maintenance Facilities" for 1000<HDD<4000 since base is in Region 4. The energy budget figure for a storage facility in this region is 15 BTU's per sq.ft annually,((1% DHW x .015)+(15% Heating x .015))= Annual natural gas consumption per square foot, ((19% Vent x .015)+(30% Lighting x .015)+(35% Cooling x .015)= Annual electricity consumption per square foot. Energy costs are basewide average annual costs as reported by the Utilities Engineer; Water consumption (50 gallons per person per shift, 255 workdays per year)and sewage percentage are basewide averages as reported by the Civil Engineering Supervisor; All costs were in FY86 dollars and converted to FY90 dollars using the OSD inflation rates (1.151), Issued 2/86.

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Electricity		
Consumption per Square Foot (in thousands of Btus)		12.6
Number of Square Feet of Building Space	(X)	105,000
Annual Electricity Consumption (in thousands of Btus)	(=)	1,323,000
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$35,695
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		2.4
Number of Square Feet of Building Space	(X)	105,000
Annual Natural Gas Consumption (in thousands of Btus)	(=)	252,000
Cost per Thousand Btus	(X)	$.00806
Total Annual Natural Gas Cost	(=)	$2,031
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Water		
Number of Units (e.g., square feet, personnel, equipment)		46
Annual Water Use per Unit (in thousands of gallons)	(X)	12.75
Total Annual Water Use	(=)	587
Cost per Thousand Gallons of Water	(X)	$.41
Total Annual Water Cost	(=)	$240
Sewage Treatment		
Total Annual Water Use (from water calculations above)		587
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	411
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.05
Total Annual Sewage Treatment Cost	(=)	$431
TOTAL ANNUAL UTILITY COST	(=)	$38,397

Assumptions, Additional Calculations, and Data Sources:

Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentage breakdown between electricity and natural gas usage was based on "Storage Type Facilities & Maintenance Facilities" for 1000<HDD<4000 since base is in Region 4. The energy budget figure for a storage facility in this region is 15 BTU's per sq.ft annually,((1% DHW x .015)+(15% Heating x .015))= Annual natural gas consumption per square foot, ((19% Vent x .015)+(30% Lighting x .015)+(35% Cooling x .015)= Annual electricity consumption per square foot. Energy costs are basewide average annual costs as reported by the Utilities Engineer; Water consumption (50 gallons per person per shift, 255 workdays per year)and sewage percentage are basewide averages as reported by the Civil Engineering Supervisor; All costs were in FY86 dollars and converted to FY90 dollars using the OSD inflation rates (1.151), Issued 2/86.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: STATUS QUO

Protective Storage			
Initial One-Time Costs			
Board Up Doors and Windows			N/A
Disconnect Utilities		(+)	N/A
Minor Repair		(+)	N/A
Other _____		(+)	N/A
Total One-Time Cost		(=)	N/A
Annual O&M Costs			
Annual O&M Cost per Square Foot			N/A
Number of Square Feet		(X)	N/A
Total Annual Cost		(=)	N/A
Trash Removal	Trash Containers Emptied Daily		
~~Annual Tons Generated per Unit (e.g., square feet, personnel)~~	^		12
~~Cost per Ton For Removal~~	Cost Per Container for Removal	(X)	$5.39
~~Annual Cost per Unit~~	Daily Removal Cost	(=)	$64.68
~~Number of Units~~	Number of Working Days per Year	(X)	255
Total Annual Cost		(=)	$16,493
Custodial Services			
Number of Units (e.g., rooms, offices, or square feet)			16,120
Custodial Cost per Unit		(X)	$.82
Subtotal Annual Cost		(=)	$13,218
Other Fixed Costs (costs not based on the number of units)		(+)	$0
Total Annual Cost		(=)	$13,218
Grounds Maintenance			
Annual Cost per Square Foot			N/A
Number of Square Feet		(X)	N/A
Subtotal Annual Cost		(=)	N/A
Other Fixed Costs (costs not based on the number of units)		(+)	N/A
Total Annual Cost		(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Cost per container for trash was obtained from the Service Contract Monitor.
Custodial cost per square foot is a base average.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: RENOVATION

Protective Storage		
Initial One-Time Costs		
Board Up Doors and Windows		N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(+)	N/A
Total One-Time Cost	(=)	N/A
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A

Trash Removal	Trash Containers Emptied Daily		
~~Annual Tons Generated per Unit (e.g., square feet, personnel)~~	^		12
~~Cost per Ton for Removal~~	Cost Per Container for Removal	(X)	$5.39
~~Annual Cost per Unit~~	Daily Removal Cost	(=)	$64.68
~~Number of Units~~	Number of Working Days per Year	(X)	255
Total Annual Cost		(=)	$16,493

Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		16,120
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$13,218
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$13,218

Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Cost per container for trash was obtained from the Service Contract Monitor.
Custodial cost per square foot is a base average.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Protective Storage		
Initial One-Time Costs		
Board Up Doors and Windows		N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(+)	N/A
Total One-Time Cost	(=)	N/A
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal — Trash Containers Emptied Daily		
~~Annual Tons Generated per Unit (e.g., square feet, personnel)~~ ^		6
~~Cost per Ton For Removal~~ — Cost Per Container for Removal	(X)	$5.39
~~Annual Cost per Unit~~ — Daily Removal Cost	(=)	$32.34
~~Number of Units~~ — Number of Working Days per Year	(X)	255
Total Annual Cost	(=)	$8,247
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		10,500
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$8,610
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$8,610
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Cost per container for trash was obtained from the Service Contract Monitor.
Custodial cost per square foot is a base average.

WORKSHEET 5 (OPTIONAL)
Miscellaneous User Costs
(In Program-Year Dollars)
Alternative: STATUS QUO

Transportation

Annual Amount of Vehicle or Equipment Use (in miles or hours)		21,000
Cost per Mile or Hour	(X)	$.281
Total Annual Cost	(=)	$5,901

Furniture, Fixtures and Equipment (Method 1 - Average Cost per Unit)

Number of Units (e.g., rooms, offices or personnel)		N/A
Annual Furniture, Fixtures and Equipment Cost per Unit	(X)	N/A
Total Annual Cost	(=)	N/A

Furniture, Fixtures and Equipment (Method 2 - Itemized Costs)

Items Required	Life Expectancy	Years Required	Cost
Fork Lifts	20 Years	1991, 2011, 2031	$294,000
Handtrucks	10 Years	1991,2001,2011,2021,2031	$75,000
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A

Other (_____)

Number of Units (e.g., rooms, offices, or personnel)		N/A
Cost per Unit	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:

WORKSHEET 5 (OPTIONAL)
Miscellaneous User Costs
(In Program-Year Dollars)
Alternative: RENOVATION

Transportation

Annual Amount of Vehicle or Equipment Use (in miles or hours)		25,500
Cost per Mile or Hour	(X)	$.281
Total Annual Cost	(=)	$7,166

Furniture, Fixtures and Equipment (Method 1 - Average Cost per Unit)

Number of Units (e.g., rooms, offices or personnel)		N/A
Annual Furniture, Fixtures and Equipment Cost per Unit	(X)	N/A
Total Annual Cost	(=)	N/A

Furniture, Fixtures and Equipment (Method 2 - Itemized Costs)

Items Required	Life Expectancy	Years Required	Cost
Fork Lifts	20 Years	1991, 2011, 2031	$357,000
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A

Other (_____)

Number of Units (e.g., rooms, offices, or personnel)		N/A
Cost per Unit	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:

WORKSHEET 5 (OPTIONAL)
Miscellaneous User Costs
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Transportation

Annual Amount of Vehicle or Equipment Use (in miles or hours)		15,000
Cost per Mile or Hour	(X)	$.281
Total Annual Cost	(=)	$4,215

Furniture, Fixtures and Equipment (Method 1 - Average Cost per Unit)

Number of Units (e.g., rooms, offices or personnel)		N/A
Annual Furniture, Fixtures and Equipment Cost per Unit	(X)	N/A
Total Annual Cost	(=)	N/A

Furniture, Fixtures and Equipment (Method 2 - Itemized Costs)

Items Required	Life Expectancy	Years Required	Cost
Fork Lifts	20 Years	1991, 2011, 2031	$210,000
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A
	Years		N/A

Other (_____)

Number of Units (e.g., rooms, offices, or personnel)		N/A
Cost per Unit	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:

WORKSHEET 7 (OPTIONAL)
Quantitative Benefits
(In Program-Year Dollars)
Alternative: RENOVATION

Increase in Productivity		
Annual Labor Cost of Alternative		$920,000
Annual Output of Alternative	(/)	63,750
Average Labor Cost per Unit of Output of Alternative	(=)	$14.43
Annual Labor Cost of Status Quo		$920,000
Annual Output of Status Quo	(/)	61,965
Average Labor Cost per Unit of Output of Status Quo	(=)	$14.85
Average Labor Cost per Unit of Output of Alternative (from above)	(-)	$14.43
Average Labor Cost per Unit of Increased Output	(=)	$.42
Annual Output of Alternative (from above)	(X)	63,750
Total Annual Benefit from Increase in Productivity	(=)	$26,502
Personnel Cost Savings		
Number of Personnel Affected		N/A
Annual Labor Savings per Person Over Status Quo (in hours)	(X)	N/A
Total Annual Labor Savings (in hours)	(=)	N/A
Average Hourly Burdened Rate of Pay	(X)	N/A
Total Annual Benefit From Personnel Cost Savings	(=)	N/A
Fuel Cost Savings		
Annual Reduction in Equipment or Vehicle Use (in miles or hours)		N/A
Average Fuel Consumption per Mile or Hour (in gallons)	(X)	N/A
Total Annual Fuel Savings (in gallons)	(=)	N/A
Price per Gallon	(X)	N/A
Total Annual Benefit From Fuel Cost Savings *	(=)	N/A
Other Cost Savings		
Number of Units Receiving Other Savings		N/A
Annual Savings per Unit Over Status Quo (in _____)	(X)	N/A
Total Annual Savings (in _____)	(=)	N/A
Price per _____	(X)	N/A
Total Annual Benefit From Other Cost Savings	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
The chief supply officer estimated that the existing personnel could meet additional demand for supply requests because of the increased efficiency achieved through the use of forklifts instead of handtrucks in part of the operation.

WORKSHEET 7 (OPTIONAL)
Quantitative Benefits
(In Program-Year Dollars)
Alternative: NEW CONSTRUCTION

Increase in Productivity		
Annual Labor Cost of Alternative		$920,000
Annual Output of Alternative	(/)	76,500
Average Labor Cost per Unit of Output of Alternative	(=)	$12.03
Annual Labor Cost of Status Quo		$920,000
Annual Output of Status Quo *	(/)	61,965
Average Labor Cost per Unit of Output of Status Quo	(=)	$14.85
Average Labor Cost per Unit of Output of Alternative (from above)	(-)	$12.03
Average Labor Cost per Unit of Increased Output	(=)	$2.82
Annual Output of Alternative (from above)	(X)	76,500
Total Annual Benefit from Increase in Productivity	(=)	$215,802
Personnel Cost Savings		
Number of Personnel Affected		N/A
Annual Labor Savings per Person Over Status Quo (in hours)	(X)	N/A
Total Annual Labor Savings (in hours)	(=)	N/A
Average Hourly Burdened Rate of Pay	(X)	N/A
Total Annual Benefit From Personnel Cost Savings	(=)	N/A
Fuel Cost Savings		
Annual Reduction in Equipment or Vehicle Use (in miles or hours)		112
Average Fuel Consumption per Mile or Hour (in gallons)	(X)	23
Total Annual Fuel Savings (in gallons)	(=)	2,576
Price per Gallon	(X)	$1
Total Annual Benefit From Fuel Cost Savings *	(=)	$2,576
Other Cost Savings		
Number of Units Receiving Other Savings		N/A
Annual Savings per Unit Over Status Quo (in _____)	(X)	N/A
Total Annual Savings (in Damages)	(=)	$5,000
Price per _____	(X)	N/A
Total Annual Benefit From Other Cost Savings	(=)	$5,000

Assumptions, Additional Calculations, and Data Sources:
Damages data based on interview with chief supply officer. He estimated that annual damage expense of $10,000 could be halved with consolidated facility. He also estimated that the existing personnel could meet the demand for supply requests because of the increased efficiency achieved by consolidation, by using forklifts

* The fuel cost savings estimate was also made by the chief supply officer and includes fuel, maintenance and repair (both parts and labor), and replacement cost as reported in "1985 Project Image - Base Civil Engineering General Purpose Vehicle Requirements Study."

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: STATUS QUO

Criteria (Specify)	Score	Weight	Weighted Score
Faster Response	2	3	6
Better Accountability	1	2	2
Sensitive Material Handling	2	2	4
Morale	2	1	2
Service & Maintainability	1	2	2
Land Use Compatability	2	1	2
Traffic Considerations	2	2	4
		Total	22

Assumptions and Data Sources:

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: RENOVATION

Criteria (Specify)	Score	Weight	Weighted Score
Faster Response	6	3	18
Better Accountability	3	2	6
Sensitive Material Handling	2	2	4
Morale	5	1	5
Service & Maintainability	7	2	14
Land Use Compatibility	2	1	2
Traffic Considerations	2	2	4
		Total	53

Assumptions and Data Sources:

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: NEW CONSTRUCTION

Criteria (Specify)	Score	Weight	Weighted Score
Faster Response	10	3	30
Better Accountability	8	2	16
Sensitive Material Handling	7	2	14
Morale	10	1	10
Service & Maintainability	10	2	20
Land Use Compatability	10	1	10
Traffic Considerations	7	2	14
		Total	114

Assumptions and Data Sources:

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (Appendix C)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0	1.000	$0	$0
**1991	$180,005	$1,383,136	$90,043	$29,701	$374,901	$0	$2,057,786	.943	$1,941,307	$1,941,307
1992	$180,005	$2,213,326	$90,043	$29,701	$5,901	$0	$2,518,976	.890	$2,241,880	$4,183,187
1993	$180,005	$668,014	$90,043	$29,701	$5,901	$0	$973,664	.840	$817,507	$5,000,694
1994	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.792	$242,104	$5,242,798
1995	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.747	$228,400	$5,471,197
1996	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.705	$215,471	$5,686,669
1997	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.665	$203,275	$5,889,943
1998	$180,005	$0	$90,043	$29,701	$5,901	$0	$305,650	.627	$191,769	$6,081,712
1999	$180,005	$483,160	$90,043	$29,701	$5,901	$0	$788,810	.592	$466,896	$6,548,608
2000	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.558	$157,284	$6,705,891
2001	$156,026	$442,511	$90,043	$29,701	$80,901	$0	$799,182	.527	$420,999	$7,126,891
2002	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.497	$139,982	$7,266,872
2003	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.469	$132,058	$7,398,931
2004	$156,026	$423,000	$90,043	$29,701	$5,901	$0	$704,671	.442	$311,677	$7,710,608
2005	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.417	$117,532	$7,828,139
2006	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.394	$110,879	$7,939,018
2007	$156,026	$695,043	$90,043	$29,701	$5,901	$0	$976,714	.371	$362,717	$8,301,735
2008	$156,026	$0	$90,043	$29,701	$5,901	$0	$281,671	.350	$98,682	$8,400,417
2009	$156,026	$1,599,880	$90,043	$29,701	$5,901	$0	$1,881,551	.331	$621,877	$9,022,294
2010	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.312	$83,276	$9,105,570
2011	$141,432	$521,282	$90,043	$29,701	$374,901	$0	$1,157,360	.294	$340,444	$9,446,014
2012	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.278	$74,115	$9,520,129
2013	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.262	$69,920	$9,590,049
2014	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.247	$65,962	$9,656,012
2015	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.233	$62,229	$9,718,241

* Program year; include capital investment in first row of Column 7.

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (Appendix C)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.220	$58,706	$9,776,947
2017	$141,432	$3,045,833	$90,043	$29,701	$5,901	$0	$3,312,911	.207	$686,991	$10,463,939
2018	$141,432	$668,014	$90,043	$29,701	$5,901	$0	$935,091	.196	$182,932	$10,646,871
2019	$141,432	$1,098,860	$90,043	$29,701	$5,901	$0	$1,365,938	.185	$252,093	$10,898,964
2020	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.174	$46,501	$10,945,465
2021	$141,432	$1,031,753	$90,043	$29,701	$80,901	$0	$1,373,830	.164	$225,658	$11,171,123
2022	$141,432	$695,043	$90,043	$29,701	$5,901	$0	$962,121	.155	$149,088	$11,320,211
2023	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.146	$39,043	$11,359,254
2024	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.138	$36,833	$11,396,087
2025	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.130	$34,748	$11,430,835
2026	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.123	$32,781	$11,463,616
2027	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.116	$30,926	$11,494,542
2028	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.109	$29,175	$11,523,717
2029	$141,432	$269,310	$90,043	$29,701	$5,901	$0	$536,388	.103	$55,278	$11,578,995
2030	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.097	$25,966	$11,604,961
2031	$141,432	$793,894	$90,043	$29,701	$374,901	$0	$1,429,971	.092	$131,156	$11,736,117
2032	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.087	$23,110	$11,759,226
2033	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.082	$21,801	$11,781,028
2034	$141,432	$2,097,140	$90,043	$29,701	$5,901	$0	$2,364,218	.077	$182,066	$11,963,094
2035	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.073	$19,403	$11,982,497
2036	$141,432	$586,090	$90,043	$29,701	$5,901	$0	$853,168	.069	$58,474	$12,040,971
2037	$141,432	$695,043	$90,043	$29,701	$5,901	$0	$962,121	.065	$62,209	$12,103,180
2038	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.061	$16,291	$12,119,472
2039	$141,432	$483,160	$90,043	$29,701	$5,901	$0	$750,238	.058	$43,173	$12,162,645
2040	$141,432	$0	$90,043	$29,701	$5,901	$0	$267,078	.054	$14,499	$12,177,144
Total	$7,564,709	$19,893,490	$4,502,149	$1,485,066	$1,552,050	$0	$34,997,464		$12,177,144	

FORM S-1
Total Life-Cycle Costs
Alternative: RENOVATION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (Appendix C)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
*1990							$4,850,000 *	1.000	$4,850,000	$4,850,000
**1991	$121,390	$0	$45,408	$29,701	$364,166	$0	$560,664	.943	$528,928	$5,378,928
1992	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.890	$181,260	$5,560,188
1993	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.840	$171,000	$5,731,189
1994	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.792	$161,321	$5,892,510
1995	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.747	$152,190	$6,044,699
1996	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.705	$143,575	$6,188,274
1997	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.665	$135,448	$6,323,722
1998	$121,390	$0	$45,408	$29,701	$7,166	$0	$203,664	.627	$127,781	$6,451,504
1999	$121,390	$0	$45,408	$29,701	$7,166	$0	$3,153,664 *	.592	$1,866,649	$8,318,152
2000	$107,031	$711,821	$45,408	$29,701	$7,166	$0	$901,126	.558	$503,184	$8,821,337
2001	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.527	$99,724	$8,921,060
2002	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.497	$94,079	$9,015,140
2003	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.469	$88,754	$9,103,893
2004	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.442	$83,730	$9,187,623
2005	$107,031	$1,118,043	$45,408	$29,701	$7,166	$0	$1,307,349	.417	$545,511	$9,733,134
2006	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.394	$74,519	$9,807,654
2007	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.371	$70,301	$9,877,955
2008	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.350	$66,322	$9,944,277
2009	$107,031	$0	$45,408	$29,701	$7,166	$0	$189,306	.331	$62,568	$10,006,845
2010	$146,647	$838,532	$45,408	$29,701	$7,166	$0	$1,067,453	.312	$332,837	$10,339,682
2011	$146,647	$0	$45,408	$29,701	$364,166	$0	$585,921	.294	$172,352	$10,512,034
2012	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.278	$63,527	$10,575,561
2013	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.262	$59,931	$10,635,491
2014	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.247	$56,539	$10,692,030
2015	$146,647	$1,549,111	$45,408	$29,701	$7,166	$0	$1,778,032	.233	$414,279	$11,106,309

* Program year; include capital investment in first row of Column 7.

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: RENOVATION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (Appendix C)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
2016	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.220	$50,319	$11,156,628
2017	$146,647	$2,750,826	$45,408	$29,701	$7,166	$0	$2,979,747	.207	$617,904	$11,774,532
2018	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.196	$44,784	$11,819,316
2019	$146,647	$0	$45,408	$29,701	$7,166	$0	$228,921	.185	$42,249	$11,861,565
2020	$173,519	$2,777,716	$45,408	$29,701	$7,166	$0	$3,033,509	.174	$528,165	$12,389,729
2021	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.164	$42,015	$12,431,745
2022	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.155	$39,637	$12,471,382
2023	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.146	$37,393	$12,508,775
2024	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.138	$35,277	$12,544,052
2025	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.130	$33,280	$12,577,332
2026	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.123	$31,396	$12,608,728
2027	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.116	$29,619	$12,638,347
2028	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.109	$27,943	$12,666,290
2029	$173,519	$0	$45,408	$29,701	$7,166	$0	$255,793	.103	$26,361	$12,692,651
2030	$180,005	$838,532	$45,408	$29,701	$7,166	$0	$1,100,811	.097	$107,023	$12,799,674
2031	$180,005	$0	$45,408	$29,701	$364,166	$0	$619,279	.092	$56,800	$12,856,474
2032	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.087	$22,694	$12,879,168
2033	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.082	$21,410	$12,900,578
2034	$180,005	$1,674,140	$45,408	$29,701	$7,166	$0	$1,936,419	.077	$149,122	$13,049,700
2035	$180,005	$1,556,564	$45,408	$29,701	$7,166	$0	$1,818,844	.073	$132,139	$13,181,839
2036	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.069	$17,976	$13,199,815
2037	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.065	$16,959	$13,216,774
2038	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.061	$15,999	$13,232,772
2039	$180,005	$0	$45,408	$29,701	$7,166	$0	$262,279	.058	$15,093	$13,247,865
2040	$180,005	$4,228,687	$45,408	$29,701	#REF!	$0	$4,483,801	.054	$243,418	$13,491,283
Total	$7,344,529	$18,043,972	$2,270,375	$1,485,066	$1,422,110	$0	$38,366,051		$13,491,283	

FORM S-1
Total Life-Cycle Costs
Alternative: NEW CONSTRUCTION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (Appendix C)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$7,600,000	1.000	$7,600,000	$7,600,000
**1991	$72,450	$0	$38,397	$16,857	$214,215	$0	$341,919	.943	$322,565	$7,922,565
1992	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.890	$117,407	$8,039,972
1993	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.840	$110,762	$8,150,734
1994	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.792	$104,492	$8,255,226
1995	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.747	$98,577	$8,353,804
1996	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.705	$92,998	$8,446,801
1997	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.665	$87,734	$8,534,535
1998	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.627	$82,768	$8,617,302
1999	$72,450	$0	$38,397	$16,857	$4,215	$0	$131,919	.592	$78,083	$8,695,385
2000	$101,430	$601,650	$38,397	$16,857	$4,215	$0	$762,549	.558	$425,803	$9,121,188
2001	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.527	$84,760	$9,205,948
2002	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.497	$79,962	$9,285,910
2003	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.469	$75,436	$9,361,345
2004	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.442	$71,166	$9,432,511
2005	$101,430	$945,000	$38,397	$16,857	$4,215	$0	$1,105,899	.417	$461,453	$9,893,964
2006	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.394	$63,337	$9,957,301
2007	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.371	$59,752	$10,017,053
2008	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.350	$56,370	$10,073,423
2009	$101,430	$0	$38,397	$16,857	$4,215	$0	$160,899	.331	$53,179	$10,126,603
2010	$137,655	$708,750	$38,397	$16,857	$4,215	$0	$905,874	.312	$282,456	$10,409,058
2011	$137,655	$0	$38,397	$16,857	$214,215	$0	$407,124	.294	$119,758	$10,528,816
2012	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.278	$54,703	$10,583,519
2013	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.262	$51,606	$10,635,125
2014	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.247	$48,685	$10,683,811
2015	$137,655	$1,309,350	$38,397	$16,857	$4,215	$0	$1,506,474	.233	$351,006	$11,034,817

* Program year; include capital investment in first row of Column 7.

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: NEW CONSTRUCTION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (Appendix C)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.220	$43,330	$11,078,147
2017	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.207	$40,877	$11,119,024
2018	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.196	$38,563	$11,157,588
2019	$137,655	$0	$38,397	$16,857	$4,215	$0	$197,124	.185	$36,381	$11,193,968
2020	$152,145	$2,347,800	$38,397	$16,857	$4,215	$0	$2,559,414	.174	$445,620	$11,639,588
2021	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.164	$34,759	$11,674,347
2022	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.155	$32,791	$11,707,138
2023	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.146	$30,935	$11,738,073
2024	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.138	$29,184	$11,767,257
2025	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.130	$27,532	$11,794,789
2026	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.123	$25,974	$11,820,762
2027	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.116	$24,503	$11,845,266
2028	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.109	$23,116	$11,868,382
2029	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.103	$21,808	$11,890,190
2030	$152,145	$708,750	$38,397	$16,857	$4,215	$0	$920,364	.097	$89,480	$11,979,670
2031	$152,145	$0	$38,397	$16,857	$214,215	$0	$421,614	.092	$38,670	$12,018,340
2032	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.087	$18,310	$12,036,651
2033	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.082	$17,274	$12,053,925
2034	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.077	$16,296	$12,070,221
2035	$152,145	$945,000	$38,397	$16,857	$4,215	$0	$1,156,614	.073	$84,028	$12,154,249
2036	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.069	$14,504	$12,168,752
2037	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.065	$13,683	$12,182,435
2038	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.061	$12,908	$12,195,343
2039	$152,145	$0	$38,397	$16,857	$4,215	$0	$211,614	.058	$12,177	$12,207,521
2040	$152,145	$3,574,200	$38,397	$16,857	$4,215	$0	$3,785,814	.054	$205,526	$12,413,046
Total	$6,237,945	$11,140,500	$1,919,860	$842,835	$840,750	$0	$28,581,890		$12,413,046	

FORM S-2
Total Life-Cycle Benefits
Alternative: RENOVATION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (Appendix C)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	$26,502	N/A	N/A	N/A	$26,502	.943	$25,002	$25,002
1992	$26,502	N/A	N/A	N/A	$26,502	.890	$23,587	$48,589
1993	$26,502	N/A	N/A	N/A	$26,502	.840	$22,252	$70,840
1994	$26,502	N/A	N/A	N/A	$26,502	.792	$20,992	$91,832
1995	$26,502	N/A	N/A	N/A	$26,502	.747	$19,804	$111,636
1996	$26,502	N/A	N/A	N/A	$26,502	.705	$18,683	$130,319
1997	$26,502	N/A	N/A	N/A	$26,502	.665	$17,625	$147,945
1998	$26,502	N/A	N/A	N/A	$26,502	.627	$16,628	$164,572
1999	$26,502	N/A	N/A	N/A	$26,502	.592	$15,687	$180,259
2000	$26,502	N/A	N/A	N/A	$26,502	.558	$14,799	$195,057
2001	$26,502	N/A	N/A	N/A	$26,502	.527	$13,961	$209,018
2002	$26,502	N/A	N/A	N/A	$26,502	.497	$13,171	$222,189
2003	$26,502	N/A	N/A	N/A	$26,502	.469	$12,425	$234,614
2004	$26,502	N/A	N/A	N/A	$26,502	.442	$11,722	$246,336
2005	$26,502	N/A	N/A	N/A	$26,502	.417	$11,058	$257,395
2006	$26,502	N/A	N/A	N/A	$26,502	.394	$10,432	$267,827
2007	$26,502	N/A	N/A	N/A	$26,502	.371	$9,842	$277,669
2008	$26,502	N/A	N/A	N/A	$26,502	.350	$9,285	$286,954
2009	$26,502	N/A	N/A	N/A	$26,502	.331	$8,759	$295,713
2010	$26,502	N/A	N/A	N/A	$26,502	.312	$8,263	$303,977
2011	$26,502	N/A	N/A	N/A	$26,502	.294	$7,796	$311,772
2012	$26,502	N/A	N/A	N/A	$26,502	.278	$7,354	$319,127
2013	$26,502	N/A	N/A	N/A	$26,502	.262	$6,938	$326,065
2014	$26,502	N/A	N/A	N/A	$26,502	.247	$6,545	$332,610
2015	$26,502	N/A	N/A	N/A	$26,502	.233	$6,175	$338,785

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: RENOVATION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (Appendix C)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	$26,502	N/A	N/A	N/A	$26,502	.220	$5,825	$344,611
2017	$26,502	N/A	N/A	N/A	$26,502	.207	$5,496	$350,106
2018	$26,502	N/A	N/A	N/A	$26,502	.196	$5,185	$355,291
2019	$26,502	N/A	N/A	N/A	$26,502	.185	$4,891	$360,182
2020	$26,502	N/A	N/A	N/A	$26,502	.174	$4,614	$364,796
2021	$26,502	N/A	N/A	N/A	$26,502	.164	$4,353	$369,149
2022	$26,502	N/A	N/A	N/A	$26,502	.155	$4,107	$373,256
2023	$26,502	N/A	N/A	N/A	$26,502	.146	$3,874	$377,130
2024	$26,502	N/A	N/A	N/A	$26,502	.138	$3,655	$380,785
2025	$26,502	N/A	N/A	N/A	$26,502	.130	$3,448	$384,233
2026	$26,502	N/A	N/A	N/A	$26,502	.123	$3,253	$387,486
2027	$26,502	N/A	N/A	N/A	$26,502	.116	$3,069	$390,555
2028	$26,502	N/A	N/A	N/A	$26,502	.109	$2,895	$393,450
2029	$26,502	N/A	N/A	N/A	$26,502	.103	$2,731	$396,181
2030	$26,502	N/A	N/A	N/A	$26,502	.097	$2,577	$398,758
2031	$26,502	N/A	N/A	N/A	$26,502	.092	$2,431	$401,189
2032	$26,502	N/A	N/A	N/A	$26,502	.087	$2,293	$403,482
2033	$26,502	N/A	N/A	N/A	$26,502	.082	$2,163	$405,645
2034	$26,502	N/A	N/A	N/A	$26,502	.077	$2,041	$407,686
2035	$26,502	N/A	N/A	N/A	$26,502	.073	$1,925	$409,611
2036	$26,502	N/A	N/A	N/A	$26,502	.069	$1,816	$411,428
2037	$26,502	N/A	N/A	N/A	$26,502	.065	$1,714	$413,141
2038	$26,502	N/A	N/A	N/A	$26,502	.061	$1,617	$414,758
2039	$26,502	N/A	N/A	N/A	$26,502	.058	$1,525	$416,283
2040	$26,502	N/A	N/A	N/A	$26,502	.054	$1,439	$417,722
Total	$1,325,103	N/A	N/A	N/A	$1,325,103		$417,722	

FORM S-2
Total Life-Cycle Benefits
Alternative: NEW CONSTRUCTION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (Appendix C)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	$215,802	N/A	$2,576	$5,000	$223,378	.943	$210,734	$210,734
1992	$215,802	N/A	$2,576	$5,000	$223,378	.890	$198,806	$409,540
1993	$215,802	N/A	$2,576	$5,000	$223,378	.840	$187,553	$597,092
1994	$215,802	N/A	$2,576	$5,000	$223,378	.792	$176,936	$774,029
1995	$215,802	N/A	$2,576	$5,000	$223,378	.747	$166,921	$940,950
1996	$215,802	N/A	$2,576	$5,000	$223,378	.705	$157,473	$1,098,422
1997	$215,802	N/A	$2,576	$5,000	$223,378	.665	$148,559	$1,246,981
1998	$215,802	N/A	$2,576	$5,000	$223,378	.627	$140,150	$1,387,132
1999	$215,802	N/A	$2,576	$5,000	$223,378	.592	$132,217	$1,519,349
2000	$215,802	N/A	$2,576	$5,000	$223,378	.558	$124,733	$1,644,082
2001	$215,802	N/A	$2,576	$5,000	$223,378	.527	$117,673	$1,761,755
2002	$215,802	N/A	$2,576	$5,000	$223,378	.497	$111,012	$1,872,767
2003	$215,802	N/A	$2,576	$5,000	$223,378	.469	$104,728	$1,977,495
2004	$215,802	N/A	$2,576	$5,000	$223,378	.442	$98,800	$2,076,295
2005	$215,802	N/A	$2,576	$5,000	$223,378	.417	$93,208	$2,169,503
2006	$215,802	N/A	$2,576	$5,000	$223,378	.394	$87,932	$2,257,435
2007	$215,802	N/A	$2,576	$5,000	$223,378	.371	$82,955	$2,340,390
2008	$215,802	N/A	$2,576	$5,000	$223,378	.350	$78,259	$2,418,649
2009	$215,802	N/A	$2,576	$5,000	$223,378	.331	$73,829	$2,492,478
2010	$215,802	N/A	$2,576	$5,000	$223,378	.312	$69,650	$2,562,129
2011	$215,802	N/A	$2,576	$5,000	$223,378	.294	$65,708	$2,627,837
2012	$215,802	N/A	$2,576	$5,000	$223,378	.278	$61,989	$2,689,825
2013	$215,802	N/A	$2,576	$5,000	$223,378	.262	$58,480	$2,748,305
2014	$215,802	N/A	$2,576	$5,000	$223,378	.247	$55,170	$2,803,474
2015	$215,802	N/A	$2,576	$5,000	$223,378	.233	$52,047	$2,855,521

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: NEW CONSTRUCTION
SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (Appendix C)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	$215,802	N/A	$2,576	$5,000	$223,378	.220	$49,101	$2,904,622
2017	$215,802	N/A	$2,576	$5,000	$223,378	.207	$46,321	$2,950,943
2018	$215,802	N/A	$2,576	$5,000	$223,378	.196	$43,699	$2,994,643
2019	$215,802	N/A	$2,576	$5,000	$223,378	.185	$41,226	$3,035,869
2020	$215,802	N/A	$2,576	$5,000	$223,378	.174	$38,892	$3,074,761
2021	$215,802	N/A	$2,576	$5,000	$223,378	.164	$36,691	$3,111,452
2022	$215,802	N/A	$2,576	$5,000	$223,378	.155	$34,614	$3,146,066
2023	$215,802	N/A	$2,576	$5,000	$223,378	.146	$32,655	$3,178,721
2024	$215,802	N/A	$2,576	$5,000	$223,378	.138	$30,806	$3,209,527
2025	$215,802	N/A	$2,576	$5,000	$223,378	.130	$29,063	$3,238,590
2026	$215,802	N/A	$2,576	$5,000	$223,378	.123	$27,418	$3,266,008
2027	$215,802	N/A	$2,576	$5,000	$223,378	.116	$25,866	$3,291,873
2028	$215,802	N/A	$2,576	$5,000	$223,378	.109	$24,402	$3,316,275
2029	$215,802	N/A	$2,576	$5,000	$223,378	.103	$23,020	$3,339,295
2030	$215,802	N/A	$2,576	$5,000	$223,378	.097	$21,717	$3,361,013
2031	$215,802	N/A	$2,576	$5,000	$223,378	.092	$20,488	$3,381,501
2032	$215,802	N/A	$2,576	$5,000	$223,378	.087	$19,328	$3,400,829
2033	$215,802	N/A	$2,576	$5,000	$223,378	.082	$18,234	$3,419,063
2034	$215,802	N/A	$2,576	$5,000	$223,378	.077	$17,202	$3,436,265
2035	$215,802	N/A	$2,576	$5,000	$223,378	.073	$16,228	$3,452,494
2036	$215,802	N/A	$2,576	$5,000	$223,378	.069	$15,310	$3,467,804
2037	$215,802	N/A	$2,576	$5,000	$223,378	.065	$14,443	$3,482,247
2038	$215,802	N/A	$2,576	$5,000	$223,378	.061	$13,626	$3,495,872
2039	$215,802	N/A	$2,576	$5,000	$223,378	.058	$12,854	$3,508,727
2040	$215,802	N/A	$2,576	$5,000	$223,378	.054	$12,127	$3,520,854
Total	$10,790,123	N/A	$128,779	$250,000	$11,168,903		$3,520,854	

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: EMF-536 Office Spaces

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: 75 Years		
Years M&R Would Be Required		

Roofing

M&R Cost per Square Foot		$2.30
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$157,550
Life Expectancy: 15 Years		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$13.27
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$908,995
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$18.86
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$1,291,910
Life Expectancy: 10 Years		
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040		

Ceiling Finishes

M&R Cost per Square Foot		$8.63
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$591,155
Life Expectancy: 20 Years		
Years M&R Would Be Required 2010, 2030		

Elevators

M&R Cost per Square Foot		$5.03
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$344,555
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: EMF-536 Office Spaces

Fire Protection Equipment

M&R Cost per Square Foot		$.52
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$35,620
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

HVAC

M&R Cost per Square Foot		$18.99
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$1,300,815
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Plumbing

M&R Cost per Square Foot		$2.07
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$141,795
Life Expectancy: 40 Years		
Years M&R Would Be Required 2035		

Electrical

M&R Cost per Square Foot		$14.50
Number of Square Feet of Building Space	(X)	68,500
Subtotal M&R Cost	(=)	$993,250
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Assumptions, Additional Calculations, and Data Sources:
Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 3

Utility Costs

(In Program Year Dollars)

Alternative: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS

Water		
Number of Units (e.g., square feet, personnel, equipment)		N/A
Annual Water Use per Unit (in thousands of gallons)	(X)	N/A
Total Annual Water Use	(=)	N/A
Cost per Thousand Gallons of Water	(X)	N/A
Total Annual Water Cost	(=)	N/A
Sewage Treatment		
Total Annual Water Use (from water calculations above)		N/A
Ratio of Sewage Treatment to Water Use	(X)	N/A
Total Annual Sewage Treatment	(=)	N/A
Cost per Thousand Gallons of Sewage Treatment	(X)	N/A
Total Annual Sewage Treatment Cost	(=)	N/A
TOTAL ANNUAL UTILITY COST	(=)	$85,257

Assumptions, Additional Calculations, and Data Sources:

Energy consumption data from metering of existing on-base trailers. Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are not calculated; costs would be similar in the 56 trailers or in the Status Quo alternative; All Costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-18,000 SF Conf Space

Electricity		
Consumption per Square Foot (in thousands of Btus)		24.5
Number of Square Feet of Building Space	(X)	18,000
Annual Electricity Consumption (in thousands of Btus)	(=)	441,000
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$11,898
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		10.5
Number of Square Feet of Building Space	(X)	18,000
Annual Natural Gas Consumption (in thousands of Btus)	(=)	189,000
Cost per Thousand Btus	(X)	$.00668
Total Annual Natural Gas Cost	(=)	$1,263
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3

Utility Costs

(In Program-Year Dollars)

Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-18,000 SF Conf Space

Water		
Number of Units (e.g., square feet, personnel, equipment)		N/A
Annual Water Use per Unit (in thousands of gallons)	(X)	N/A
Total Annual Water Use	(=)	N/A
Cost per Thousand Gallons of Water	(X)	N/A
Total Annual Water Cost	(=)	N/A
Sewage Treatment		
Total Annual Water Use (from water calculations above)		N/A
Ratio of Sewage Treatment to Water Use	(X)	N/A
Total Annual Sewage Treatment	(=)	N/A
Cost per Thousand Gallons of Sewage Treatment	(X)	N/A
Total Annual Sewage Treatment Cost	(=)	N/A
TOTAL ANNUAL UTILITY COST	(=)	$13,161

Assumptions, Additional Calculations, and Data Sources:

Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentages of electricity and natural gas usage (70% electricity-30% gas) is base average; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are calculated on the base average of 40 gallons per person per day the Status Quo alternative; All costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: STATUS QUO, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-Existing Permanent Facilities

Electricity		
Consumption per Square Foot (in thousands of Btus)		49.0
Number of Square Feet of Building Space	(X)	40,000
Annual Electricity Consumption (in thousands of Btus)	(=)	1,960,000
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$52,881
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		21.0
Number of Square Feet of Building Space	(X)	40,000
Annual Natural Gas Consumption (in thousands of Btus)	(=)	840,000
Cost per Thousand Btus	(X)	$.00668
Total Annual Natural Gas Cost	(=)	$5,611
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3

Utility Costs

(In Program-Year Dollars)

Alternative: STATUS QUO, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-Existing Permanent Facilities

Water		
Number of Units (e.g., square feet, personnel, equipment)		471
Annual Water Use per Unit (in thousands of gallons)	(X)	10.4
Total Annual Water Use	(=)	4,898
Cost per Thousand Gallons of Water	(X)	$1.77
Total Annual Water Cost	(=)	$8,652
Sewage Treatment		
Total Annual Water Use (from water calculations above)		4,898
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	3,429
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.63
Total Annual Sewage Treatment Cost	(=)	$5,593
TOTAL ANNUAL UTILITY COST	(=)	$72,737

Assumptions, Additional Calculations, and Data Sources:

Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentages of electricity and natural gas usage (70% electricity-30% gas) is base average; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are calculated on the base average of 40 gallons per person per day the Status Quo alternative; All costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: COMB NEW/EXISTING BLDGS-240 Office Spaces

Electricity		
Consumption per Square Foot (in thousands of Btus)		24.5
Number of Square Feet of Building Space	(X)	30,685
Annual Electricity Consumption (in thousands of Btus)	(=)	751,783
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$20,283
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		10.5
Number of Square Feet of Building Space	(X)	30,685
Annual Natural Gas Consumption (in thousands of Btus)	(=)	322,193
Cost per Thousand Btus	(X)	$.00668
Total Annual Natural Gas Cost	(=)	$2,152
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 2

Periodic Maintenance, Repair, and Replacement Costs

(In Program-Year Dollars)

Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-18,000 SF Conf Space

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A

Life Expectancy: 75 Years

Years M&R Would Be Required _____

Roofing

M&R Cost per Square Foot		$7.16
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$128,880

Life Expectancy: 15 Years

Years M&R Would Be Required 2005, 2020, 2035

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$15.64
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$281,520

Life Expectancy: 50 Years

Years M&R Would Be Required 2040

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$19.36
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$348,480

Life Expectancy: 10 Years

Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040

Ceiling Finishes

M&R Cost per Square Foot		$6.86
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$123,480

Life Expectancy: 20 Years

Years M&R Would Be Required 2010, 2030

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A

Life Expectancy: _____ Years

Years M&R Would Be Required _____

WORKSHEET 2

Periodic Maintenance, Repair, and Replacement Costs

(In Program-Year Dollars)

Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-18,000 SF Conf Space

Fire Protection Equipment

M&R Cost per Square Foot		$.50
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$9,000
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

HVAC

M&R Cost per Square Foot		$12.48
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$224,640
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Plumbing

M&R Cost per Square Foot		$5.66
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$101,880
Life Expectancy: 40 Years		
Years M&R Would Be Required 2035		

Electrical

M&R Cost per Square Foot		$5.34
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$96,120
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		$2.96
Number of Square Feet of Building Space	(X)	18,000
Subtotal M&R Cost	(=)	$53,280
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Assumptions, Additional Calculations, and Data Sources:

Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 2

Periodic Maintenance, Repair, and Replacement Costs

(In Program-Year Dollars)

Alternative: STATUS QUO, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-Existing Permanent Facilities

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		$19.17
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$766,800

Life Expectancy: 75 Years

Years M&R Would Be Required 2025

Roofing

M&R Cost per Square Foot		$2.30
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$92,000

Life Expectancy: 15 Years

Years M&R Would Be Required 1992, 2007, 2022, 2037

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$13.27
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$530,800

Life Expectancy: 50 Years

Years M&R Would Be Required 2000

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$18.86
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$754,400

Life Expectancy: 10 Years

Years M&R Would Be Required 1991, 2001, 2011, 2021, 2031

Ceiling Finishes

M&R Cost per Square Foot		$8.63
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$345,200

Life Expectancy: 20 Years

Years M&R Would Be Required 1991, 2011, 2031

Elevators

M&R Cost per Square Foot		$5.03
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$201,200

Life Expectancy: 40 Years

Years M&R Would Be Required 1991, 2031

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: STATUS QUO, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-Existing Permanent Facilities

Fire Protection Equipment

M&R Cost per Square Foot		$.52
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$20,800

Life Expectancy: 50 Years
Years M&R Would Be Required 1992

HVAC

M&R Cost per Square Foot		$18.99
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$759,600

Life Expectancy: 25 Years
Years M&R Would Be Required 1993, 2018

Plumbing

M&R Cost per Square Foot		$2.07
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$82,800

Life Expectancy: 40 Years
Years M&R Would Be Required 1991, 2031

Electrical

M&R Cost per Square Foot		$14.50
Number of Square Feet of Building Space	(X)	40,000
Subtotal M&R Cost	(=)	$580,000

Life Expectancy: 30 Years
Years M&R Would Be Required 1991, 2021

Special Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of Building Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A

Life Expectancy: 25 Years
Years M&R Would Be Required 1992, 2017

Assumptions, Additional Calculations, and Data Sources:
Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: COMB NEW/EXISTING BLDGS-240 Office Spaces

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: 75 Years		
Years M&R Would Be Required _____		

Roofing

M&R Cost per Square Foot		$2.30
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$70,576
Life Expectancy: 15 Years		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$13.27
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$407,190
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$18.86
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$578,719
Life Expectancy: 10 Years		
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040		

Ceiling Finishes

M&R Cost per Square Foot		$8.63
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$264,812
Life Expectancy: 20 Years		
Years M&R Would Be Required 2010, 2030		

Elevators

M&R Cost per Square Foot		$5.03
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$154,346
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: COMB NEW/EXISTING BLDGS-240 Office Spaces

Fire Protection Equipment

M&R Cost per Square Foot		$.52
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$15,956
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

HVAC

M&R Cost per Square Foot		$18.99
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$582,708
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Plumbing

M&R Cost per Square Foot		$2.07
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$63,518
Life Expectancy: 40 Years		
Years M&R Would Be Required 2035		

Electrical

M&R Cost per Square Foot		$14.50
Number of Square Feet of Building Space	(X)	30,685
Subtotal M&R Cost	(=)	$444,933
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

Assumptions, Additional Calculations, and Data Sources:
Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: EMF-536 Office Spaces

Electricity		
Consumption per Square Foot (in thousands of Btus)		24.5
Number of Square Feet of Building Space	(X)	68,500
Annual Electricity Consumption (in thousands of Btus)	(=)	1,678,250
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$45,279
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		10.5
Number of Square Feet of Building Space	(X)	68,500
Annual Natural Gas Consumption (in thousands of Btus)	(=)	719,250
Cost per Thousand Btus	(X)	$.00668
Total Annual Natural Gas Cost	(=)	$4,805
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: EMF-536 Office Spaces

Water		
Number of Units (e.g., square feet, personnel, equipment)		536
Annual Water Use per Unit (in thousands of gallons)	(X)	10.4
Total Annual Water Use	(=)	5,574
Cost per Thousand Gallons of Water	(X)	$1.77
Total Annual Water Cost	(=)	$9,846
Sewage Treatment		
Total Annual Water Use (from water calculations above)		5,574
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	3,902
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.63
Total Annual Sewage Treatment Cost	(=)	$6,365
TOTAL ANNUAL UTILITY COST	(=)	$66,295

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentages of electricity and natural gas usage (70% electricity-30% gas) is base average; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are calculated on the base average of 40 gallons per person per day the Status Quo alternative; All costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program Year Dollars)
Alternative: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS

Electricity		
Consumption per Square Foot (in thousands of Btus)		79.0
Number of Square Feet of Building Space	(X)	40,000
Annual Electricity Consumption (in thousands of Btus)	(=)	3,160,000
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$85,257
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Natural Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Natural Gas Cost	(=)	N/A
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: COMB NEW/EXISTING BLDGS-240 Office Spaces

Water		
Number of Units (e.g., square feet, personnel, equipment)		65
Annual Water Use per Unit (in thousands of gallons)	(X)	10.4
Total Annual Water Use	(=)	676
Cost per Thousand Gallons of Water	(X)	$1.77
Total Annual Water Cost	(=)	$1,194
Sewage Treatment		
Total Annual Water Use (from water calculations above)		676
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	473
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.63
Total Annual Sewage Treatment Cost	(=)	$772
TOTAL ANNUAL UTILITY COST	(=)	$24,401

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentages of electricity and natural gas usage (70% electricity-30% gas) is base average; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are calculated on the base average of 40 gallons per person per day the Status Quo alternative; All costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: STATUS QUO, COMB NEW/LEASE-Existing 13 Trailers

Electricity		
Consumption per Square Foot (in thousands of Btus)		79.0
Number of Square Feet of Building Space	(X)	9,282
Annual Electricity Consumption (in thousands of Btus)	(=)	733,278
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$19,784
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Natural Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Natural Gas Cost	(=)	N/A
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: STATUS QUO, COMB NEW/LEASE-Existing 13 Trailers

Water		
Number of Units (e.g., square feet, personnel, equipment)		N/A
Annual Water Use per Unit (in thousands of gallons)	(X)	N/A
Total Annual Water Use	(=)	N/A
Cost per Thousand Gallons of Water	(X)	N/A
Total Annual Water Cost	(=)	N/A
Sewage Treatment		
Total Annual Water Use (from water calculations above)		N/A
Ratio of Sewage Treatment to Water Use	(X)	N/A
Total Annual Sewage Treatment	(=)	N/A
Cost per Thousand Gallons of Sewage Treatment	(X)	N/A
Total Annual Sewage Treatment Cost	(=)	N/A
TOTAL ANNUAL UTILITY COST	(=)	$19,784

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from metering of existing on-base trailers. Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are calculated on the base average of 40 gallons per person per day the Status Quo alternative; All costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: COMB NEW/LEASE-30 Additional Trailers

Electricity		
Consumption per Square Foot (in thousands of Btus)		79.0
Number of Square Feet of Building Space	(X)	30,702
Annual Electricity Consumption (in thousands of Btus)	(=)	2,425,458
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$65,439
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Natural Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Natural Gas Cost	(=)	N/A
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: COMB NEW/LEASE-30 Additional Trailers

Water		
Number of Units (e.g., square feet, personnel, equipment)		65
Annual Water Use per Unit (in thousands of gallons)	(X)	10.4
Total Annual Water Use	(=)	676
Cost per Thousand Gallons of Water	(X)	$1.77
Total Annual Water Cost	(=)	$1,194
Sewage Treatment		
Total Annual Water Use (from water calculations above)		676
Ratio of Sewage Treatment to Water Use	(X)	70%
Total Annual Sewage Treatment	(=)	473
Cost per Thousand Gallons of Sewage Treatment	(X)	$1.63
Total Annual Sewage Treatment Cost	(=)	$772
TOTAL ANNUAL UTILITY COST	(=)	$67,405

Assumptions, Additional Calculations, and Data Sources:
Energy consumption data from metering of existing on-base trailers. Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are calculated on the base average of 40 gallons per person per day the Status Quo alternative; All costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: EMF-536 Office Spaces

Protective Storage		
Initial One-Time Costs		N/A
Board Up Doors and Windows	(+)	N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(=)	N/A
Total One-Time Cost		
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.267
Cost per Ton For Removal	(X)	$63.16
Annual Cost per Unit	(=)	$16.86
Number of Units	(X)	536
Total Annual Cost	(=)	$9,039
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		68,500
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$56,170
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$56,170
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Average annual tons of trash generated, cost per ton for trash removal, and the base average custodial cost per square foot was obtained from the Service Contract Monitor.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-18,000 SF Conf Space

Protective Storage		
Initial One-Time Costs		N/A
Board Up Doors and Windows	(+)	N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(=)	N/A
Total One-Time Cost		
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		N/A
Cost per Ton For Removal	(X)	N/A
Annual Cost per Unit	(=)	N/A
Number of Units	(X)	N/A
Total Annual Cost	(=)	N/A
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		18,000
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$14,760
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$14,760
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Average custodial cost per square foot was obtained from the Service Contract Monitor.

WORKSHEET 4 (OPTIONAL)

Miscellaneous Operations and Maintenance Costs

(In Program-Year Dollars)

Alternative: STATUS QUO, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-Existing Permanent Facilities

Protective Storage		
Initial One-Time Costs		N/A
Board Up Doors and Windows	(+)	N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(=)	N/A
Total One-Time Cost		
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.267
Cost per Ton For Removal	(X)	$63.16
Annual Cost per Unit	(=)	$16.86
Number of Units	(X)	391
Total Annual Cost	(=)	$6,594
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		40,000
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$32,800
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$32,800
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:

Average annual tons of trash generated, cost per ton for trash removal, and the base average custodial cost per square foot was obtained from the Service Contract Monitor.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: COMB NEW/EXISTING BLDGS-240 Office Spaces

Protective Storage		
Initial One-Time Costs		N/A
Board Up Doors and Windows	(+)	N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(=)	N/A
Total One-Time Cost		
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.267
Cost per Ton For Removal	(X)	$63.16
Annual Cost per Unit	(=)	$16.86
Number of Units	(X)	65
Total Annual Cost	(=)	$1,096
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		30,685
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$25,162
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$25,162
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Average annual tons of trash generated, cost per ton for trash removal, and the base average custodial cost per square foot was obtained from the Service Contract Monitor.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: STATUS QUO, COMB NEW/LEASE-Existing 13 Trailers

Protective Storage		
Initial One-Time Costs		N/A
Board Up Doors and Windows	(+)	N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(=)	N/A
Total One-Time Cost		
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.267
Cost per Ton For Removal	(X)	$63.16
Annual Cost per Unit	(=)	$16.86
Number of Units	(X)	80
Total Annual Cost	(=)	$1,349
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		9,282
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$7,611
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$7,611
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Average annual tons of trash generated, cost per ton for trash removal, and the base average custodial cost per square foot was obtained from the Service Contract Monitor.

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: COMB NEW/LEASE-30 Additional Trailers

Protective Storage		
Initial One-Time Costs		N/A
Board Up Doors and Windows	(+)	N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(=)	N/A
Total One-Time Cost		
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		.267
Cost per Ton For Removal	(X)	$63.16
Annual Cost per Unit	(=)	$16.86
Number of Units	(X)	65
Total Annual Cost	(=)	$1,096
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		21,420
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$17,564
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$17,564
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Average annual tons of trash generated, cost per ton for trash removal, and the base average custodial cost per square foot was obtained from the Service Contract Monitor.

WORKSHEET 5 (OPTIONAL)
Miscellaneous User Costs
(In Program-Year Dollars)
Alternative: STATUS QUO-Travel to leased conference space

Transportation

Annual Amount of Vehicle or Equipment Use (in miles or hours)		60,000
Cost per Mile or Hour	(X)	$.225
Total Annual Cost	(=)	$13,500

Furniture, Fixtures and Equipment (Method 1 - Average Cost per Unit)

Number of Units (e.g., rooms, offices or personnel)		N/A
Annual Furniture, Fixtures and Equipment Cost per Unit	(X)	N/A
Total Annual Cost	(=)	N/A

Furniture, Fixtures and Equipment (Method 2 - Itemized Costs)

Items Required	Life Expectancy	Years Required	Cost
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A
	____ Years		N/A

Other (_____)

Number of Units (e.g., rooms, offices, or personnel)		N/A
Cost per Unit	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Data source is the on base Transportation Office; FY 1986 dollars converted to FY 1990 dollars using the OSD inflator (15.1%).

WORKSHEET 6
Lease Costs
(In Program-Year Dollars)
Alternative: EMF COST SAVING BY VACATING 56 LEASED TRAILERS

Lease		
Annual Lease Cost per Square Foot *		$9.40
Number of Square Feet	(X)	40,000
Total Annual Cost	(=)	$375,880
Temporary Quarters		
On Base		
Number of Personnel Housed in On Base Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Contract Quarters		
Number of Personnel Housed in Contract Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Other Quarters (personnel issued nonavailablity certificates)		
Number of Personnel Housed in Other Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A

* If the Annual Cost per Square Foot is the gross lease cost, then maintenance and repair, custodial services, and utilities costs can be assumed to be included in the price of the lease; if the Annual Cost Per Square Foot is the triple-net lease then maintenance and repair, custodial services, and utilities costs must be estimated separately on the appropriate cost forms.

** Any transportation costs (car rental, pickup service, etc.) should be included in the Transportation cost category on Worksheet 5.

Assumptions, Additional Calculations, and Data Sources:
Trailer lease cost is $485.77 per month; This is the price currently charged for a 720 SF trailer by the existing trailer vendor as reported by the Funds Management Office; FY 1986 dollars converted to FY 1990 dollars using the OSD inflator (15.1%).

WORKSHEET 6
Lease Costs
(In Program-Year Dollars)
Alternative: STATUS QUO-Leased Conference Space

Lease

~~Annual Lease Cost per Square Foot~~ *	Cost per Conference		$2,250
~~Number of Square Feet~~	Annual Number of Conferences Held	(X)	12
Total Annual Cost		(=)	$27,000

Temporary Quarters

On Base		
Number of Personnel Housed in On Base Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Contract Quarters		
Number of Personnel Housed in Contract Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Other Quarters (personnel issued nonavailablity certificates)		
Number of Personnel Housed in Other Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A

* If the Annual Cost per Square Foot is the gross lease cost, then maintenance and repair, custodial services, and utilities costs can be assumed to be included in the price of the lease; if the Annual Cost Per Square Foot is the triple-net lease then maintenance and repair, custodial services, and utilities costs must be estimated separately on the appropriate cost forms.

** Any transportation costs (car rental, pickup service, etc.) should be included in the Transportation cost category on Worksheet 5.

Assumptions, Additional Calculations, and Data Sources:
Conference lease cost is $.24 per SF for a 8,145 SF facility as reported by the Funds Management Office : FY 1986 dollars converted to FY 1990 dollars using the OSD inflato

WORKSHEET 6
Lease Costs
(In Program-Year Dollars)
Alternative: STATUS QUO, COMB NEW/LEASE-Existing 13 Trailers

Lease		
Annual Lease Cost per Square Foot *		$9.40
Number of Square Feet	(X)	9,282
Total Annual Cost	(=)	$87,223
Temporary Quarters		
On Base		
Number of Personnel Housed in On Base Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Contract Quarters		
Number of Personnel Housed in Contract Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Other Quarters (personnel issued nonavailablity certificates)		
Number of Personnel Housed in Other Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A

* If the Annual Cost per Square Foot is the gross lease cost, then maintenance and repair, custodial services, and utilities costs can be assumed to be included in the price of the lease; if the Annual Cost Per Square Foot is the triple-net lease then maintenance and repair, custodial services, and utilities costs must be estimated separately on the appropriate cost forms.

** Any transportation costs (car rental, pickup service, etc.) should be included in the Transportation cost category on Worksheet 5.

Assumptions, Additional Calculations, and Data Sources:
Trailer lease cost is $485.77 per month; This is the price currently charged for a 720 SF trailer by the existing trailer vendor as reported by the Funds Management Office; FY 1986 dollars converted to FY 1990 dollars using the OSD inflator (15.1%).

WORKSHEET 6
Lease Costs
(In Program-Year Dollars)
Alternative: COMB NEW/LEASE-30 Additional Trailers

Lease		
Annual Lease Cost per Square Foot *		$9.40
Number of Square Feet	(X)	21,420
Total Annual Cost	(=)	$201,284
Temporary Quarters		
On Base		
Number of Personnel Housed in On Base Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Contract Quarters		
Number of Personnel Housed in Contract Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A
Other Quarters (personnel issued nonavailablity certificates)		
Number of Personnel Housed in Other Quarters per Year		N/A
Average Room Rate Plus per Diem	(X)	N/A
Total Annual Cost **	(=)	N/A

* If the Annual Cost per Square Foot is the gross lease cost, then maintenance and repair, custodial services, and utilities costs can be assumed to be included in the price of the lease; if the Annual Cost Per Square Foot is the triple-net lease then maintenance and repair, custodial services, and utilities costs must be estimated separately on the appropriate cost forms.

** Any transportation costs (car rental, pickup service, etc.) should be included in the Transportation cost category on Worksheet 5.

Assumptions, Additional Calculations, and Data Sources:
Trailer lease cost is $485.77 per month; This is the price currently charged for a 720 SF trailer by the existing trailer vendor as reported by the Funds Management Office; FY 1986 dollars converted to FY 1990 dollars using the OSD inflator (15.1%).

WORKSHEET 7 (OPTIONAL)
Benefit From User Cost Savings
(In Program-Year Dollars)
Alternative: EMF

Increase in Productivity		
Annual Labor Cost of Alternative		N/A
Annual Output of Alternative	(/)	N/A
Average Labor Cost per Unit of Output of Alternative	(=)	N/A
Annual Labor Cost of Status Quo		N/A
Annual Output of Status Quo	(/)	N/A
Average Labor Cost per Unit of Output of Status Quo	(=)	N/A
Average Labor Cost per Unit of Output of Alternative (from above)	(-)	N/A
Average Labor Cost per Unit of Increased Output	(=)	N/A
Annual Output of Alternative (from above)	(X)	N/A
Total Annual Benefit from Increase in Productivity	(=)	N/A

		Conference Travel	Consolidation
Personnel Cost Savings			
Number of Personnel Affected		200	179
Annual Labor Savings per Person Over Status Quo (in hours)	(X)	12	23.66
Total Annual Labor Savings (in hours)	(=)	2,400	4,235
Average Hourly Burdened Rate of Pay	(X)	$26.66	$26.66
Total Annual Benefit From Personnel Cost Savings	(=)	$63,977	$112,897

Fuel Cost Savings		
Annual Reduction in Equipment or Vehicle Use (in miles or hours)		N/A
Average Fuel Consumption per Mile or Hour (in gallons)	(X)	N/A
Total Annual Fuel Savings (in gallons)	(=)	N/A
Price per Gallon	(X)	N/A
Total Annual Benefit From Fuel Cost Savings	(=)	N/A

Other Cost Savings		
Number of Units Receiving Other Savings		56
Annual Savings per Unit Over Status Quo (in _____)	(X)	
Total Annual Savings (in _____)	(=)	
Price per _____	(X)	
Total Annual Benefit From Other Cost Savings	(=)	*

*** SEE ATTACHED FORM S-1: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS**

Assumptions, Additional Calculations, and Data Sources:
Assumption regarding the number of labor hours saved from consolidation is based on a survey of engineering personnel in the existing facility; Average annual burdened rates estimated by the Office of Cost and Management.

WORKSHEET 7 (OPTIONAL)
Benefit From User Cost Savings
(In Program-Year Dollars)
Alternative: COMBINATION NEW/EXISTING BUILDINGS

Increase in Productivity		
Annual Labor Cost of Alternative		N/A
Annual Output of Alternative	(/)	N/A
Average Labor Cost per Unit of Output of Alternative	(=)	N/A
Annual Labor Cost of Status Quo		N/A
Annual Output of Status Quo	(/)	N/A
Average Labor Cost per Unit of Output of Status Quo	(=)	N/A
Average Labor Cost per Unit of Output of Alternative (from above)	(-)	N/A
Average Labor Cost per Unit of Increased Output	(=)	N/A
Annual Output of Alternative (from above)	(X)	N/A
Total Annual Benefit from Increase in Productivity	(=)	N/A
Personnel Cost Savings		
Number of Personnel Affected		200
Annual Labor Savings per Person Over Status Quo (in hours)	(X)	12
Total Annual Labor Savings (in hours)	(=)	2,400
Average Hourly Burdened Rate of Pay	(X)	$26.66
Total Annual Benefit From Personnel Cost Savings	(=)	$63,977
Fuel Cost Savings		
Annual Reduction in Equipment or Vehicle Use (in miles or hours)		N/A
Average Fuel Consumption per Mile or Hour (in gallons)	(X)	N/A
Total Annual Fuel Savings (in gallons)	(=)	N/A
Price per Gallon	(X)	N/A
Total Annual Benefit From Fuel Cost Savings	(=)	N/A
Other Cost Savings		
Number of Units Receiving Other Savings		N/A
Annual Savings per Unit Over Status Quo (in _____)	(X)	N/A
Total Annual Savings (in _____)	(=)	N/A
Price per _____	(X)	N/A
Total Annual Benefit From Other Cost Savings	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Assumption regarding the number of labor hours saved from consolidation is based on a survey of engineering personnel in the existing facility; Average annual burdened rates estimated by the Office of Cost and Management.

WORKSHEET 7 (OPTIONAL)
Benefit From User Cost Savings
(In Program-Year Dollars)
Alternative: COMBINATION NEW/LEASE

Increase in Productivity		
Annual Labor Cost of Alternative		N/A
Annual Output of Alternative	(/)	N/A
Average Labor Cost per Unit of Output of Alternative	(=)	N/A
Annual Labor Cost of Status Quo		N/A
Annual Output of Status Quo	(/)	N/A
Average Labor Cost per Unit of Output of Status Quo	(=)	N/A
Average Labor Cost per Unit of Output of Alternative (from above)	(-)	N/A
Average Labor Cost per Unit of Increased Output	(=)	N/A
Annual Output of Alternative (from above)	(X)	N/A
Total Annual Benefit from Increase in Productivity	(=)	N/A
Personnel Cost Savings		
Number of Personnel Affected		200
Annual Labor Savings per Person Over Status Quo (in hours)	(X)	12
Total Annual Labor Savings (in hours)	(=)	2,400
Average Hourly Burdened Rate of Pay	(X)	$26.66
Total Annual Benefit From Personnel Cost Savings	(=)	$63,977
Fuel Cost Savings		
Annual Reduction in Equipment or Vehicle Use (in miles or hours)		N/A
Average Fuel Consumption per Mile or Hour (in gallons)	(X)	N/A
Total Annual Fuel Savings (in gallons)	(=)	N/A
Price per Gallon	(X)	N/A
Total Annual Benefit From Fuel Cost Savings	(=)	N/A
Other Cost Savings		
Number of Units Receiving Other Savings		N/A
Annual Savings per Unit Over Status Quo (in _____)	(X)	N/A
Total Annual Savings (in _____)	(=)	N/A
Price per _____	(X)	N/A
Total Annual Benefit From Other Cost Savings	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Assumption regarding the number of labor hours saved from consolidation is based on a survey of engineering personnel in the existing facility; Average annual burdened rates estimated by the Office of Cost and Management.

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: EMF

Criteria (Specify)	Score	Weight	Weighted Score
Efficiency/Productivity	10	3	30
Security	10	3	30
Communication	10	2	20
Accessibility	10	2	20
Maintainability	7	1	7
Morale	10	1	10
		Total	117

Assumptions and Data Sources:

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: COMBINATION NEW/EXISTING BUILDINGS

Criteria (Specify)	Score	Weight	Weighted Score
Efficiency/Productivity	7	3	21
Security	10	3	30
Communication	7	2	14
Accessibility	6	2	12
Maintainability	5	1	5
Morale	8	1	8
		Total	90

Assumptions and Data Sources:

WORKSHEET 8 (OPTIONAL)
Qualitative Benefits
Alternative: COMBINATION NEW/LEASING

Criteria (Specify)	Score	Weight	Weighted Score
Efficiency/Productivity	4	3	12
Security	10	3	30
Communication	3	2	6
Accessibility	3	2	6
Maintainability	6	1	6
Morale	4	1	4
		Total	64

Assumptions and Data Sources:

WORKSHEET 1

Annual Maintenance Costs

(In Program-Year Dollars)

Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-7,500 SF Conf Space

CONFERENCE FACILITY SENSITIVITY ANALYSIS

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.59
Number of Square Feet of Building Space	(X)	7,500
Total Annual Maintenance Cost	(=)	$4,425

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1990	
Building Age Multiplier During Years:	1991-1999	1.00
Building Age Multiplier During Years:	2000-2009	1.40
Building Age Multiplier During Years:	2010-2019	1.90
Building Age Multiplier During Years:	2020-2029	2.10
Building Age Multiplier During Years:	2030-2040	2.10

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:			
Average Annual Change in Maintenance Costs During Years:		N/A	%
Average Annual Change in Maintenance Costs During Years:		N/A	%
Average Annual Change in Maintenance Costs During Years:		N/A	%
Average Annual Change in Maintenance Costs During Years:		N/A	%
Average Annual Change in Maintenance Costs During Years:		N/A	%

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $0.57 * 0.87 * 1.188 = $.59 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 2

Periodic Maintenance, Repair, and Replacement Costs

(In Program-Year Dollars)

Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-7,500 SF Conf Space

CONFERENCE FACILITY SENSITIVITY ANALYSIS

Foundations, Floors, Structural Walls, Roof Structures, Stairs

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: 75 Years		
Years M&R Would Be Required _____		

Roofing

M&R Cost per Square Foot		$7.16
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$53,700
Life Expectancy: 15 Years		
Years M&R Would Be Required 2005, 2020, 2035		

Interior Walls and Doors, Windows, Exterior Closure

M&R Cost per Square Foot		$15.64
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$117,300
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

Wall and Floor Finishes, Paint, Wall Coverings, Carpeting

M&R Cost per Square Foot		$19.36
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$145,200
Life Expectancy: 10 Years		
Years M&R Would Be Required 2000, 2010, 2020, 2030, 2040		

Ceiling Finishes

M&R Cost per Square Foot		$6.86
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$51,450
Life Expectancy: 20 Years		
Years M&R Would Be Required 2010, 2030		

Elevators

M&R Cost per Square Foot		N/A
Number of Square Feet of _____ Space	(X)	N/A
Subtotal M&R Cost	(=)	N/A
Life Expectancy: _____ Years		
Years M&R Would Be Required _____		

WORKSHEET 2
Periodic Maintenance, Repair, and Replacement Costs
(In Program-Year Dollars)
Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-7,500 SF Conf Space
CONFERENCE FACILITY SENSITIVITY ANALYSIS

Fire Protection Equipment

M&R Cost per Square Foot		$.50
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$3,750
Life Expectancy: 50 Years		
Years M&R Would Be Required 2040		

HVAC

M&R Cost per Square Foot		$12.48
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$93,600
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Plumbing

M&R Cost per Square Foot		$5.66
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$42,450
Life Expectancy: 40 Years		
Years M&R Would Be Required 2035		

Electrical

M&R Cost per Square Foot		$5.34
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$40,050
Life Expectancy: 30 Years		
Years M&R Would Be Required 2020		

Special Equipment

M&R Cost per Square Foot		$2.96
Number of Square Feet of Building Space	(X)	7,500
Subtotal M&R Cost	(=)	$22,200
Life Expectancy: 25 Years		
Years M&R Would Be Required 2015, 2040		

Assumptions, Additional Calculations, and Data Sources:
Square foot costs based on subsystems percentage of total costs from Means Square Foot Costs and total cost per square foot from the Air Force Annual Construction Pricing Guide.

WORKSHEET 3
Utility Costs
(In Program-Year Dollars)
Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-7,500 SF Conf Space
CONFERENCE FACILITY SENSITIVITY ANALYSIS

Electricity		
Consumption per Square Foot (in thousands of Btus)		24.5
Number of Square Feet of Building Space	(X)	7,500
Annual Electricity Consumption (in thousands of Btus)	(=)	183,750
Cost per Thousand Btus	(X)	$.02698
Total Annual Electricity Cost	(=)	$4,958
Natural Gas		
Consumption per Square Foot (in thousands of Btus)		10.5
Number of Square Feet of Building Space	(X)	7,500
Annual Natural Gas Consumption (in thousands of Btus)	(=)	78,750
Cost per Thousand Btus	(X)	$.00668
Total Annual Natural Gas Cost	(=)	$526
Coal		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Coal Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Fuel Oil		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Fuel Oil Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Coal Cost	(=)	N/A
Propane Gas		
Consumption per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Propane Gas Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Propane Gas Cost	(=)	N/A
Other Energy Products (_____)		
Consumption Per Square Foot (in thousands of Btus)		N/A
Number of Square Feet of Building Space	(X)	N/A
Annual Consumption (in thousands of Btus)	(=)	N/A
Cost per Thousand Btus	(X)	N/A
Total Annual Cost	(=)	N/A

WORKSHEET 3

Utility Costs

(In Program-Year Dollars)

Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-7,500 SF Conf Space

CONFERENCE FACILITY SENSITIVITY ANALYSIS

Water		
Number of Units (e.g., square feet, personnel, equipment)		N/A
Annual Water Use per Unit (in thousands of gallons)	(X)	N/A
Total Annual Water Use	(=)	N/A
Cost per Thousand Gallons of Water	(X)	N/A
Total Annual Water Cost	(=)	N/A
Sewage Treatment		
Total Annual Water Use (from water calculations above)		N/A
Ratio of Sewage Treatment to Water Use	(X)	N/A
Total Annual Sewage Treatment	(=)	N/A
Cost per Thousand Gallons of Sewage Treatment	(X)	N/A
Total Annual Sewage Treatment Cost	(=)	N/A
TOTAL ANNUAL UTILITY COST	(=)	$5,484

Assumptions, Additional Calculations, and Data Sources:

Energy consumption data from Engineering Technical Letter (ETL) 86-1; percentages of electricity and natural gas usage (70% electricity-30% gas) is base average; Energy costs are basewide average annual costs as reported from the Base Energy Office; Water and sewer costs are calculated on the base average of 40 gallons per person per day the Status Quo alternative; All costs were in FY 1986 dollars and are converted to FY 1990 dollars using the OSD price inflator (15.1%).

WORKSHEET 4 (OPTIONAL)
Miscellaneous Operations and Maintenance Costs
(In Program-Year Dollars)
Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-7,500 SF Conf Space
CONFERENCE FACILITY SENSITIVITY ANALYSIS

Protective Storage		
Initial One-Time Costs		N/A
Board Up Doors and Windows	(+)	N/A
Disconnect Utilities	(+)	N/A
Minor Repair	(+)	N/A
Other _____	(=)	N/A
Total One-Time Cost		
Annual O&M Costs		
Annual O&M Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Total Annual Cost	(=)	N/A
Trash Removal		
Annual Tons Generated per Unit (e.g., square feet, personnel)		N/A
Cost per Ton For Removal	(X)	N/A
Annual Cost per Unit	(=)	N/A
Number of Units	(X)	N/A
Total Annual Cost	(=)	N/A
Custodial Services		
Number of Units (e.g., rooms, offices, or square feet)		7,500
Custodial Cost per Unit	(X)	$.82
Subtotal Annual Cost	(=)	$6,150
Other Fixed Costs (costs not based on the number of units)	(+)	$0
Total Annual Cost	(=)	$6,150
Grounds Maintenance		
Annual Cost per Square Foot		N/A
Number of Square Feet	(X)	N/A
Subtotal Annual Cost	(=)	N/A
Other Fixed Costs (costs not based on the number of units)	(+)	N/A
Total Annual Cost	(=)	N/A

Assumptions, Additional Calculations, and Data Sources:
Average custodial cost per square foot was obtained from the Service Contract Monitor.

WORKSHEET 7 (OPTIONAL)
Benefit From User Cost Savings
(In Program-Year Dollars)
Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-7,500 SF Conf Space
CONFERENCE FACILITY SENSITIVITY ANALYSIS

Increase in Productivity		
Annual Labor Cost of Alternative		N/A
Annual Output of Alternative	(/)	N/A
Average Labor Cost per Unit of Output of Alternative	(=)	N/A
Annual Labor Cost of Status Quo		N/A
Annual Output of Status Quo	(/)	N/A
Average Labor Cost per Unit of Output of Status Quo	(=)	N/A
Average Labor Cost per Unit of Output of Alternative (from above)	(-)	N/A
Average Labor Cost per Unit of Increased Output	(=)	N/A
Annual Output of Alternative (from above)	(X)	N/A
Total Annual Benefit from Increase in Productivity	(=)	N/A

Personnel Cost Savings		Conference Travel	Consolidation
Number of Personnel Affected		200	179
Annual Labor Savings per Person Over Status Quo (in hours)	(X)	12	23.66
Total Annual Labor Savings (in hours)	(=)	2,400	4,235
Average Hourly Burdened Rate of Pay	(X)	$26.66	$26.66
Total Annual Benefit From Personnel Cost Savings	(=)	$63,977	$112,897

Fuel Cost Savings		
Annual Reduction in Equipment or Vehicle Use (in miles or hours)		N/A
Average Fuel Consumption per Mile or Hour (in gallons)	(X)	N/A
Total Annual Fuel Savings (in gallons)	(=)	N/A
Price per Gallon	(X)	N/A
Total Annual Benefit From Fuel Cost Savings	(=)	N/A

Other Cost Savings		
Number of Units Receiving Other Savings		56
Annual Savings per Unit Over Status Quo (in _____)	(X)	
Total Annual Savings (in _____)	(=)	
Price per _____	(X)	
Total Annual Benefit From Other Cost Savings	(=)	*

*** SEE ATTACHED FORM S-1: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS**

Assumptions, Additional Calculations, and Data Sources:
Assumption regarding the number of labor hours saved from consolidation is based on a survey of engineering personnel in the existing facility; Average annual burdened rates estimated by the Office of Cost and Management.

FORM S-1
Total Life-Cycle Costs
Alternative: NEW 7,500 SF CONFERENCE FACILITY
CONFERENCE FACILITY SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$500,000 *	1.000	$500,000	$500,000
**1991	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.909	$14,599	$514,599
1992	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.826	$13,272	$527,870
1993	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.751	$12,065	$539,935
1994	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.683	$10,968	$550,904
1995	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.621	$9,971	$560,875
1996	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.564	$9,065	$569,939
1997	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.513	$8,241	$578,180
1998	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.467	$7,491	$585,672
1999	$4,425	$0	$5,484	$6,150	$0	$0	$16,059	.424	$6,810	$592,482
2000	$6,195	$145,200	$5,484	$6,150	$0	$0	$163,029	.386	$62,855	$655,337
2001	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.350	$6,249	$661,585
2002	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.319	$5,681	$667,266
2003	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.290	$5,164	$672,430
2004	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.263	$4,695	$677,125
2005	$6,195	$53,700	$5,484	$6,150	$0	$0	$71,529	.239	$17,123	$694,249
2006	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.218	$3,880	$698,129
2007	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.198	$3,527	$701,656
2008	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.180	$3,207	$704,863
2009	$6,195	$0	$5,484	$6,150	$0	$0	$17,829	.164	$2,915	$707,778
2010	$8,408	$196,650	$5,484	$6,150	$0	$0	$216,691	.149	$32,210	$739,988
2011	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.135	$2,708	$742,696
2012	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.123	$2,462	$745,158
2013	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.112	$2,238	$747,396
2014	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.102	$2,035	$749,431
2015	$8,408	$93,600	$5,484	$6,150	$0	$0	$113,641	.092	$10,489	$759,919

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1

Total Life-Cycle Costs

Alternative: NEW 7,500 SF CONFERENCE FACILITY

CONFERENCE FACILITY SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.084	$1,682	$761,601
2017	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.076	$1,529	$763,129
2018	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.069	$1,390	$764,519
2019	$8,408	$0	$5,484	$6,150	$0	$0	$20,041	.063	$1,263	$765,782
2020	$9,293	$238,950	$5,484	$6,150	$0	$0	$259,876	.057	$14,893	$780,676
2021	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.052	$1,090	$781,766
2022	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.047	$991	$782,757
2023	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.043	$901	$783,658
2024	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.039	$819	$784,477
2025	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.036	$745	$785,222
2026	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.032	$677	$785,899
2027	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.029	$615	$786,514
2028	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.027	$559	$787,074
2029	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.024	$509	$787,582
2030	$9,293	$196,650	$5,484	$6,150	$0	$0	$217,576	.022	$4,807	$792,389
2031	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.020	$420	$792,810
2032	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.018	$382	$793,192
2033	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.017	$347	$793,539
2034	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.015	$316	$793,855
2035	$9,293	$53,700	$5,484	$6,150	$0	$0	$74,626	.014	$1,024	$794,879
2036	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.012	$261	$795,140
2037	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.011	$237	$795,377
2038	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.010	$216	$795,593
2039	$9,293	$0	$5,484	$6,150	$0	$0	$20,926	.009	$196	$795,789
2040	$9,293	$359,850	$5,484	$6,150	$0	$0	$380,776	.009	$3,244	$799,033
Total	$380,993	$1,338,300	$274,181	$307,500	$0	$0	$2,800,974		$799,033	

FORM S-1
Total Life-Cycle Costs
Alternative: LEASE OFF-BASE CONFERENCE FACILITY
CONFERENCE FACILITY SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0 *	1.000	$0	$0
**1991	$0	$0	$0	$0	$13,500	$27,000	$40,500	.909	$36,818	$36,818
1992	$0	$0	$0	$0	$13,500	$27,000	$40,500	.826	$33,471	$70,289
1993	$0	$0	$0	$0	$13,500	$27,000	$40,500	.751	$30,428	$100,717
1994	$0	$0	$0	$0	$13,500	$27,000	$40,500	.683	$27,662	$128,379
1995	$0	$0	$0	$0	$13,500	$27,000	$40,500	.621	$25,147	$153,526
1996	$0	$0	$0	$0	$13,500	$27,000	$40,500	.564	$22,861	$176,387
1997	$0	$0	$0	$0	$13,500	$27,000	$40,500	.513	$20,783	$197,169
1998	$0	$0	$0	$0	$13,500	$27,000	$40,500	.467	$18,893	$216,063
1999	$0	$0	$0	$0	$13,500	$27,000	$40,500	.424	$17,176	$233,239
2000	$0	$0	$0	$0	$13,500	$27,000	$40,500	.386	$15,614	$248,853
2001	$0	$0	$0	$0	$13,500	$27,000	$40,500	.350	$14,195	$263,048
2002	$0	$0	$0	$0	$13,500	$27,000	$40,500	.319	$12,904	$275,952
2003	$0	$0	$0	$0	$13,500	$27,000	$40,500	.290	$11,731	$287,684
2004	$0	$0	$0	$0	$13,500	$27,000	$40,500	.263	$10,665	$298,349
2005	$0	$0	$0	$0	$13,500	$27,000	$40,500	.239	$9,695	$308,044
2006	$0	$0	$0	$0	$13,500	$27,000	$40,500	.218	$8,814	$316,858
2007	$0	$0	$0	$0	$13,500	$27,000	$40,500	.198	$8,013	$324,870
2008	$0	$0	$0	$0	$13,500	$27,000	$40,500	.180	$7,284	$332,155
2009	$0	$0	$0	$0	$13,500	$27,000	$40,500	.164	$6,622	$338,777
2010	$0	$0	$0	$0	$13,500	$27,000	$40,500	.149	$6,020	$344,797
2011	$0	$0	$0	$0	$13,500	$27,000	$40,500	.135	$5,473	$350,270
2012	$0	$0	$0	$0	$13,500	$27,000	$40,500	.123	$4,975	$355,245
2013	$0	$0	$0	$0	$13,500	$27,000	$40,500	.112	$4,523	$359,768
2014	$0	$0	$0	$0	$13,500	$27,000	$40,500	.102	$4,112	$363,879
2015	$0	$0	$0	$0	$13,500	$27,000	$40,500	.092	$3,738	$367,617

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1

Total Life-Cycle Costs

Alternative: LEASE OFF-BASE CONFERENCE FACILITY

CONFERENCE FACILITY SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$0	$0	$0	$0	$13,500	$27,000	$40,500	.084	$3,398	$371,016
2017	$0	$0	$0	$0	$13,500	$27,000	$40,500	.076	$3,089	$374,105
2018	$0	$0	$0	$0	$13,500	$27,000	$40,500	.069	$2,808	$376,913
2019	$0	$0	$0	$0	$13,500	$27,000	$40,500	.063	$2,553	$379,466
2020	$0	$0	$0	$0	$13,500	$27,000	$40,500	.057	$2,321	$381,787
2021	$0	$0	$0	$0	$13,500	$27,000	$40,500	.052	$2,110	$383,897
2022	$0	$0	$0	$0	$13,500	$27,000	$40,500	.047	$1,918	$385,815
2023	$0	$0	$0	$0	$13,500	$27,000	$40,500	.043	$1,744	$387,559
2024	$0	$0	$0	$0	$13,500	$27,000	$40,500	.039	$1,585	$389,144
2025	$0	$0	$0	$0	$13,500	$27,000	$40,500	.036	$1,441	$390,586
2026	$0	$0	$0	$0	$13,500	$27,000	$40,500	.032	$1,310	$391,896
2027	$0	$0	$0	$0	$13,500	$27,000	$40,500	.029	$1,191	$393,087
2028	$0	$0	$0	$0	$13,500	$27,000	$40,500	.027	$1,083	$394,169
2029	$0	$0	$0	$0	$13,500	$27,000	$40,500	.024	$984	$395,154
2030	$0	$0	$0	$0	$13,500	$27,000	$40,500	.022	$895	$396,049
2031	$0	$0	$0	$0	$13,500	$27,000	$40,500	.020	$813	$396,862
2032	$0	$0	$0	$0	$13,500	$27,000	$40,500	.018	$740	$397,602
2033	$0	$0	$0	$0	$13,500	$27,000	$40,500	.017	$672	$398,274
2034	$0	$0	$0	$0	$13,500	$27,000	$40,500	.015	$611	$398,885
2035	$0	$0	$0	$0	$13,500	$27,000	$40,500	.014	$556	$399,441
2036	$0	$0	$0	$0	$13,500	$27,000	$40,500	.012	$505	$399,946
2037	$0	$0	$0	$0	$13,500	$27,000	$40,500	.011	$459	$400,405
2038	$0	$0	$0	$0	$13,500	$27,000	$40,500	.010	$417	$400,822
2039	$0	$0	$0	$0	$13,500	$27,000	$40,500	.009	$379	$401,202
2040	$0	$0	$0	$0	$13,500	$27,000	$40,500	.009	$345	$401,547
Total	$0	$0	$0	$0	$675,000	$1,349,985	$2,024,985		$401,547	

FORM S-2

Total Life-Cycle Benefits

Alternative: NEW 7,500 SF CONFERENCE FACILITY

CONFERENCE CENTER SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$63,977	N/A	N/A	$63,977	.909	$58,161	$58,161
1992	N/A	$63,977	N/A	N/A	$63,977	.826	$52,874	$111,035
1993	N/A	$63,977	N/A	N/A	$63,977	.751	$48,067	$159,102
1994	N/A	$63,977	N/A	N/A	$63,977	.683	$43,697	$202,800
1995	N/A	$63,977	N/A	N/A	$63,977	.621	$39,725	$242,525
1996	N/A	$63,977	N/A	N/A	$63,977	.564	$36,114	$278,638
1997	N/A	$63,977	N/A	N/A	$63,977	.513	$32,831	$311,469
1998	N/A	$63,977	N/A	N/A	$63,977	.467	$29,846	$341,315
1999	N/A	$63,977	N/A	N/A	$63,977	.424	$27,133	$368,447
2000	N/A	$63,977	N/A	N/A	$63,977	.386	$24,666	$393,113
2001	N/A	$63,977	N/A	N/A	$63,977	.350	$22,424	$415,537
2002	N/A	$63,977	N/A	N/A	$63,977	.319	$20,385	$435,922
2003	N/A	$63,977	N/A	N/A	$63,977	.290	$18,532	$454,454
2004	N/A	$63,977	N/A	N/A	$63,977	.263	$16,847	$471,301
2005	N/A	$63,977	N/A	N/A	$63,977	.239	$15,316	$486,617
2006	N/A	$63,977	N/A	N/A	$63,977	.218	$13,923	$500,540
2007	N/A	$63,977	N/A	N/A	$63,977	.198	$12,658	$513,198
2008	N/A	$63,977	N/A	N/A	$63,977	.180	$11,507	$524,705
2009	N/A	$63,977	N/A	N/A	$63,977	.164	$10,461	$535,166
2010	N/A	$63,977	N/A	N/A	$63,977	.149	$9,510	$544,676
2011	N/A	$63,977	N/A	N/A	$63,977	.135	$8,645	$553,321
2012	N/A	$63,977	N/A	N/A	$63,977	.123	$7,859	$561,180
2013	N/A	$63,977	N/A	N/A	$63,977	.112	$7,145	$568,325
2014	N/A	$63,977	N/A	N/A	$63,977	.102	$6,495	$574,820
2015	N/A	$63,977	N/A	N/A	$63,977	.092	$5,905	$580,725

** First year of occupancy.

FORM S-2

Total Life-Cycle Benefits

Alternative: NEW 7,500 SF CONFERENCE FACILITY

CONFERENCE CENTER SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$63,977	N/A	N/A	$63,977	.084	$5,368	$586,093
2017	N/A	$63,977	N/A	N/A	$63,977	.076	$4,880	$590,973
2018	N/A	$63,977	N/A	N/A	$63,977	.069	$4,436	$595,410
2019	N/A	$63,977	N/A	N/A	$63,977	.063	$4,033	$599,443
2020	N/A	$63,977	N/A	N/A	$63,977	.057	$3,666	$603,109
2021	N/A	$63,977	N/A	N/A	$63,977	.052	$3,333	$606,442
2022	N/A	$63,977	N/A	N/A	$63,977	.047	$3,030	$609,473
2023	N/A	$63,977	N/A	N/A	$63,977	.043	$2,755	$612,227
2024	N/A	$63,977	N/A	N/A	$63,977	.039	$2,504	$614,731
2025	N/A	$63,977	N/A	N/A	$63,977	.036	$2,277	$617,008
2026	N/A	$63,977	N/A	N/A	$63,977	.032	$2,070	$619,078
2027	N/A	$63,977	N/A	N/A	$63,977	.029	$1,881	$620,959
2028	N/A	$63,977	N/A	N/A	$63,977	.027	$1,710	$622,670
2029	N/A	$63,977	N/A	N/A	$63,977	.024	$1,555	$624,224
2030	N/A	$63,977	N/A	N/A	$63,977	.022	$1,414	$625,638
2031	N/A	$63,977	N/A	N/A	$63,977	.020	$1,285	$626,923
2032	N/A	$63,977	N/A	N/A	$63,977	.018	$1,168	$628,091
2033	N/A	$63,977	N/A	N/A	$63,977	.017	$1,062	$629,153
2034	N/A	$63,977	N/A	N/A	$63,977	.015	$965	$630,119
2035	N/A	$63,977	N/A	N/A	$63,977	.014	$878	$630,997
2036	N/A	$63,977	N/A	N/A	$63,977	.012	$798	$631,795
2037	N/A	$63,977	N/A	N/A	$63,977	.011	$725	$632,520
2038	N/A	$63,977	N/A	N/A	$63,977	.010	$659	$633,179
2039	N/A	$63,977	N/A	N/A	$63,977	.009	$599	$633,779
2040	N/A	$63,977	N/A	N/A	$63,977	.009	$545	$634,324
Total	N/A	$3,198,869	N/A	N/A	$3,198,869		$634,324	

FORM S-1a
Total Life-Cycle Costs
Alternative: EMF
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$7,300,000 *	1.000	$7,300,000	$7,300,000
**1991	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.943	$200,485	$7,500,485
1992	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.890	$189,137	$7,689,622
1993	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.840	$178,431	$7,868,054
1994	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.792	$168,331	$8,036,385
1995	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.747	$158,803	$8,195,188
1996	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.705	$149,814	$8,345,003
1997	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.665	$141,334	$8,486,337
1998	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.627	$133,334	$8,619,671
1999	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.592	$125,787	$8,745,458
2000	$74,326	$1,640,390	$79,456	$79,969	$0	$0	$1,874,140	.558	$1,046,510	$9,791,968
2001	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.527	$123,137	$9,915,105
2002	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.497	$116,167	$10,031,272
2003	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.469	$109,591	$10,140,863
2004	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.442	$103,388	$10,244,251
2005	$74,326	$286,430	$79,456	$79,969	$0	$0	$520,180	.417	$217,053	$10,461,305
2006	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.394	$92,015	$10,553,320
2007	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.371	$86,807	$10,640,126
2008	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.350	$81,893	$10,722,019
2009	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.331	$77,258	$10,799,277
2010	$100,871	$2,355,025	$79,456	$79,969	$0	$0	$2,615,320	.312	$815,469	$11,614,746
2011	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.294	$76,567	$11,691,313
2012	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.278	$72,233	$11,763,547
2013	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.262	$68,145	$11,831,691
2014	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.247	$64,287	$11,895,979
2015	$100,871	$1,525,455	$79,456	$79,969	$0	$0	$1,785,750	.233	$416,077	$12,312,056

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1a
Total Life-Cycle Costs
Alternative: EMF
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.220	$57,216	$12,369,272
2017	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.207	$53,977	$12,423,249
2018	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.196	$50,922	$12,474,170
2019	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.185	$48,039	$12,522,210
2020	$111,489	$3,016,190	$79,456	$79,969	$0	$0	$3,287,103	.174	$572,318	$13,094,528
2021	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.164	$44,499	$13,139,026
2022	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.155	$41,980	$13,181,007
2023	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.146	$39,604	$13,220,610
2024	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.138	$37,362	$13,257,972
2025	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.130	$35,247	$13,293,220
2026	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.123	$33,252	$13,326,472
2027	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.116	$31,370	$13,357,842
2028	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.109	$29,594	$13,387,436
2029	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.103	$27,919	$13,415,355
2030	$111,489	$2,355,025	$79,456	$79,969	$0	$0	$2,625,938	.097	$255,299	$13,670,655
2031	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.092	$24,848	$13,695,503
2032	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.087	$23,441	$13,718,944
2033	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.082	$22,115	$13,741,059
2034	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.077	$20,863	$13,761,921
2035	$111,489	$286,430	$79,456	$79,969	$0	$0	$557,343	.073	$40,491	$13,802,412
2036	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.069	$18,568	$13,820,980
2037	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.065	$17,517	$13,838,497
2038	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.061	$16,525	$13,855,022
2039	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.058	$15,590	$13,870,612
2040	$111,489	$4,400,980	$79,456	$79,969	$0	$0	$4,671,893	.054	$253,629	$14,124,242
Total	$4,571,049	$15,865,925	$3,972,776	$3,998,448	$0	$0	$35,708,198		$14,124,242	

FORM S-1a

Total Life-Cycle Costs

Alternative: COMBINATION NEW/EXISTING BUILDINGS

6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
*1990							$4,300,000 *	1.000	$4,300,000	$4,300,000
**1991	$81,725	$1,963,600	$110,299	$80,412	$0	$0	$2,236,035	.943	$2,109,467	$6,409,467
1992	$81,725	$112,800	$110,299	$80,412	$0	$0	$385,235	.890	$342,858	$6,752,325
1993	$81,725	$759,600	$110,299	$80,412	$0	$0	$1,032,035	.840	$866,517	$7,618,842
1994	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.792	$215,794	$7,834,636
1995	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.747	$203,580	$8,038,216
1996	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.705	$192,056	$8,230,272
1997	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.665	$181,185	$8,411,457
1998	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.627	$170,929	$8,582,387
1999	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.592	$161,254	$8,743,641
2000	$82,423	$1,457,999	$110,299	$80,412	$0	$0	$1,731,132	.558	$966,655	$9,710,296
2001	$82,423	$754,400	$110,299	$80,412	$0	$0	$1,027,533	.527	$541,292	$10,251,588
2002	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.497	$135,739	$10,387,326
2003	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.469	$128,056	$10,515,382
2004	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.442	$120,807	$10,636,189
2005	$82,423	$199,456	$110,299	$80,412	$0	$0	$472,589	.417	$197,195	$10,833,384
2006	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.394	$107,518	$10,940,902
2007	$82,423	$92,000	$110,299	$80,412	$0	$0	$365,133	.371	$135,597	$11,076,499
2008	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.350	$95,691	$11,172,190
2009	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.331	$90,274	$11,262,464
2010	$97,245	$1,315,491	$110,299	$80,412	$0	$0	$1,603,446	.312	$499,962	$11,762,426
2011	$97,245	$1,099,600	$110,299	$80,412	$0	$0	$1,387,556	.294	$408,157	$12,170,583
2012	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.278	$79,909	$12,250,492
2013	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.262	$75,386	$12,325,878
2014	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.247	$71,119	$12,396,997
2015	$97,245	$807,348	$110,299	$80,412	$0	$0	$1,095,304	.233	$255,204	$12,652,201

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1a

Total Life-Cycle Costs

Alternative: COMBINATION NEW/EXISTING BUILDINGS

6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
2016	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.220	$63,296	$12,715,497
2017	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.207	$59,713	$12,775,209
2018	$97,245	$759,600	$110,299	$80,412	$0	$0	$1,047,556	.196	$204,933	$12,980,143
2019	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.185	$53,144	$13,033,287
2020	$103,174	$1,667,707	$110,299	$80,412	$0	$0	$1,961,592	.174	$341,533	$13,374,820
2021	$103,174	$1,334,400	$110,299	$80,412	$0	$0	$1,628,285	.164	$267,454	$13,642,274
2022	$103,174	$92,000	$110,299	$80,412	$0	$0	$385,885	.155	$59,796	$13,702,069
2023	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.146	$42,962	$13,745,031
2024	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.138	$40,530	$13,785,561
2025	$103,174	$766,800	$110,299	$80,412	$0	$0	$1,060,685	.130	$138,001	$13,923,562
2026	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.123	$36,072	$13,959,633
2027	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.116	$34,030	$13,993,663
2028	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.109	$32,104	$14,025,767
2029	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.103	$30,286	$14,056,053
2030	$103,174	$1,315,491	$110,299	$80,412	$0	$0	$1,609,375	.097	$156,467	$14,212,520
2031	$103,174	$1,383,600	$110,299	$80,412	$0	$0	$1,677,485	.092	$153,857	$14,366,377
2032	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.087	$25,429	$14,391,806
2033	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.082	$23,990	$14,415,796
2034	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.077	$22,632	$14,438,428
2035	$103,174	$199,456	$110,299	$80,412	$0	$0	$493,340	.073	$35,841	$14,474,269
2036	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.069	$20,142	$14,494,411
2037	$103,174	$92,000	$110,299	$80,412	$0	$0	$385,885	.065	$24,951	$14,519,362
2038	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.061	$17,926	$14,537,288
2039	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.058	$16,912	$14,554,200
2040	$103,174	$2,448,213	$110,299	$80,412	$0	$0	$2,742,098	.054	$148,864	$14,703,064
Total	$4,698,849	$18,621,560	$5,514,954	$4,020,578	$0	$0	$37,155,941		$14,703,064	

FORM S-1a
Total Life-Cycle Costs
Alternative: COMBINATION NEW/LEASING
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
*1990						$596,541	$2,196,541	1.000	$2,196,541	$2,196,541
**1991	$81,735	$1,963,600	$173,086	$81,775	$0	$288,507	$2,588,703	.943	$2,442,173	$4,638,713
1992	$81,735	$112,800	$173,086	$81,775	$0	$288,507	$737,903	.890	$656,731	$5,295,444
1993	$81,735	$759,600	$173,086	$81,775	$0	$288,507	$1,384,703	.840	$1,162,623	$6,458,068
1994	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.792	$495,140	$6,953,208
1995	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.747	$467,113	$7,420,321
1996	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.705	$440,673	$7,860,994
1997	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.665	$415,729	$8,276,723
1998	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.627	$392,197	$8,668,920
1999	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.592	$369,997	$9,038,917
2000	$74,823	$879,280	$173,086	$81,775	$0	$470,397	$1,679,361	.558	$937,746	$9,976,664
2001	$74,823	$754,400	$173,086	$81,775	$0	$288,507	$1,372,591	.527	$723,064	$10,699,727
2002	$74,823	$0	$173,086	$81,775	$0	$367,326	$697,010	.497	$346,393	$11,046,120
2003	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.469	$289,832	$11,335,952
2004	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.442	$273,426	$11,609,378
2005	$74,823	$128,880	$173,086	$81,775	$0	$288,507	$747,071	.417	$311,727	$11,921,105
2006	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.394	$243,349	$12,164,454
2007	$74,823	$92,000	$173,086	$81,775	$0	$288,507	$710,191	.371	$263,740	$12,428,193
2008	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.350	$216,579	$12,644,772
2009	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.331	$204,320	$12,849,093
2010	$80,133	$471,960	$173,086	$81,775	$0	$470,397	$1,277,351	.312	$398,284	$13,247,377
2011	$80,133	$1,099,600	$173,086	$81,775	$0	$288,507	$1,723,101	.294	$506,859	$13,754,236
2012	$80,133	$0	$173,086	$81,775	$0	$367,326	$702,320	.278	$194,897	$13,949,133
2013	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.262	$163,231	$14,112,364
2014	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.247	$153,991	$14,266,356
2015	$80,133	$224,640	$173,086	$81,775	$0	$288,507	$848,141	.233	$197,616	$14,463,971

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1a
Total Life-Cycle Costs
Alternative: COMBINATION NEW/LEASING
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
2016	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.220	$137,052	$14,601,023
2017	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.207	$129,294	$14,730,317
2018	$80,133	$759,600	$173,086	$81,775	$0	$288,507	$1,383,101	.196	$270,576	$15,000,893
2019	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.185	$115,071	$15,115,965
2020	$82,257	$573,480	$173,086	$81,775	$0	$470,397	$1,380,995	.174	$240,445	$15,356,410
2021	$82,257	$1,334,400	$173,086	$81,775	$0	$288,507	$1,960,025	.164	$321,944	$15,678,353
2022	$82,257	$92,000	$173,086	$81,775	$0	$367,326	$796,444	.155	$123,415	$15,801,768
2023	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.146	$91,458	$15,893,226
2024	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.138	$86,281	$15,979,507
2025	$82,257	$766,800	$173,086	$81,775	$0	$288,507	$1,392,425	.130	$181,162	$16,160,669
2026	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.123	$76,790	$16,237,458
2027	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.116	$72,443	$16,309,901
2028	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.109	$68,343	$16,378,244
2029	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.103	$64,474	$16,442,718
2030	$82,257	$471,960	$173,086	$81,775	$0	$470,397	$1,279,475	.097	$124,393	$16,567,111
2031	$82,257	$1,383,600	$173,086	$81,775	$0	$288,507	$2,009,225	.092	$184,284	$16,751,395
2032	$82,257	$0	$173,086	$81,775	$0	$367,326	$704,444	.087	$60,954	$16,812,349
2033	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.082	$51,070	$16,863,419
2034	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.077	$48,179	$16,911,597
2035	$82,257	$128,880	$173,086	$81,775	$0	$288,507	$754,505	.073	$54,815	$16,966,412
2036	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.069	$42,879	$17,009,291
2037	$82,257	$92,000	$173,086	$81,775	$0	$288,507	$717,625	.065	$46,400	$17,055,692
2038	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.061	$38,162	$17,093,854
2039	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.058	$36,002	$17,129,856
2040	$82,257	$863,640	$173,086	$81,775	$0	$470,397	$1,671,155	.054	$90,724	$17,220,580
Total	$4,012,584	$12,953,120	$8,654,322	$4,088,730	$0	$16,246,596	$47,555,352		$17,220,580	

FORM S-1a
Total Life-Cycle Costs
Alternative: STATUS QUO
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0 *	1.000	$0	$0
**1991	$57,835	$1,963,600	$92,521	$48,354	$13,500	$114,223	$2,290,033	.943	$2,160,408	$2,160,408
1992	$57,835	$112,800	$92,521	$48,354	$13,500	$367,326	$692,335	.890	$616,176	$2,776,584
1993	$57,835	$759,600	$92,521	$48,354	$13,500	$114,223	$1,086,033	.840	$911,854	$3,688,438
1994	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.792	$258,565	$3,947,003
1995	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.747	$243,929	$4,190,932
1996	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.705	$230,122	$4,421,054
1997	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.665	$217,096	$4,638,151
1998	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.627	$204,808	$4,842,959
1999	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.592	$193,215	$5,036,173
2000	$46,675	$530,800	$92,521	$48,354	$13,500	$367,326	$1,099,175	.558	$613,774	$5,649,947
2001	$46,675	$754,400	$92,521	$48,354	$13,500	$114,223	$1,069,673	.527	$563,490	$6,213,437
2002	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.497	$156,681	$6,370,118
2003	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.469	$147,812	$6,517,930
2004	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.442	$139,445	$6,657,376
2005	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.417	$131,552	$6,788,928
2006	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.394	$124,106	$6,913,034
2007	$46,675	$92,000	$92,521	$48,354	$13,500	$114,223	$407,273	.371	$151,247	$7,064,280
2008	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.350	$110,454	$7,174,734
2009	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.331	$104,202	$7,278,936
2010	$46,675	$0	$92,521	$48,354	$13,500	$367,326	$568,375	.312	$177,222	$7,456,158
2011	$46,675	$1,099,600	$92,521	$48,354	$13,500	$114,223	$1,414,873	.294	$416,192	$7,872,350
2012	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.278	$87,490	$7,959,840
2013	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.262	$82,537	$8,042,377
2014	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.247	$77,866	$8,120,243
2015	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.233	$73,458	$8,193,701

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1a
Total Life-Cycle Costs
Alternative: STATUS QUO
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.220	$69,300	$8,263,001
2017	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.207	$65,377	$8,328,378
2018	$46,675	$759,600	$92,521	$48,354	$13,500	$114,223	$1,074,873	.196	$210,277	$8,538,656
2019	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.185	$58,186	$8,596,842
2020	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.174	$54,892	$8,651,734
2021	$46,675	$1,334,400	$92,521	$48,354	$13,500	$114,223	$1,649,673	.164	$270,967	$8,922,700
2022	$46,675	$92,000	$92,521	$48,354	$13,500	$367,326	$660,375	.155	$102,330	$9,025,030
2023	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.146	$46,088	$9,071,119
2024	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.138	$43,480	$9,114,599
2025	$46,675	$766,800	$92,521	$48,354	$13,500	$114,223	$1,082,073	.130	$140,783	$9,255,382
2026	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.123	$38,697	$9,294,079
2027	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.116	$36,506	$9,330,585
2028	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.109	$34,440	$9,365,025
2029	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.103	$32,491	$9,397,516
2030	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.097	$30,651	$9,428,167
2031	$46,675	$1,383,600	$92,521	$48,354	$13,500	$114,223	$1,698,873	.092	$155,819	$9,583,986
2032	$46,675	$0	$92,521	$48,354	$13,500	$367,326	$568,375	.087	$49,180	$9,633,166
2033	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.082	$25,736	$9,658,902
2034	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.077	$24,279	$9,683,181
2035	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.073	$22,905	$9,706,085
2036	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.069	$21,608	$9,727,693
2037	$46,675	$92,000	$92,521	$48,354	$13,500	$114,223	$407,273	.065	$26,334	$9,754,027
2038	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.061	$19,231	$9,773,258
2039	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.058	$18,143	$9,791,401
2040	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.054	$17,116	$9,808,516
Total	$2,434,182	$9,741,200	$4,626,050	$2,417,703	$675,000	$6,976,646	$26,870,780		$9,808,516	

FORM S-2
Total Life-Cycle Benefits
Alternative: EMF
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7) *	(5) Total Sum (1)-(4)	(6) Present Value Mult. (6% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$176,875	N/A	($1,248,707)	($1,071,833)	.792	($848,992)	($848,992)
1992	N/A	$176,875	N/A	$262,565	$439,439	.747	$328,375	($520,617)
1993	N/A	$176,875	N/A	($384,235)	($207,361)	.705	($164,249)	($684,867)
1994	N/A	$176,875	N/A	$375,365	$552,239	.665	$412,665	($272,201)
1995	N/A	$176,875	N/A	$375,365	$552,239	.627	$389,307	$117,105
1996	N/A	$176,875	N/A	$375,365	$552,239	.592	$367,271	$484,376
1997	N/A	$176,875	N/A	$375,365	$552,239	.558	$346,482	$830,858
1998	N/A	$176,875	N/A	$375,365	$552,239	.527	$326,870	$1,157,727
1999	N/A	$176,875	N/A	$375,365	$552,239	.497	$308,367	$1,466,095
2000	N/A	$176,875	N/A	($144,275)	$32,599	.469	$17,173	$1,483,268
2001	N/A	$176,875	N/A	($28,347)	$148,527	.442	$73,813	$1,557,081
2002	N/A	$176,875	N/A	$386,525	$563,399	.417	$264,144	$1,821,225
2003	N/A	$176,875	N/A	$386,525	$563,399	.394	$249,192	$2,070,417
2004	N/A	$176,875	N/A	$386,525	$563,399	.371	$235,087	$2,305,503
2005	N/A	$176,875	N/A	$386,525	$563,399	.350	$221,780	$2,527,283
2006	N/A	$176,875	N/A	$386,525	$563,399	.331	$209,226	$2,736,510
2007	N/A	$176,875	N/A	$294,525	$471,399	.312	$165,152	$2,901,662
2008	N/A	$176,875	N/A	$386,525	$563,399	.294	$186,211	$3,087,872
2009	N/A	$176,875	N/A	$386,525	$563,399	.278	$175,671	$3,263,543
2010	N/A	$176,875	N/A	$386,525	$563,399	.262	$165,727	$3,429,270
2011	N/A	$176,875	N/A	($373,547)	($196,673)	.247	($54,578)	$3,374,692
2012	N/A	$176,875	N/A	$386,525	$563,399	.233	$147,496	$3,522,188
2013	N/A	$176,875	N/A	$386,525	$563,399	.220	$139,148	$3,661,336
2014	N/A	$176,875	N/A	$386,525	$563,399	.207	$131,271	$3,792,607
2015	N/A	$176,875	N/A	$386,525	$563,399	.196	$123,841	$3,916,448

* **SEE ATTACHED FORM S-1: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS.**

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: EMF
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (6% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$176,875	N/A	$386,525	$563,399	.185	$103,979	$4,020,427
2017	N/A	$176,875	N/A	$386,525	$563,399	.174	$98,094	$4,118,521
2018	N/A	$176,875	N/A	($373,075)	($196,201)	.164	($32,227)	$4,086,294
2019	N/A	$176,875	N/A	$386,525	$563,399	.155	$87,303	$4,173,596
2020	N/A	$176,875	N/A	$386,525	$563,399	.146	$82,361	$4,255,958
2021	N/A	$176,875	N/A	($608,347)	($431,473)	.138	($59,505)	$4,196,453
2022	N/A	$176,875	N/A	$294,525	$471,399	.130	$61,331	$4,257,784
2023	N/A	$176,875	N/A	$386,525	$563,399	.123	$69,152	$4,326,936
2024	N/A	$176,875	N/A	$386,525	$563,399	.116	$65,238	$4,392,174
2025	N/A	$176,875	N/A	($380,275)	($203,401)	.109	($22,219)	$4,369,955
2026	N/A	$176,875	N/A	$386,525	$563,399	.103	$58,061	$4,428,016
2027	N/A	$176,875	N/A	$386,525	$563,399	.097	$54,775	$4,482,791
2028	N/A	$176,875	N/A	$386,525	$563,399	.092	$51,674	$4,534,465
2029	N/A	$176,875	N/A	$386,525	$563,399	.087	$48,749	$4,583,215
2030	N/A	$176,875	N/A	$386,525	$563,399	.082	$45,990	$4,629,205
2031	N/A	$176,875	N/A	($657,547)	($480,673)	.077	($37,016)	$4,592,189
2032	N/A	$176,875	N/A	$386,525	$563,399	.073	$40,931	$4,633,120
2033	N/A	$176,875	N/A	$386,525	$563,399	.069	$38,614	$4,671,734
2034	N/A	$176,875	N/A	$386,525	$563,399	.065	$36,428	$4,708,162
2035	N/A	$176,875	N/A	$386,525	$563,399	.061	$34,366	$4,742,529
2036	N/A	$176,875	N/A	$386,525	$563,399	.058	$32,421	$4,774,950
2037	N/A	$176,875	N/A	$294,525	$471,399	.054	$25,591	$4,800,541
2038	N/A	$176,875	N/A	$386,525	$563,399	.051	$28,855	$4,829,396
2039	N/A	$176,875	N/A	$386,525	$563,399	.048	$27,221	$4,856,618
2040	N/A	$176,875	N/A	$386,525	$563,399	.046	$25,681	$4,882,298
Total	N/A	$8,843,727	N/A	$11,182,232	$20,025,959		$4,882,298	

FORM S-1

Total Life-Cycle Costs

Alternative: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS

6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0 *	1.000	$0	$0
**1991	($27,280)	($1,963,600)	$26,765	$0	$0	$715,408	($1,248,707)	.943	($1,178,026)	($1,178,026)
1992	($27,280)	($112,800)	$26,765	$0	$0	$375,880	$262,565	.890	$233,682	($944,344)
1993	($27,280)	($759,600)	$26,765	$0	$0	$375,880	($384,235)	.840	($322,611)	($1,266,956)
1994	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.792	$297,324	($969,632)
1995	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.747	$280,494	($689,137)
1996	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.705	$264,617	($424,520)
1997	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.665	$249,639	($174,881)
1998	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.627	$235,508	$60,627
1999	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.592	$222,178	$282,805
2000	($16,120)	($530,800)	$26,765	$0	$0	$375,880	($144,275)	.558	($80,563)	$202,242
2001	($16,120)	($754,400)	$26,765	$0	$0	$715,408	($28,347)	.527	($14,933)	$187,309
2002	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.497	$192,091	$379,400
2003	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.469	$181,218	$560,618
2004	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.442	$170,960	$731,578
2005	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.417	$161,283	$892,862
2006	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.394	$152,154	$1,045,016
2007	($16,120)	($92,000)	$26,765	$0	$0	$375,880	$294,525	.371	$109,376	$1,154,392
2008	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.350	$135,417	$1,289,808
2009	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.331	$127,751	$1,417,559
2010	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.312	$120,520	$1,538,080
2011	($16,120)	($1,099,600)	$26,765	$0	$0	$715,408	($373,547)	.294	($109,881)	$1,428,199
2012	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.278	$107,263	$1,535,461
2013	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.262	$101,191	$1,636,652
2014	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.247	$95,463	$1,732,116
2015	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.233	$90,060	$1,822,175

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1

Total Life-Cycle Costs

Alternative: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS

6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (6% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.220	$84,962	$1,907,137
2017	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.207	$80,153	$1,987,290
2018	($16,120)	($759,600)	$26,765	$0	$0	$375,880	($373,075)	.196	($72,985)	$1,914,305
2019	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.185	$71,336	$1,985,641
2020	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.174	$67,298	$2,052,939
2021	($16,120)	($1,334,400)	$26,765	$0	$0	$715,408	($608,347)	.164	($99,924)	$1,953,015
2022	($16,120)	($92,000)	$26,765	$0	$0	$375,880	$294,525	.155	$45,639	$1,998,654
2023	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.146	$56,505	$2,055,158
2024	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.138	$53,306	$2,108,465
2025	($16,120)	($766,800)	$26,765	$0	$0	$375,880	($380,275)	.130	($49,476)	$2,058,989
2026	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.123	$47,442	$2,106,431
2027	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.116	$44,757	$2,151,188
2028	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.109	$42,224	$2,193,411
2029	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.103	$39,833	$2,233,245
2030	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.097	$37,579	$2,270,824
2031	($16,120)	($1,383,600)	$26,765	$0	$0	$715,408	($657,547)	.092	($60,310)	$2,210,514
2032	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.087	$33,445	$2,243,959
2033	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.082	$31,552	$2,275,511
2034	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.077	$29,766	$2,305,277
2035	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.073	$28,081	$2,333,358
2036	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.069	$26,492	$2,359,849
2037	($16,120)	($92,000)	$26,765	$0	$0	$375,880	$294,525	.065	$19,043	$2,378,893
2038	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.061	$23,577	$2,402,470
2039	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.058	$22,243	$2,424,713
2040	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.054	$20,984	$2,445,697
Total	($906,440)	($9,741,200)	$1,338,240	$0	$0	$20,491,632	$11,182,232		$2,445,697	

FORM S-2

Total Life-Cycle Benefits

Alternative: COMBINATION NEW/EXISTING BUILDINGS

6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1) (4)	(6) Present Value Mult. (6% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$63,977	N/A	N/A	$63,977	.890	$56,940	$56,940
1992	N/A	$63,977	N/A	N/A	$63,977	.840	$53,717	$110,656
1993	N/A	$63,977	N/A	N/A	$63,977	.792	$50,676	$161,332
1994	N/A	$63,977	N/A	N/A	$63,977	.747	$47,808	$209,140
1995	N/A	$63,977	N/A	N/A	$63,977	.705	$45,102	$254,242
1996	N/A	$63,977	N/A	N/A	$63,977	.665	$42,549	$296,790
1997	N/A	$63,977	N/A	N/A	$63,977	.627	$40,140	$336,930
1998	N/A	$63,977	N/A	N/A	$63,977	.592	$37,868	$374,798
1999	N/A	$63,977	N/A	N/A	$63,977	.558	$35,725	$410,523
2000	N/A	$63,977	N/A	N/A	$63,977	.527	$33,702	$444,226
2001	N/A	$63,977	N/A	N/A	$63,977	.497	$31,795	$476,020
2002	N/A	$63,977	N/A	N/A	$63,977	.469	$29,995	$506,015
2003	N/A	$63,977	N/A	N/A	$63,977	.442	$28,297	$534,313
2004	N/A	$63,977	N/A	N/A	$63,977	.417	$26,696	$561,008
2005	N/A	$63,977	N/A	N/A	$63,977	.394	$25,184	$586,193
2006	N/A	$63,977	N/A	N/A	$63,977	.371	$23,759	$609,952
2007	N/A	$63,977	N/A	N/A	$63,977	.350	$22,414	$632,366
2008	N/A	$63,977	N/A	N/A	$63,977	.331	$21,145	$653,511
2009	N/A	$63,977	N/A	N/A	$63,977	.312	$19,948	$673,460
2010	N/A	$63,977	N/A	N/A	$63,977	.294	$18,819	$692,279
2011	N/A	$63,977	N/A	N/A	$63,977	.278	$17,754	$710,033
2012	N/A	$63,977	N/A	N/A	$63,977	.262	$16,749	$726,782
2013	N/A	$63,977	N/A	N/A	$63,977	.247	$15,801	$742,583
2014	N/A	$63,977	N/A	N/A	$63,977	.233	$14,907	$757,490
2015	N/A	$63,977	N/A	N/A	$63,977	.220	$14,063	$771,553

** First year of occupancy.

FORM S-2

Total Life-Cycle Benefits

Alternative: COMBINATION NEW/EXISTING BUILDINGS

6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (6% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$63,977	N/A	N/A	$63,977	.207	$13,267	$784,819
2017	N/A	$63,977	N/A	N/A	$63,977	.196	$12,516	$797,335
2018	N/A	$63,977	N/A	N/A	$63,977	.185	$11,807	$809,143
2019	N/A	$63,977	N/A	N/A	$63,977	.174	$11,139	$820,282
2020	N/A	$63,977	N/A	N/A	$63,977	.164	$10,509	$830,790
2021	N/A	$63,977	N/A	N/A	$63,977	.155	$9,914	$840,704
2022	N/A	$63,977	N/A	N/A	$63,977	.146	$9,353	$850,057
2023	N/A	$63,977	N/A	N/A	$63,977	.138	$8,823	$858,880
2024	N/A	$63,977	N/A	N/A	$63,977	.130	$8,324	$867,204
2025	N/A	$63,977	N/A	N/A	$63,977	.123	$7,853	$875,056
2026	N/A	$63,977	N/A	N/A	$63,977	.116	$7,408	$882,465
2027	N/A	$63,977	N/A	N/A	$63,977	.109	$6,989	$889,453
2028	N/A	$63,977	N/A	N/A	$63,977	.103	$6,593	$896,047
2029	N/A	$63,977	N/A	N/A	$63,977	.097	$6,220	$902,267
2030	N/A	$63,977	N/A	N/A	$63,977	.092	$5,868	$908,135
2031	N/A	$63,977	N/A	N/A	$63,977	.087	$5,536	$913,670
2032	N/A	$63,977	N/A	N/A	$63,977	.082	$5,222	$918,893
2033	N/A	$63,977	N/A	N/A	$63,977	.077	$4,927	$923,820
2034	N/A	$63,977	N/A	N/A	$63,977	.073	$4,648	$928,468
2035	N/A	$63,977	N/A	N/A	$63,977	.069	$4,385	$932,853
2036	N/A	$63,977	N/A	N/A	$63,977	.065	$4,137	$936,989
2037	N/A	$63,977	N/A	N/A	$63,977	.061	$3,903	$940,892
2038	N/A	$63,977	N/A	N/A	$63,977	.058	$3,682	$944,573
2039	N/A	$63,977	N/A	N/A	$63,977	.054	$3,473	$948,047
2040	N/A	$63,977	N/A	N/A	$63,977	.051	$3,277	$951,323
Total	N/A	$3,198,869	N/A	N/A	$3,198,869		$951,323	

FORM S-2
Total Life-Cycle Benefits
Alternative: COMBINATION NEW/LEASING
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (6% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$63,977	N/A	N/A	$63,977	.890	$56,940	$56,940
1992	N/A	$63,977	N/A	N/A	$63,977	.840	$53,717	$110,656
1993	N/A	$63,977	N/A	N/A	$63,977	.792	$50,676	$161,332
1994	N/A	$63,977	N/A	N/A	$63,977	.747	$47,808	$209,140
1995	N/A	$63,977	N/A	N/A	$63,977	.705	$45,102	$254,242
1996	N/A	$63,977	N/A	N/A	$63,977	.665	$42,549	$296,790
1997	N/A	$63,977	N/A	N/A	$63,977	.627	$40,140	$336,930
1998	N/A	$63,977	N/A	N/A	$63,977	.592	$37,868	$374,798
1999	N/A	$63,977	N/A	N/A	$63,977	.558	$35,725	$410,523
2000	N/A	$63,977	N/A	N/A	$63,977	.527	$33,702	$444,226
2001	N/A	$63,977	N/A	N/A	$63,977	.497	$31,795	$476,020
2002	N/A	$63,977	N/A	N/A	$63,977	.469	$29,995	$506,015
2003	N/A	$63,977	N/A	N/A	$63,977	.442	$28,297	$534,313
2004	N/A	$63,977	N/A	N/A	$63,977	.417	$26,696	$561,008
2005	N/A	$63,977	N/A	N/A	$63,977	.394	$25,184	$586,193
2006	N/A	$63,977	N/A	N/A	$63,977	.371	$23,759	$609,952
2007	N/A	$63,977	N/A	N/A	$63,977	.350	$22,414	$632,366
2008	N/A	$63,977	N/A	N/A	$63,977	.331	$21,145	$653,511
2009	N/A	$63,977	N/A	N/A	$63,977	.312	$19,948	$673,460
2010	N/A	$63,977	N/A	N/A	$63,977	.294	$18,819	$692,279
2011	N/A	$63,977	N/A	N/A	$63,977	.278	$17,754	$710,033
2012	N/A	$63,977	N/A	N/A	$63,977	.262	$16,749	$726,782
2013	N/A	$63,977	N/A	N/A	$63,977	.247	$15,801	$742,583
2014	N/A	$63,977	N/A	N/A	$63,977	.233	$14,907	$757,490
2015	N/A	$63,977	N/A	N/A	$63,977	.220	$14,063	$771,553

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: COMBINATION NEW/LEASING
6% DISCOUNT RATE SENSITIVITY ANALYSIS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (6% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$63,977	N/A	N/A	$63,977	.207	$13,267	$784,819
2017	N/A	$63,977	N/A	N/A	$63,977	.196	$12,516	$797,335
2018	N/A	$63,977	N/A	N/A	$63,977	.185	$11,807	$809,143
2019	N/A	$63,977	N/A	N/A	$63,977	.174	$11,139	$820,282
2020	N/A	$63,977	N/A	N/A	$63,977	.164	$10,509	$830,790
2021	N/A	$63,977	N/A	N/A	$63,977	.155	$9,914	$840,704
2022	N/A	$63,977	N/A	N/A	$63,977	.146	$9,353	$850,057
2023	N/A	$63,977	N/A	N/A	$63,977	.138	$8,823	$858,880
2024	N/A	$63,977	N/A	N/A	$63,977	.130	$8,324	$867,204
2025	N/A	$63,977	N/A	N/A	$63,977	.123	$7,853	$875,056
2026	N/A	$63,977	N/A	N/A	$63,977	.116	$7,408	$882,465
2027	N/A	$63,977	N/A	N/A	$63,977	.109	$6,989	$889,453
2028	N/A	$63,977	N/A	N/A	$63,977	.103	$6,593	$896,047
2029	N/A	$63,977	N/A	N/A	$63,977	.097	$6,220	$902,267
2030	N/A	$63,977	N/A	N/A	$63,977	.092	$5,868	$908,135
2031	N/A	$63,977	N/A	N/A	$63,977	.087	$5,536	$913,670
2032	N/A	$63,977	N/A	N/A	$63,977	.082	$5,222	$918,893
2033	N/A	$63,977	N/A	N/A	$63,977	.077	$4,927	$923,820
2034	N/A	$63,977	N/A	N/A	$63,977	.073	$4,648	$928,468
2035	N/A	$63,977	N/A	N/A	$63,977	.069	$4,385	$932,853
2036	N/A	$63,977	N/A	N/A	$63,977	.065	$4,137	$936,989
2037	N/A	$63,977	N/A	N/A	$63,977	.061	$3,903	$940,892
2038	N/A	$63,977	N/A	N/A	$63,977	.058	$3,682	$944,573
2039	N/A	$63,977	N/A	N/A	$63,977	.054	$3,473	$948,047
2040	N/A	$63,977	N/A	N/A	$63,977	.051	$3,277	$951,323
Total	N/A	$3,198,869	N/A	N/A	$3,198,869		$951,323	

ECONOMIC ANALYSIS

AIR TEST CENTER
ENGINEERING MANAGEMENT FACILITY

FY 1990 MCP

Eveready AFB

Ourtown, US

CERTIFICATE OF SATISFACTORY ECONOMIC ANALYSIS

Installation/MAJCOM: Eveready AFB

Project Title: Air Test Center Engineering Management Facility

Project Number: ABCD900125

Alternatives Considered:

Construct New Engineering Management Facility (EMF)

Combination New/Existing Buildings

Combination New/Leasing

Summary of Analysis Results:

The economic analysis concluded that the new construction alternative would be the most cost-effective approach to meeting Air Test Center engineering management needs at Eveready AFB, based on life-cycle costs and benefits. The life-cycle costs of the combination alternatives would be higher than new construction, and they would provide fewer benefits than new construction. The new construction alternative is, therefore, recommended.

Base-level ACC Evaluation: _____ *(signature)*

Concurrence (AC): _____ *(signature)*

Concurrence (DE): _____ *(signature)*

Evaluation by MAJCOM ACC:

Concur with the selection of new construction as the most cost-effective alternative for meeting base Air Test Center engineering management needs. It has the most benefits and is the least costly of all the alternatives considered.

MAJCOM ACC Evaluation: _____ *(signature)*

Contents

Section		*Page*
1.0	Introduction	1
1.1	Requirement	1
1.2	Background	1
1.3	Objectives	2
2.0	Alternatives	2
2.1	Alternatives Evaluated	2
2.2	Alternatives Determined To Be Infeasible	3
3.0	Life-Cycle Cost Analysis	5
3.1	Constraints and Assumptions	6
3.2	Life-Cycle Costs	12
4.0	Benefits Analysis	12
4.1	Constraints and Assumptions	12
4.2	Benefits	13
5.0	Comparison of Alternatives	15
6.0	Sensitivity Analysis	15
6.1	New Conference Facility	15
6.2	Alternate Discount Rate	17
7.0	Conclusions and Recommendation	19

List of Figures

Figure		*Page*
1	Break-Even Graph (10 percent discount rate)	16
2	Sensitivity Analysis Break-Even Graph (6 percent discount rate)	18

List of Tables

Table		*Page*
1	Alternatives Evaluated	4

1.0 INTRODUCTION

1.1 Requirement

The Air Test Center at Eveready AFB is required to provide adequate space for air test program technical support personnel, conferences and meetings, and security vaults. The primary mission of the Air Test Center is to conduct and support aircraft testing, flight evaluation and recovery, and test pilot training and to manage, operate, and maintain the test and training range. In 1990, the center's mission will include the current flight test programs and additional classified programs.

Additional engineering and technical workspace is required to meet both current and future mission needs. Currently, 471 engineering and technical personnel support the Air Test Center mission. They are dispersed among 6 buildings and 13 trailers. Between 1987 and 1990, the Air Test Center workload is projected to increase by 90%. This trend is expected to continue through 1995 at a rate of 5% per year. To accommodate the initial increase in workload, the engineering and technical staff will be increased to 536 by fiscal year (FY) 1990. The effectiveness of the Air Test Center program is limited by the space available for technical support staff.

Air Force Manual (AFM) 86-2 provides for a work area of 115 net square feet per person for technical staff. The current workspace provides 87 square feet per person (24% below standard) for workers housed in permanent facilities and 104 square feet per person (9% below standard) for workers with offices in the trailers. In addition to workspace inadequacies, there are limited facilities available for secure conferences and meetings. Special access programs require secure work areas and conference rooms.

Losses in productivity due to inadequate facilities could result in mission compromises and a decrease in the number of tests the Air Test Center can support. If the current trends continue, some programs will have to be curtailed, requiring that testing be conducted at other locations. This would in turn cause the costs of the test program to escalate.

1.2 Background

The existing facilities available for program support personnel at the Air Test Center are inadequate. At present, personnel from this group are located in 6 permanent buildings and 13 leased trailers in various areas of the flightline across the base. Four of the 6 buildings were constructed in the 1950s and the other two in 1982 and 1985. The 13 trailers were installed in 1982. These facilities comprise a total of 250,784 square feet and house 4,670 technical personnel. The 471 engineering and technical personnel occupy 40,000 gross (34,000 net) square feet of permanent facilities and 9,282 gross (8,354 net) square feet of leased trailer space. They are dispersed and physically separated by distances as great as 3 miles.

The requirement to travel between buildings results in a loss of productive time and reduced efficiency, as well as in increased personal vehicle costs. The separation of personnel also inhibits communication, resulting in inefficient planning and implementation of test programs. In addition, the dispersion of

resources presents security risks to classified programs, inhibits coordination, and affects the timeliness of operations.

Conference areas and meeting rooms are limited on base. Currently, there are two conference facilities on base, but neither is cleared for sensitive or classified meetings. Since there is a deficiency in conference space, some conferences must be held off base at a leased facility. Smaller meetings are usually held in the technical staff's work area and interfere with technical work.

In the past decade, the number of personnel at Eveready AFB has increased considerably (from approximately 13,000 military and civilian personnel in 1976 to over 21,000 in 1986). The increase in personnel has caused overcrowding in most existing work areas, and many administrative personnel have been assigned to work in leased trailer space. Leased trailer space has provided a short-term solution to the work area shortage; however, in the long run leasing trailers is not cost effective (as the economic analysis will demonstrate).

1.3 Objectives

The purpose of this analysis is to identify the most effective means of providing adequate facilities to support the Air Test Center mission and to increase the efficiency of the test programs. The objectives considered in evaluating alternatives include the following:

1. Provide adequate office space for current program support personnel and to accommodate the increase in the work force.

2. Ensure that Air Test Center staff are able to meet productivity and communication requirements.

3. Provide work space in a cost-effective manner.

4. Provide secure meeting rooms and special access conference areas.

2.0 ALTERNATIVES

2.1 Alternatives Evaluated

CONSTRUCT A NEW ENGINEERING MANAGEMENT FACILITY (EMF). This alternative involves construction of a 86,500 SF facility with 536 office spaces and conference and meeting rooms. The facility would increase individual work space; provide special access areas, conference space, and meeting rooms; and consolidate Air Test Center engineering support personnel. Construction of this facility would create vacancies in the six buildings currently occupied by this staff. A backfill program would be implemented to relocate other staff currently working in leased trailer space into these vacated offices, alleviating existing space shortages within other sections of the Air Test Center. The new facility would be designed to accommodate 536 personnel with the required 115 net square feet per person.

COMBINATION NEW CONSTRUCTION AND EXISTING PERMANENT BUILDINGS. This alternative involves constructing a new 48,685 SF facility to provide special access areas, conference space, meeting rooms, and workspace for 240 technical support

personnel required to meet increased mission demands. Of the existing 471 technical support personnel, 296 would continue to be housed in the existing six permanent facilities. Personnel in the trailers would be moved into the new facility. This alternative would meet the space requirements (115 net square feet per person) but only partly consolidate the Air Test Center engineering operations.

NEW CONSTRUCTION (CONFERENCE AND MEETING SPACE ONLY) IN COMBINATION WITH THE STATUS QUO AND LEASING 30 ADDITIONAL TRAILERS. This alternative involves constructing a new 18,000 SF facility to provide secure conference and meeting space. Work space for technical personnel would be provided by leasing 30,702 square feet of trailer space (a total of 43 trailers with the existing 13). Under this alternative, Air Test Center functions would continue to be dispersed. Leasing the additional trailers would require approval from OSD.

Table 1 summarizes the components of each alternative.

2.2 Alternatives Determined to be Infeasible

EXPANDING AN EXISTING FACILITY. This alternative was found to be infeasible because no existing building on base has sufficient adjacent land to accommodate the expansion required.

CONVERTING ANOTHER BUILDING ON BASE. This alternative is not feasible because there are no vacant buildings with the square footage required in a suitable location on base. All appropriately located buildings are at 100% utilization.

COMBINATION NEW CONSTRUCTION (145 OFFICE SPACES AND CONFERENCE AND MEETING SPACE) AND STATUS QUO. For this alternative, a new 36,250 SF facility would provide secure workspace, conference areas, and adequate office space to accommodate the personnel increase of 65 and the 80 personnel currently in leased trailer space. The 391 personnel housed in the six existing buildings would remain in their current workspace, which would continue to be inadequate. Since this alternative would not bring all personnel work space up to standard, it was eliminated from further consideration.

COMBINATION NEW CONSTRUCTION (65 OFFICE SPACES AND CONFERENCE AND MEETING SPACE) AND STATUS QUO. A new 26,305 SF facility would be constructed for this alternative. This facility would provide secure workspace, conference areas, and enough office space for the 65 additional personnel expected by 1991. The 471 personnel currently working in the existing facilities would remain where they are. Since these personnel would continue to have inadequate workspace, this alternative was also eliminated.

COMBINATION NEW CONSTRUCTION (CONFERENCE AND MEETING SPACE ONLY), STATUS QUO, AND LEASING 13 ADDITIONAL TRAILERS. This alternative entails building a new 18,000 SF conference building with 10,500 square feet of secure workspace and conference space and 7,500 square feet of nonsecure conference area. No additional space for offices would be included in the new building. The 471 existing personnel would remain in the current facilities, and the additional 65 personnel would be accommodated in 13 additional leased trailers. This would bring the 145 personnel housed in the trailers up to the 115 net square feet per person standard, but the 391 personnel in the existing permanent buildings would

Table 1

ALTERNATIVES EVALUATED

	EMF	*Combination New/Existing Bldgs.*	*Combination New/Leasing*
Square Footage			
New Construction	86,500	48,685	18,000
Existing Permanent Facilities	<40,000>[1]	40,000	40,000
Existing Leased Trailers	<9,282>[2]	<9,282>[2]	9,282
New Leased Trailers	--	--	21,420
TOTAL	86,500	88,685	88,702
Personnel Accommodated			
New Construction	536	240	--
Existing Permanent Facilities	<296>[3]	296	296
Existing Leased Trailers	--	--	73
New Leased Trailers	--	--	167
TOTAL	536	536	536
Conference/Secure Space Square Footage			
General Conference Area	7,500	7,500	7,500
Secure Work Space	5,250	5,250	5,250
Secure Conference Space	5,250	5,250	5,250
TOTAL	18,000	18,000	18,000

1. Square footage of facilities that would be vacated and available for use by another organization.
2. Square footage of trailer space that would be vacated and annual lease terminated.
3. Number of personnel from another organization that could be accommodated in vacated space, assuming 115 net square feet per person.

remain in space that is 24% below standard. Therefore this alternative was not analyzed further.

STATUS QUO. The status quo is not considered a viable alternative because the mission requirements cannot be met by using only the existing facilities. Space in the existing buildings is not adequate to accommodate the existing personnel and could not accommodate the new personnel coming on base. There is also a lack of secure work areas and conference facilities. The cost of the status quo alternative is estimated in this analysis to provide a baseline for comparison of the three alternatives that do meet mission requirements. In addition, components of the status quo are used in combination with new construction in two of the alternatives.

3.0 LIFE-CYCLE COST ANALYSIS

To estimate the life-cycle costs of the three alternatives, each alternative is broken down into the various components which, in combination, will fulfill the Air Test Center mission requirement. There are six separate facility components which are listed below.

Facility Components	*Square Feet*	*Personnel Accommodated*
New construction of 536 office spaces	68,500	536
New construction of 240 office spaces	30,685	240
Existing permanent facilities	40,000	296
Existing leased trailer space (13 trailers)	9,282	73
Additional leased trailer space (30 trailers)	21,420	167
New construction of conference and meeting area space	18,000	N/A

Each alternative is made up of at least two of the six facility components. The combination of components which make up each alternative is shown below.

EMF	*Combination New/Existing Bldgs*	*Combination New/Leasing*
New construction of 536 office spaces	New construction of 240 office spaces	Existing permanent facilities
New construction of conference and meeting area space	Existing permanent facilities	Existing leased trailer space
	New construction of conference and meeting area space	Additional leased trailer space
		New construction of conference and meeting area space

3.1 Constraints and Assumptions

Capital Investment

All three alternatives evaluated involve new construction through an FY 1990 MCP project. Investment costs for each of the alternatives are based on the following assumptions:

1. All costs are in FY 1990 dollars, using the OSD inflator multiplier rates of 1.188 to convert FY 1985 and and 1.151 to convert FY 1986 dollars.

2. Facility construction costs are $79 per square foot for administrative space and $76 per square foot for the conference and meeting area space. These costs are based on the Air Force *Annual Construction Pricing Guide* (facilities are classified as multi-purpose administrative and applied instruction).

3. Supporting facilities' costs, including site work, pavements, utilities, communications, and systems furniture, amount to 15% of the facility construction costs.

4. A contingency of 5% and supervision, inspection, and overhead (SIOH) of 5.5% are added to facility construction costs.

5. An additional $2 per square foot is included for unique passive solar applications.

Capital investment requirements for the three new construction facility components are shown below.

	New Construction 536 Offices	*New Construction 240 Offices*	*Conference & Meeting Space*
Square Feet	68,500	30,685	18,000
Cost per Square Foot ($)	79.00	79.00	76.00
Size Adjustment Factor	0.93	0.98	1.04
Area Cost Factor	0.87	0.87	0.87
SUBTOTAL ($)	4,378,445	2,066,800	1,237,766
Supporting Facilities Factor	1.15	1.15	1.15
SUBTOTAL ($)	5,035,211	2,376,821	1,423,431
Unique Passive Solar ($)	137,000	61,370	36,000
SIOH and Contingency	1.105	1.105	1.105
TOTAL ($)	5,715,294	2,694,201	1,612,672
Programmed Amount ($)	5,700,000	2,700,000	1,600,000

The following list indicates the total investment required for each alternative, combining the capital investment costs of the new construction facility components as appropriate.

Alternative	*Total Square Feet of New Construction*	*Total Investment Cost ($ FY 1990)*
EMF	86,500	7,300,000
Combination New/ Existing Building	48,685	4,300,000
Combination New/ Leasing	18,000	1,600,000

Annual Maintenance Costs

The annual maintenance costs included for the life-cycle analysis are based on information in Appendix B of the *Military Construction Program Economic Analysis Manual.*

The cost per square foot for annual maintenance is equal to $0.62 for administrative space and $0.59 for the conference and meeting area space (the

latter was interpreted as a "community services" facility). The annual maintenance costs for each facility component are shown below.

Facility Component	*Age of Building (Years)*	*Building Age Multiplier*	*Annual Cost ($)*
New Construction of 536 Office Spaces			
1991-1999	0-9	1.00	42,470
2000-2009	10-19	1.40	59,458
2010-2019	20-29	1.90	80,693
2020-2029	30-39	2.10	89,187
2030-2040	40-50	2.10	89,187
New Construction of 240 Office Spaces			
1991-1999	0-9	1.00	19,025
2000-2009	10-19	1.40	26,635
2010-2019	20-29	1.90	36,148
2020-2029	30-39	2.10	39,953
2030-2040	40-50	2.10	39,953
Existing Permanent Facilities			
1991-1999	40-50	2.10	52,080
2000-2040	>50	1.65	40,920
Existing Leased Trailer Space			
1991-2040	0-9	1.00	5,755
Additional Leased Trailer Space			
1991-2040	0-9	1.00	13,280
New Construction of Conference and Meeting Space			
1990-1999	0-9	1.00	10,620
2000-2009	10-19	1.40	14,868
2010-2019	20-29	1.90	20,178
2020-2029	30-39	2.10	22,302
2030-2040	40-50	2.10	22,302

The existing 13 office trailers are leased on an annual basis. Since this is a triple net lease agreement, annual maintenance costs (as well as utilities, trash collection, and custodial services) for the trailers are not included in the lease cost and are therefore calculated separately.

Maintenance costs for the new facilities are assumed to begin accruing in 1991.

Periodic Maintenance, Repair, and Replacement Costs

Periodic maintenance, repair, and replacement (M&R) costs for all permanent office space facility components were calculated based on the assumptions on frequency and costs for major repair items shown below.

Subsystem	*Subsystem Factor* (Percent)*	*Periodic M&R Cost ($ per Sq. Ft.)*	*Subsystem Life Expectancy** (Years)*
Foundations, Floors, Structural Walls, Roof Structures, Stairs	19	19.17	75
Roofing	2	2.30	15
Interior Walls and Doors, Windows, Exterior Closure	13	13.27	50
Wall and Floor Finishes, Paint, Wall Coverings, Carpeting	18	18.86	10
Ceiling Finishes	8	8.63	20
Elevators	5	5.03	40
Fire Protection Equipment	1	0.52	50
HVAC	18	18.99	25
Plumbing	2	2.07	40
Electrical	14	14.50	30

* The periodic M&R cost per square foot for each subsystem is equal to the subsystem percentage factor multiplied by the renovation cost per square foot, which is further multiplied by a demolition/removal factor of 1.3, the area cost factor of 0.87, and an additional 15.5% for SIOH and contingency.

** From Appendix B of the Military Construction Program Economic Analysis Manual.

The periodic M&R cost per square foot of building space is based on *Means Square Foot Costs* and the Air Force *Annual Construction Pricing Guide*, and the percentage of total costs required to replace each subsystem was obtained from the *Means* guide. An additional demolition/removal factor was applied to the cost per square foot for each subsystem based on information in Appendix B of the *Military Construction Program Economic Analysis Manual.*

The same methodology is used to determine periodic maintenance, repair, and replacement costs for the conference and meeting area space facility component, but with different base construction costs and subsystem percentages. The resulting costs per square foot are shown below.

Subsystem	*Subsystem Factor* (Percent)*	*Periodic M&R Cost ($ per Sq. Ft.)*	*Subsystem Life Expectancy** (Years)*
Roofing	7	7.16	15
Interior Walls and Doors, Windows, Exterior Closure	16	15.64	50
Wall and Floor Finishes, Paint, Wall Coverings, Carpeting	19	19.36	10
Ceiling Finishes	7	6.86	20
Fire Protection Equipment	1	0.50	50
HVAC	13	12.48	25
Plumbing	6	5.66	40
Electrical	5	5.34	30
Special Equipment	3	2.96	25

* **The periodic M&R cost per square foot for each subsystem is equal to the subsystem percentage factor multiplied by the renovation cost per square foot, further multiplied by a demolition/removal factor of 1.3, the area cost factor of 0.87, and an additional 15.5% for SIOH and contingency.**

** **From Appendix B of the Military Construction Program Economic Analysis Manual.**

Utility Costs

Eveready AFB uses natural gas and electricity. Natural gas is supplied by Ourtown Gas Company and is used for space heating and domestic hot water. Electricity, supplied by Commercial Electric Company, is used primarily for lighting, cooling, and ventilation. Status quo and leasing costs for this analysis are based on engineering estimates for buildings and trailers. Energy budget figures (EBF) were used to calculate utility costs for the alternatives involving new facilities. Engineering Technical Letter 86-1 indicates that the EBF figure for new construction is 35,000 Btus per square foot per year in Region 4, which includes Eveready AFB. The basewide average ratio of electricity to natural gas (70% to 30%) was used to estimate energy usage for each of the alternatives.

Utility costs for heating and cooling trailers are higher than for permanent buildings. Electricity is used for space and water heating as well as cooling, ventilation, and lighting. Estimates of electrical usage are based on a 9-kilowatt-hour rating determined by engineering calculations. These figures equate to 57.5 million Btus of electricity used per trailer per year. Each trailer has 714 square feet, resulting in a consumption rate of 80,532 Btus per square foot per year.

Base civil engineering records indicate that the annual water use per person for similar facilities is 10,400 gallons. This is based on 40 gallons per person per day for 260 days. The sewage treatment requirement was assumed to be 70% of the total water use, based on engineering standards. Water and sewer usage is expected to be the same for all alternatives.

Utility costs are summarized in the following table.

Alternative	Annual Cost ($ FY 1990) Electricity	Natural Gas	Water/Sewer	Total
EMF	57,177	6,068	16,211	79,456
Combination New/ Existing Buildings	85,062	9,026	16,211	110,299
Combination New/ Leasing	150,002	6,873	16,211	173,086

Miscellaneous Operations and Maintenance Costs

Trash removal services were calculated using the data in Appendix B of the *Military Construction Program Economic Analysis Manual.* The base service monitor provided historic data for custodial costs. The average cost per square foot for custodial services is $0.82 (FY 1990 dollars). Using these figures, the annual expenditures for these services was estimated for each of the alternatives and is shown below.

Alternative	Annual Cost ($ FY 1990) Trash Removal	Custodial Services	Total
EMF	9,039	70,930	79,969
Combination New/ Existing Buildings	9,039	72,722	81,761
Combination New/ Leasing	9,039	72,735	81,774

Leasing Costs

Currently, 115 trailers are used at Eveready AFB by various organizations. Trailer leasing costs were $485.77 per month in FY 1986. The square footage costs for FY 1990 are estimated at $9.40. The leasing alternative involves the use of 43 trailers to provide 30,702 square feet of office space for Air Test Center support personnel. The annual cost of trailer leasing, using the FY 1990 rate, would total $288,509.

In addition to recurring costs, there would be a one-time charge of $5,063 per trailer for site preparation. Site preparation includes grading and utility line extension and hookup. A move-in and configuration charge of $5,221 is also required per trailer. Based on these fees, the total cost of installing the additional

30 trailers (13 are currently in use) at Eveready AFB would be $596,541 in FY 1990.

Leased trailers have a life expectancy of 10 years at Eveready AFB. At the end of each 10-year period, the trailers would be moved out and replaced. The contract amount to move the trailers off base is $842 per trailer (FY 1990 dollars). This would be added to the move-in and configuration charge in years 2000, 2010, and 2020 at a total cost of $181,890 ($6,063 per trailer for 30 trailers) for each of these years. The existing 13 trailers were installed in 1982. They would be replaced in the years 1992, 2002, 2012, 2022, and 2032 at a total cost of $78,819 ($6,063 per trailer for 13 trailers) in each of those years.

3.2 Life-Cycle Costs

Life-cycle costs for all alternatives were calculated in FY 1990 dollars and discounted to present value using a discount rate of 10%. Form S-1 for each alternative is attached. The total costs in program-year dollars and present value are presented in the following table for each alternative.

Alternative	*Life-Cycle Costs ($ FY 1990)*	
	Constant Dollars	*Present Value*
EMF	35,708,198	11,000,395
Combination New/ Existing Buildings	37,155,941	11,121,295
Combination New/ Leasing	47,555,352	12,104,154

4.0 BENEFITS ANALYSIS

4.1 Constraints and Assumptions

Each of the alternatives would benefit from the elimination of labor hours spent traveling off-base to the monthly conference (approximately 1 hour round trip). For the 200 personnel who typically go to this conference, this labor savings would total 2,400 hours per year.

Consolidation of functions in a single EMF is expected to result in user cost savings in personnel labor time and vehicle costs. These savings were calculated based on a survey of interbuilding trips conducted in 1986 by PRC Engineering. Currently, a total of 4,235 person-hours annually are expended traveling between Air Test Center facilities, with an average round-trip travel time of 13 minutes. Two trips per week were made by each person surveyed. These hours equate to an annual cost of $112,897 (based on an average hourly rate of $26.66). These cost savings would be realized only with the EMF alternative.

The EMF alternative would also save $11,182,232 (FY 1990) because personnel presently located in 56 trailers could move into permanent facilities and the lease on those trailers could be terminated. This savings is calculated on Form S-1 and is attached. Figures in parentheses indicate that costs for the permanent facilities are higher than for leasing in those categories.

Although providing adequate working space is expected to increase labor efficiency and productivity, the difference over the status quo cannot be quantified and therefore is not included in the life-cycle benefit calculations. Each of the alternatives evaluated would provide adequate work space; therefore each alternative would benefit from the increased work space.

In addition to the benefits from user cost savings, qualitative factors were a major consideration in the analysis. The qualitative criteria used include efficiency/ productivity, security, communications, morale, accessibility, and maintainability. The criteria used to evaluate qualitative benefits were weighted as follows to reflect base priorities with respect to present and future mission requirements.

Criterion	*Weight*
Efficiency/Productivity	3
Security	3
Communications	2
Morale	1
Accessibility	2
Maintainability	1

4.2 Benefits

The table below shows the annual user cost savings benefits from consolidation of office space and from elimination of off-base travel to conferences accrued by each alternative.

	Annual Cost Savings ($ FY 1990)		
	Consolidation	*Conference Travel*	*Total Benefit*
New EMF	112,897	63,977	176,874*
Combination New/Existing Bldgs	--	63,977	62,532
Combination New/Lease	--	63,977	62,532

* Does not include cost savings from vacating the 56 trailers, which vary from year to year.

Currently, staff is operating below the space standards in AFM 86-2. Limited availability of building space for personnel has caused an overcrowded condition. Dispersion of support personnel causes delays in test program planning, execution, and reporting. In addition, the dispersion creates potential security risks and communication problems. Since the current workspace conditions are inadequate, morale is adversely affected. The physical distance between the various facilities also reduces accessibility. Under the current conditions, accessibility for small staff meetings or conferences is limited by the available facilities.

The new EMF scores highest on all qualitative criteria for alleviating these inadequacies. All existing deficiencies would be eliminated, and morale and accessibility would be improved. A modern facility would also make maintenance and service more efficient.

The combination new/existing buildings alternative would rank second in the qualitative benefits analysis. The new conference area with secure work space and conference rooms would eliminate the existing breach of security. It would also eliminate the need to hold small office meetings and conferences in existing offices, which disturbs others working nearby. All workers would be provided with the required 115 net square feet of office work area. This is expected to increase the efficiency/productivity and moral of the workers. Consolidating at least some of the technical staff would improve communications and accessibility. The continued use of the existing buildings that will require some major repairs in the next few years causes this alternative to rank relatively low in terms of maintainability.

The combination new/leasing alternative ranks last in the qualitative benefits analysis. Construction of a new conference center would resolve the security problem, and leasing 30,702 square feet of trailer space would alleviate the work space deficiency and increase efficiency. Although the work space would be adequate, it would still be dispersed, so communications and accessibility would not be as efficient as with the new EMF. The use of trailers (which only require annual maintenance) results in the highest ranking for maintainability among the three alternatives.

Weighted qualitative benefits scores for each of the alternatives are presented in the table below.

Criterion	*EMF*	*Combination New/ Existing Bldgs.*	*Combination New/ Leasing*
Efficiency/ Productivity	30	21	12
Security	30	30	30
Communication	20	14	6
Morale	10	8	4
Accessibility	20	12	6
Maintainability	7	5	6
TOTAL	117	90	64

5.0 COMPARISON OF ALTERNATIVES

The EMF is the least costly alternative, considering life-cycle costs only; however, the break-even graph in Figure 1 demonstrates that all of the alternatives are relatively close in terms of life-cycle costs.

When the benefits from user cost savings are included, the EMF alternative also has the highest benefit-cost ratio (BCR) at 0.87. The combination new/existing buildings has a BCR of 0.67, and the combination new/leasing alternative has the lowest BCR at 0.62 (see Form S-3 attached). Considering life-cycle costs and BCR, the EMF alternative is the most cost effective. It also ranks first in qualitative benefits.

6.0 SENSITIVITY ANALYSIS

Two sensitivity analyses were conducted: the first compares the cost of the status quo to constructing a new conference facility for conducting nonsecure conferences only, and the second uses an alternate discount rate to calculate present value.

6.1 New Conference Facility

Many of the alternatives that were considered could be modified by decreasing the amount of conference space built. Within the 18,000 SF conference area planned, there would be 10,500 square feet of secure work area and 7,500 square feet of nonsecure general conference area. The 10,500 square feet of secure space is required to meet mission requirements, but having 7,500 square feet of general conference area on base is not absolutely necessary to the mission. Currently, large conferences are held monthly in a leased facility off base. Therefore, if 7,500

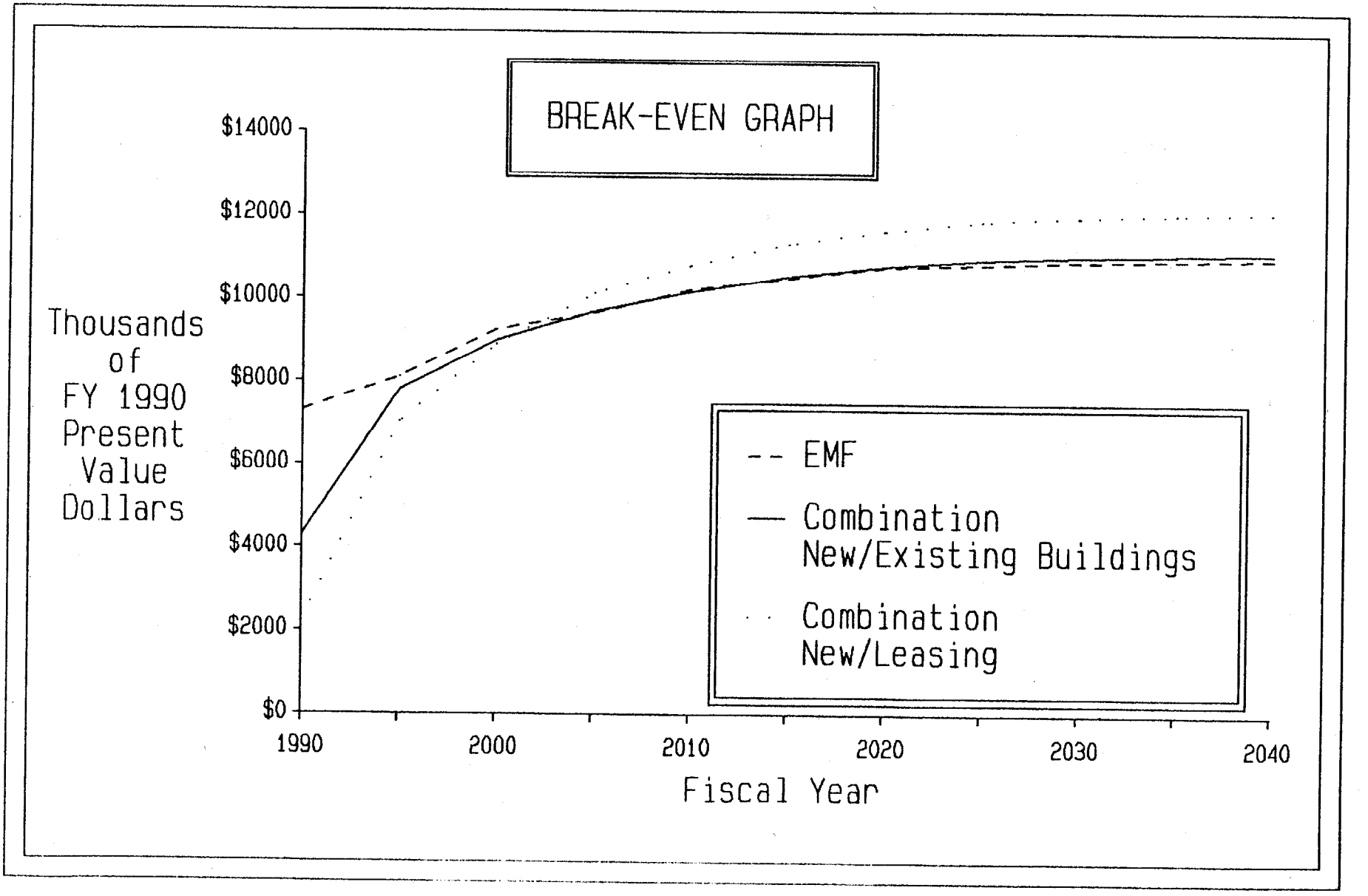


Figure 1

BREAK-EVEN GRAPH
(10 percent discount rate)

square feet of the new facility were not built, those meetings could continue to be held off base.

There are additional life-cycle costs associated with holding conferences off base (additional transportation costs, lease costs, and labor costs associated with travel time) that could be significant. The purpose of this sensitivity analysis is to determine whether the life-cycle costs of building the portion of the new facility that would be used for nonsecure conferences are greater than the life-cycle costs of continuing to lease conference space off base.

The results of the sensitivity analysis indicate that construction of the new conference facility as planned will pay for itself over the life of the facility, if quantitative benefits are taken into account. Leasing conference space off base would cost $401,547 in present value over the 50-year life cycle. Although the total life-cycle costs for constructing new space on base are $799,033, an on-base conference facility would save $634,324 in travel time (labor costs) and $401,547 in leasing and vehicle operation costs. Considering these savings, the on-base conference facility has a BCR of 1.30 (see Form S-3, Conference Facility Sensitivity Analysis). This indicates that the construction of the full conference facility is a cost-effective approach to meeting the need for conference space, and the size of the conference area should remain as planned in any of the alternatives evaluated in this analysis.

6.2 Alternate Discount Rate

Another analysis was conducted to test the sensitivity of the analysis to changes in the discount rate. In this analysis, a 6% discount rate was used to convert constant program-year dollars to present value. This was done to reflect lower interest rates prevalent in recent years. Even long-term (20-year) investment rates are currently well below 10% in real terms. These long-term rates reflect expectations that interest rates will continue to be lower than 10% in the future. Using the lower discount rate has the effect of placing a greater value on dollars spent in the future.

The results indicate that the EMF alternative remains the least-cost alternative (see Figure 2). The combination new/leasing alternative remains the highest cost alternative, more expensive than the EMF alternative by the year 2000. When benefits are considered, the ranking of the three alternatives does not change, but the relative difference among the alternatives does. The EMF alternative has a BCR of 1.04, the combination new/existing buildings has a BCR of 0.73, and the combination new/leasing alternative has a BCR of 0.62 (see Form S-3, 6% Discount Rate Sensitivity Analysis).

These results further reinforce the conclusion that the EMF alternative is the most economical alternative.

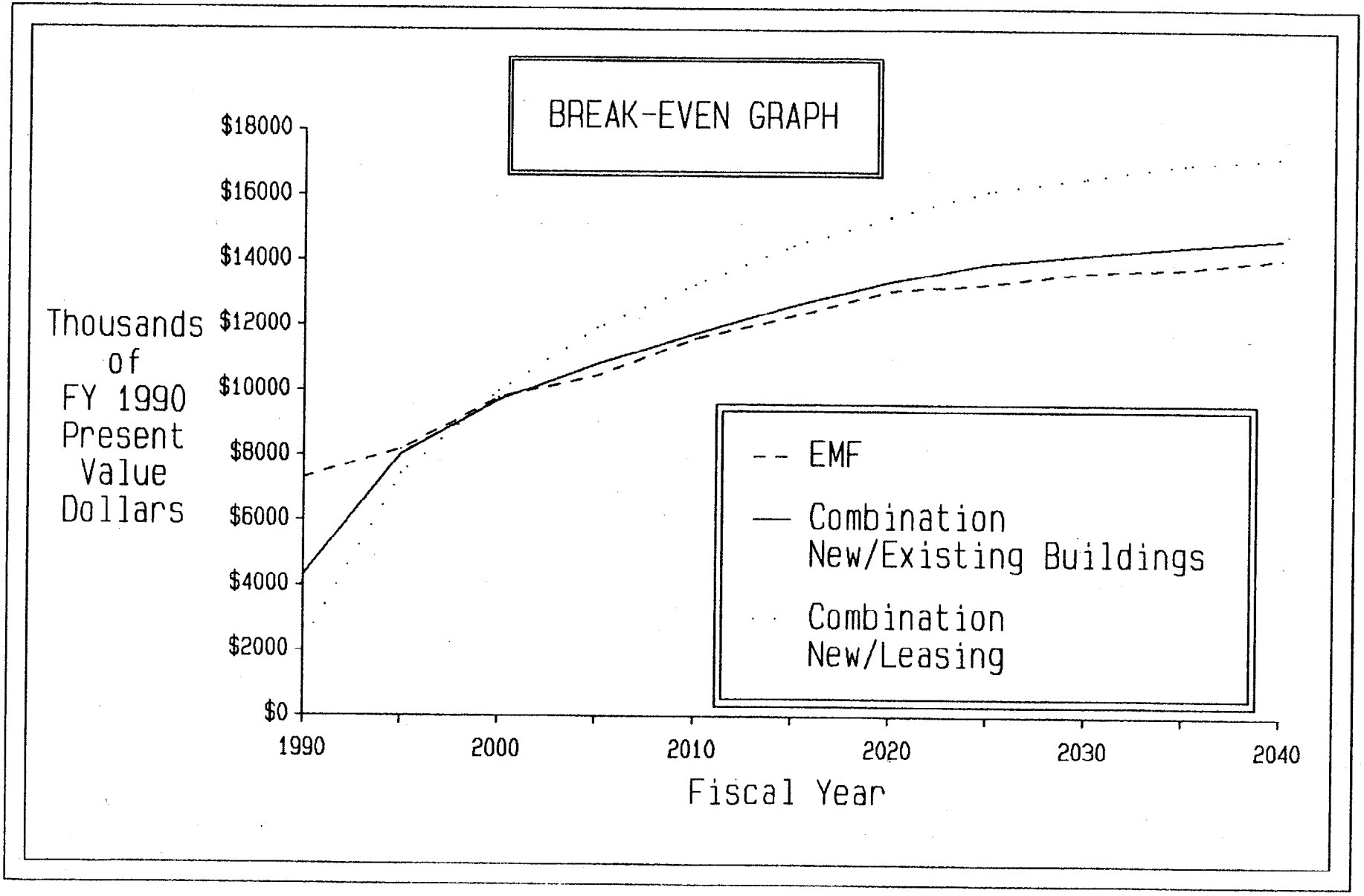


Figure 2

SENSITIVITY ANALYSIS
BREAK-EVEN GRAPH
(6 percent discount rate)

7.0 CONCLUSIONS AND RECOMMENDATION

Based on considerations of costs and benefits, the recommended alternative is construction of a new 86,500 SF EMF, eliminating trailer leasing. This alternative would be a great improvement over the status quo. The combination new construction/leasing alternative is the least preferred. Although leasing of trailer space can meet facility requirements adequately in the short term, the long-term cost is several million dollars more than for the new construction alternatives.

FORM S-3
Ranking Alternatives

	Status Quo	Alternative: EMF	Alternative: Comb New/ Existing Bldg	Alternative: Comb New/Leasing	Alternative:	Alternative:
Life-Cycle Benefits (from FORM S-2)	N/A	$2,752,247	$634,324	$634,324		
Life-Cycle Costs of Status Quo (from FORM S-1)	N/A	(+) $6,818,663	(+) $6,818,663	(+) $6,818,663	(+)	(+)
Total Life-Cycle Benefit (Including Status Quo Cost Avoidance)	N/A	(=) $9,570,910	(=) $7,452,987	(=) $7,452,987	(=)	(=)
Total Life-Cycle Costs (from FORM S-1)	N/A	(/) $11,000,395	(/) $11,121,295	(/) $12,104,154	(/)	(/)
Benefit-Cost Ratio (BCR) *	1	(=) .87	(=) .67	(=) .62	(=)	(=)
Payback Period (if applicable)	N/A	N/A	N/A	N/A		
Savings-Investment Ratio (SIR)	N/A	.43	-.00	-1.41		
Eff/Prod-Investment Ratio (EPIR)	N/A	.38	.15	.29		
Qualitative Benefit Score	N/A	117	90	64		
Rank	N/A	1	2	3		

* - If BCR > 1, then that alternative is **more cost-effective** than the status quo.
If BCR < 1, then that alternative is **less cost-effective** than the status quo.
The alternative with the largest BCR is the **most cost-effective** alternative.

FORM S-3
Ranking Alternatives
CONFERENCE FACILITY SENSITIVITY ANALYSIS

	Status Quo (Lease Off Base)	Alternative: New Conf Fac	Alternative:	Alternative:	Alternative:	Alternative:
Life-Cycle Benefits (from FORM S-2)	N/A	$634,324				
Life-Cycle Costs of Status Quo (from FORM S-1)	N/A	(+) $401,547	(+)	(+)	(+)	(+)
Total Life-Cycle Benefit (including Status Quo cost avoidance)	N/A	(=) $1,035,871	(=)	(=)	(=)	(=)
Total Life-Cycle Costs (from FORM S-1)	N/A	(/) $799,033	(/)	(/)	(/)	(/)
Benefit-Cost Ratio (BCR) *	1	(=) 1.30	(=)	(=)	(=)	(=)
Payback Period (if applicable)	N/A	N/A				
Savings-Investment Ratio (SIR)	N/A	.21				
Eff/Prod-Investment Ratio (EPIR)	N/A	1.27				
Qualitative Benefit Score	N/A	N/A				
Rank	2	1				

* - If BCR > 1, then that alternative is **more cost-effective** than the status quo.
If BCR < 1, then that alternative is **less cost-effective** than the status quo.
The alternative with the largest BCR is the **most cost-effective** alternative.

FORM S-3
Ranking of Alternatives
6% DISCOUNT RATE SENSITIVITY ANALYSIS

	Status Quo	Alternative: EMF	Alternative: Comb New/ Existing Bldg	Alternative: Comb New/Leasing	Alternative:	Alternative:
Life-Cycle Benefits (from FORM S-2)	N/A	$4,882,298	$951,323	$951,323		
Life-Cycle Costs of Status Quo (from FORM S-1)	N/A	(+) $9,808,516	(+) $9,808,516	(+) $9,808,516	(+)	(+)
Total Life-Cycle Benefit (Including Status Quo Cost Avoidance)	N/A	(=) $14,690,814	(=) $10,759,839	(=) $10,759,839	(=)	(=)
Total Life-Cycle Costs (from FORM S-1)	N/A	(/) $14,124,242	(/) $14,703,064	(/) $17,220,580	(/)	(/)
Benefit-Cost Ratio (BCR) *	1	(=) 1.04	(=) .73	(=) .62	(=)	(=)
Payback Period (if applicable)	N/A	N/A	N/A	N/A		
Savings-Investment Ratio (SIR)	N/A	.41	-.14	-2.37		
Eff/Prod-Investment Ratio (EPIR)	N/A	.67	.22	.43		
Qualitative Benefit Score	N/A	117	90	64		
Rank	N/A	1	2	3		

* - If BCR > 1, then that alternative is **more cost-effective** than the status quo.
If BCR < 1, then that alternative is **less cost-effective** than the status quo.
The alternative with the largest BCR is the **most cost-effective** alternative.

FORM S-1
Total Life-Cycle Costs
Alternative: EMF

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$7,300,000 *	1.000	$7,300,000	$7,300,000
**1991	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.909	$193,195	$7,493,195
1992	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.826	$175,632	$7,668,827
1993	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.751	$159,665	$7,828,492
1994	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.683	$145,150	$7,973,642
1995	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.621	$131,955	$8,105,597
1996	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.564	$119,959	$8,225,556
1997	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.513	$109,054	$8,334,609
1998	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.467	$99,140	$8,433,749
1999	$53,090	$0	$79,456	$79,969	$0	$0	$212,514	.424	$90,127	$8,523,876
2000	$74,326	$1,640,390	$79,456	$79,969	$0	$0	$1,874,140	.386	$722,562	$9,246,438
2001	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.350	$81,928	$9,328,366
2002	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.319	$74,480	$9,402,846
2003	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.290	$67,709	$9,470,556
2004	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.263	$61,554	$9,532,109
2005	$74,326	$286,430	$79,456	$79,969	$0	$0	$520,180	.239	$124,527	$9,656,637
2006	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.218	$50,871	$9,707,507
2007	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.198	$46,246	$9,753,754
2008	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.180	$42,042	$9,795,796
2009	$74,326	$0	$79,456	$79,969	$0	$0	$233,750	.164	$38,220	$9,834,016
2010	$100,871	$2,355,025	$79,456	$79,969	$0	$0	$2,615,320	.149	$388,751	$10,222,767
2011	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.135	$35,174	$10,257,940
2012	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.123	$31,976	$10,289,917
2013	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.112	$29,069	$10,318,986
2014	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.102	$26,427	$10,345,413
2015	$100,871	$1,525,455	$79,456	$79,969	$0	$0	$1,785,750	.092	$164,818	$10,510,230

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: EMF

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.084	$21,840	$10,532,071
2017	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.076	$19,855	$10,551,925
2018	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.069	$18,050	$10,569,975
2019	$100,871	$0	$79,456	$79,969	$0	$0	$260,295	.063	$16,409	$10,586,384
2020	$111,489	$3,016,190	$79,456	$79,969	$0	$0	$3,287,103	.057	$188,379	$10,774,763
2021	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.052	$14,114	$10,788,877
2022	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.047	$12,831	$10,801,708
2023	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.043	$11,665	$10,813,373
2024	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.039	$10,604	$10,823,977
2025	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.036	$9,640	$10,833,618
2026	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.032	$8,764	$10,842,381
2027	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.029	$7,967	$10,850,348
2028	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.027	$7,243	$10,857,591
2029	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.024	$6,584	$10,864,176
2030	$111,489	$2,355,025	$79,456	$79,969	$0	$0	$2,625,938	.022	$58,020	$10,922,196
2031	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.020	$5,442	$10,927,637
2032	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.018	$4,947	$10,932,584
2033	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.017	$4,497	$10,937,081
2034	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.015	$4,088	$10,941,170
2035	$111,489	$286,430	$79,456	$79,969	$0	$0	$557,343	.014	$7,646	$10,948,816
2036	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.012	$3,379	$10,952,195
2037	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.011	$3,072	$10,955,267
2038	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.010	$2,792	$10,958,059
2039	$111,489	$0	$79,456	$79,969	$0	$0	$270,913	.009	$2,539	$10,960,598
2040	$111,489	$4,400,980	$79,456	$79,969	$0	$0	$4,671,893	.009	$39,798	$11,000,395
Total	$4,571,049	$15,865,925	$3,972,776	$3,998,448	$0	$0	$35,708,198		$11,000,395	

FORM S-1

Total Life-Cycle Costs

Alternative: COMBINATION NEW/EXISTING BUILDINGS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
*1990							$4,300,000 *	1.000	$4,300,000	$4,300,000
**1991	$81,725	$1,963,600	$110,299	$80,412	$0	$0	$2,236,035	.909	$2,032,759	$6,332,759
1992	$81,725	$112,800	$110,299	$80,412	$0	$0	$385,235	.826	$318,376	$6,651,136
1993	$81,725	$759,600	$110,299	$80,412	$0	$0	$1,032,035	.751	$775,383	$7,426,519
1994	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.683	$186,077	$7,612,596
1995	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.621	$169,161	$7,781,757
1996	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.564	$153,783	$7,935,540
1997	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.513	$139,802	$8,075,342
1998	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.467	$127,093	$8,202,435
1999	$81,725	$0	$110,299	$80,412	$0	$0	$272,435	.424	$115,539	$8,317,974
2000	$82,423	$1,457,999	$110,299	$80,412	$0	$0	$1,731,132	.386	$667,426	$8,985,401
2001	$82,423	$754,400	$110,299	$80,412	$0	$0	$1,027,533	.350	$360,144	$9,345,545
2002	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.319	$87,029	$9,432,574
2003	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.290	$79,117	$9,511,691
2004	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.263	$71,925	$9,583,615
2005	$82,423	$199,456	$110,299	$80,412	$0	$0	$472,589	.239	$113,134	$9,696,749
2006	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.218	$59,442	$9,756,191
2007	$82,423	$92,000	$110,299	$80,412	$0	$0	$365,133	.198	$72,240	$9,828,431
2008	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.180	$49,125	$9,877,556
2009	$82,423	$0	$110,299	$80,412	$0	$0	$273,133	.164	$44,659	$9,922,215
2010	$97,245	$1,315,491	$110,299	$80,412	$0	$0	$1,603,446	.149	$238,342	$10,160,557
2011	$97,245	$1,099,600	$110,299	$80,412	$0	$0	$1,387,556	.135	$187,501	$10,348,059
2012	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.123	$35,374	$10,383,433
2013	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.112	$32,158	$10,415,591
2014	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.102	$29,235	$10,444,826
2015	$97,245	$807,348	$110,299	$80,412	$0	$0	$1,095,304	.092	$101,092	$10,545,918

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: COMBINATION NEW/EXISTING BUILDINGS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
2016	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.084	$24,161	$10,570,079
2017	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.076	$21,965	$10,592,044
2018	$97,245	$759,600	$110,299	$80,412	$0	$0	$1,047,556	.069	$72,641	$10,664,685
2019	$97,245	$0	$110,299	$80,412	$0	$0	$287,956	.063	$18,153	$10,682,837
2020	$103,174	$1,667,707	$110,299	$80,412	$0	$0	$1,961,592	.057	$112,416	$10,795,253
2021	$103,174	$1,334,400	$110,299	$80,412	$0	$0	$1,628,285	.052	$84,831	$10,880,085
2022	$103,174	$92,000	$110,299	$80,412	$0	$0	$385,885	.047	$18,276	$10,898,361
2023	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.043	$12,654	$10,911,015
2024	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.039	$11,503	$10,922,518
2025	$103,174	$766,800	$110,299	$80,412	$0	$0	$1,060,685	.036	$37,744	$10,960,262
2026	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.032	$9,507	$10,969,769
2027	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.029	$8,643	$10,978,411
2028	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.027	$7,857	$10,986,268
2029	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.024	$7,143	$10,993,411
2030	$103,174	$1,315,491	$110,299	$80,412	$0	$0	$1,609,375	.022	$35,559	$11,028,970
2031	$103,174	$1,383,600	$110,299	$80,412	$0	$0	$1,677,485	.020	$33,694	$11,062,665
2032	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.018	$5,366	$11,068,031
2033	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.017	$4,879	$11,072,910
2034	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.015	$4,435	$11,077,345
2035	$103,174	$199,456	$110,299	$80,412	$0	$0	$493,340	.014	$6,768	$11,084,113
2036	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.012	$3,665	$11,087,778
2037	$103,174	$92,000	$110,299	$80,412	$0	$0	$385,885	.011	$4,375	$11,092,153
2038	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.010	$3,029	$11,095,183
2039	$103,174	$0	$110,299	$80,412	$0	$0	$293,885	.009	$2,754	$11,097,936
2040	$103,174	$2,448,213	$110,299	$80,412	$0	$0	$2,742,098	.009	$23,359	$11,121,295
Total	$4,698,849	$18,621,560	$5,514,954	$4,020,578	$0	$0	$37,155,941		$11,121,295	

FORM S-1

Total Life-Cycle Costs

Alternative: COMBINATION NEW/LEASING

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
*1990						$596,541	$2,196,541	1.000	$2,196,541	$2,196,541
**1991	$81,735	$1,963,600	$173,086	$81,775	$0	$288,507	$2,588,703	.909	$2,353,366	$4,549,907
1992	$81,735	$112,800	$173,086	$81,775	$0	$288,507	$737,903	.826	$609,837	$5,159,744
1993	$81,735	$759,600	$173,086	$81,775	$0	$288,507	$1,384,703	.751	$1,040,348	$6,200,092
1994	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.683	$426,954	$6,627,046
1995	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.621	$388,140	$7,015,185
1996	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.564	$352,854	$7,368,040
1997	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.513	$320,777	$7,688,816
1998	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.467	$291,615	$7,980,431
1999	$81,735	$0	$173,086	$81,775	$0	$288,507	$625,103	.424	$265,105	$8,245,536
2000	$74,823	$879,280	$173,086	$81,775	$0	$470,397	$1,679,361	.386	$647,466	$8,893,002
2001	$74,823	$754,400	$173,086	$81,775	$0	$288,507	$1,372,591	.350	$481,085	$9,374,087
2002	$74,823	$0	$173,086	$81,775	$0	$367,326	$697,010	.319	$222,089	$9,596,176
2003	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.290	$179,068	$9,775,244
2004	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.263	$162,789	$9,938,033
2005	$74,823	$128,880	$173,086	$81,775	$0	$288,507	$747,071	.239	$178,843	$10,116,875
2006	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.218	$134,536	$10,251,412
2007	$74,823	$92,000	$173,086	$81,775	$0	$288,507	$710,191	.198	$140,507	$10,391,919
2008	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.180	$111,187	$10,503,106
2009	$74,823	$0	$173,086	$81,775	$0	$288,507	$618,191	.164	$101,079	$10,604,185
2010	$80,133	$471,960	$173,086	$81,775	$0	$470,397	$1,277,351	.149	$189,870	$10,794,056
2011	$80,133	$1,099,600	$173,086	$81,775	$0	$288,507	$1,723,101	.135	$232,844	$11,026,899
2012	$80,133	$0	$173,086	$81,775	$0	$367,326	$702,320	.123	$86,277	$11,113,176
2013	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.112	$69,631	$11,182,808
2014	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.102	$63,301	$11,246,109
2015	$80,133	$224,640	$173,086	$81,775	$0	$288,507	$848,141	.092	$78,280	$11,324,389

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: COMBINATION NEW/LEASING

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Valu (Annual Sum)
2016	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.084	$52,315	$11,376,704
2017	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.076	$47,559	$11,424,263
2018	$80,133	$759,600	$173,086	$81,775	$0	$288,507	$1,383,101	.069	$95,909	$11,520,172
2019	$80,133	$0	$173,086	$81,775	$0	$288,507	$623,501	.063	$39,305	$11,559,477
2020	$82,257	$573,480	$173,086	$81,775	$0	$470,397	$1,380,995	.057	$79,143	$11,638,620
2021	$82,257	$1,334,400	$173,086	$81,775	$0	$288,507	$1,960,025	.052	$102,115	$11,740,735
2022	$82,257	$92,000	$173,086	$81,775	$0	$367,326	$796,444	.047	$37,722	$11,778,456
2023	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.043	$26,937	$11,805,394
2024	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.039	$24,489	$11,829,882
2025	$82,257	$766,800	$173,086	$81,775	$0	$288,507	$1,392,425	.036	$49,548	$11,879,430
2026	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.032	$20,238	$11,899,669
2027	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.029	$18,399	$11,918,068
2028	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.027	$16,726	$11,934,794
2029	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.024	$15,205	$11,949,999
2030	$82,257	$471,960	$173,086	$81,775	$0	$470,397	$1,279,475	.022	$28,270	$11,978,269
2031	$82,257	$1,383,600	$173,086	$81,775	$0	$288,507	$2,009,225	.020	$40,358	$12,018,627
2032	$82,257	$0	$173,086	$81,775	$0	$367,326	$704,444	.018	$12,863	$12,031,490
2033	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.017	$10,386	$12,041,876
2034	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.015	$9,441	$12,051,317
2035	$82,257	$128,880	$173,086	$81,775	$0	$288,507	$754,505	.014	$10,351	$12,061,668
2036	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.012	$7,803	$12,069,471
2037	$82,257	$92,000	$173,086	$81,775	$0	$288,507	$717,625	.011	$8,137	$12,077,608
2038	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.010	$6,449	$12,084,056
2039	$82,257	$0	$173,086	$81,775	$0	$288,507	$625,625	.009	$5,862	$12,089,919
2040	$82,257	$863,640	$173,086	$81,775	$0	$470,397	$1,671,155	.009	$14,236	$12,104,154
Total	$4,012,584	$12,953,120	$8,654,322	$4,088,730	$0	$16,246,596	$47,555,352		$12,104,154	

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0 *	1.000	$0	$0
**1991	$57,835	$1,963,600	$92,521	$48,354	$13,500	$114,223	$2,290,033	.909	$2,081,848	$2,081,848
1992	$57,835	$112,800	$92,521	$48,354	$13,500	$367,326	$692,335	.826	$572,178	$2,654,026
1993	$57,835	$759,600	$92,521	$48,354	$13,500	$114,223	$1,086,033	.751	$815,952	$3,469,978
1994	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.683	$222,958	$3,692,936
1995	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.621	$202,689	$3,895,625
1996	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.564	$184,263	$4,079,887
1997	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.513	$167,511	$4,247,399
1998	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.467	$152,283	$4,399,682
1999	$57,835	$0	$92,521	$48,354	$13,500	$114,223	$326,433	.424	$138,439	$4,538,121
2000	$46,675	$530,800	$92,521	$48,354	$13,500	$367,326	$1,099,175	.386	$423,780	$4,961,901
2001	$46,675	$754,400	$92,521	$48,354	$13,500	$114,223	$1,069,673	.350	$374,914	$5,336,815
2002	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.319	$100,456	$5,437,270
2003	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.290	$91,323	$5,528,594
2004	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.263	$83,021	$5,611,615
2005	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.239	$75,474	$5,687,088
2006	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.218	$68,612	$5,755,701
2007	$46,675	$92,000	$92,521	$48,354	$13,500	$114,223	$407,273	.198	$80,577	$5,836,278
2008	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.180	$56,705	$5,892,982
2009	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.164	$51,550	$5,944,532
2010	$46,675	$0	$92,521	$48,354	$13,500	$367,326	$568,375	.149	$84,485	$6,029,017
2011	$46,675	$1,099,600	$92,521	$48,354	$13,500	$114,223	$1,414,873	.135	$191,193	$6,220,210
2012	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.123	$38,730	$6,258,940
2013	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.112	$35,209	$6,294,149
2014	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.102	$32,008	$6,326,157
2015	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.092	$29,098	$6,355,255

* Program year; include capital investment in first row of Column (7).

** First year of occupancy.

FORM S-1
Total Life-Cycle Costs
Alternative: STATUS QUO

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.084	$26,453	$6,381,708
2017	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.076	$24,048	$6,405,757
2018	$46,675	$759,600	$92,521	$48,354	$13,500	$114,223	$1,074,873	.069	$74,535	$6,480,292
2019	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.063	$19,875	$6,500,166
2020	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.057	$18,068	$6,518,234
2021	$46,675	$1,334,400	$92,521	$48,354	$13,500	$114,223	$1,649,673	.052	$85,946	$6,604,180
2022	$46,675	$92,000	$92,521	$48,354	$13,500	$367,326	$660,375	.047	$31,277	$6,635,457
2023	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.043	$13,575	$6,649,032
2024	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.039	$12,341	$6,661,372
2025	$46,675	$766,800	$92,521	$48,354	$13,500	$114,223	$1,082,073	.036	$38,505	$6,699,877
2026	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.032	$10,199	$6,710,076
2027	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.029	$9,272	$6,719,347
2028	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.027	$8,429	$6,727,776
2029	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.024	$7,663	$6,735,438
2030	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.022	$6,966	$6,742,404
2031	$46,675	$1,383,600	$92,521	$48,354	$13,500	$114,223	$1,698,873	.020	$34,124	$6,776,528
2032	$46,675	$0	$92,521	$48,354	$13,500	$367,326	$568,375	.018	$10,379	$6,786,907
2033	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.017	$5,234	$6,792,141
2034	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.015	$4,758	$6,796,899
2035	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.014	$4,325	$6,801,224
2036	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.012	$3,932	$6,805,156
2037	$46,675	$92,000	$92,521	$48,354	$13,500	$114,223	$407,273	.011	$4,618	$6,809,774
2038	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.010	$3,250	$6,813,023
2039	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.009	$2,954	$6,815,978
2040	$46,675	$0	$92,521	$48,354	$13,500	$114,223	$315,273	.009	$2,686	$6,818,663
Total	$2,434,182	$9,741,200	$4,626,050	$2,417,703	$675,000	$6,976,646	$26,870,780		$6,818,663	

FORM S-2
Total Life-Cycle Benefits
Alternative: EMF

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7) *	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$176,875	N/A	($1,248,707)	($1,071,833)	.909	($974,393)	($974,393)
1992	N/A	$176,875	N/A	$262,565	$439,439	.826	$363,173	($611,221)
1993	N/A	$176,875	N/A	($384,235)	($207,361)	.751	($155,793)	($767,014)
1994	N/A	$176,875	N/A	$375,365	$552,239	.683	$377,187	($389,827)
1995	N/A	$176,875	N/A	$375,365	$552,239	.621	$342,897	($46,930)
1996	N/A	$176,875	N/A	$375,365	$552,239	.564	$311,725	$264,795
1997	N/A	$176,875	N/A	$375,365	$552,239	.513	$283,386	$548,181
1998	N/A	$176,875	N/A	$375,365	$552,239	.467	$257,624	$805,804
1999	N/A	$176,875	N/A	$375,365	$552,239	.424	$234,203	$1,040,008
2000	N/A	$176,875	N/A	($144,275)	$32,599	.386	$12,568	$1,052,576
2001	N/A	$176,875	N/A	($28,347)	$148,527	.350	$52,058	$1,104,634
2002	N/A	$176,875	N/A	$386,525	$563,399	.319	$179,516	$1,284,150
2003	N/A	$176,875	N/A	$386,525	$563,399	.290	$163,197	$1,447,347
2004	N/A	$176,875	N/A	$386,525	$563,399	.263	$148,361	$1,595,708
2005	N/A	$176,875	N/A	$386,525	$563,399	.239	$134,873	$1,730,581
2006	N/A	$176,875	N/A	$386,525	$563,399	.218	$122,612	$1,853,193
2007	N/A	$176,875	N/A	$294,525	$471,399	.198	$93,264	$1,946,457
2008	N/A	$176,875	N/A	$386,525	$563,399	.180	$101,332	$2,047,789
2009	N/A	$176,875	N/A	$386,525	$563,399	.164	$92,120	$2,139,909
2010	N/A	$176,875	N/A	$386,525	$563,399	.149	$83,746	$2,223,655
2011	N/A	$176,875	N/A	($373,547)	($196,673)	.135	($26,577)	$2,197,078
2012	N/A	$176,875	N/A	$386,525	$563,399	.123	$69,211	$2,266,290
2013	N/A	$176,875	N/A	$386,525	$563,399	.112	$62,919	$2,329,209
2014	N/A	$176,875	N/A	$386,525	$563,399	.102	$57,199	$2,386,409
2015	N/A	$176,875	N/A	$386,525	$563,399	.092	$51,999	$2,438,408

* **SEE ATTACHED FORM S-1: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS.**

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: EMF

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$176,875	N/A	$386,525	$563,399	.084	$47,272	$2,485,680
2017	N/A	$176,875	N/A	$386,525	$563,399	.076	$42,975	$2,528,655
2018	N/A	$176,875	N/A	($373,075)	($196,201)	.069	($13,605)	$2,515,050
2019	N/A	$176,875	N/A	$386,525	$563,399	.063	$35,516	$2,550,566
2020	N/A	$176,875	N/A	$386,525	$563,399	.057	$32,288	$2,582,854
2021	N/A	$176,875	N/A	($608,347)	($431,473)	.052	($22,479)	$2,560,375
2022	N/A	$176,875	N/A	$294,525	$471,399	.047	$22,327	$2,582,701
2023	N/A	$176,875	N/A	$386,525	$563,399	.043	$24,258	$2,606,959
2024	N/A	$176,875	N/A	$386,525	$563,399	.039	$22,053	$2,629,012
2025	N/A	$176,875	N/A	($380,275)	($203,401)	.036	($7,238)	$2,621,775
2026	N/A	$176,875	N/A	$386,525	$563,399	.032	$18,226	$2,640,000
2027	N/A	$176,875	N/A	$386,525	$563,399	.029	$16,569	$2,656,569
2028	N/A	$176,875	N/A	$386,525	$563,399	.027	$15,062	$2,671,631
2029	N/A	$176,875	N/A	$386,525	$563,399	.024	$13,693	$2,685,324
2030	N/A	$176,875	N/A	$386,525	$563,399	.022	$12,448	$2,697,772
2031	N/A	$176,875	N/A	($657,547)	($480,673)	.020	($9,655)	$2,688,117
2032	N/A	$176,875	N/A	$386,525	$563,399	.018	$10,288	$2,698,405
2033	N/A	$176,875	N/A	$386,525	$563,399	.017	$9,353	$2,707,758
2034	N/A	$176,875	N/A	$386,525	$563,399	.015	$8,502	$2,716,260
2035	N/A	$176,875	N/A	$386,525	$563,399	.014	$7,729	$2,723,990
2036	N/A	$176,875	N/A	$386,525	$563,399	.012	$7,027	$2,731,016
2037	N/A	$176,875	N/A	$294,525	$471,399	.011	$5,345	$2,736,361
2038	N/A	$176,875	N/A	$386,525	$563,399	.010	$5,807	$2,742,168
2039	N/A	$176,875	N/A	$386,525	$563,399	.009	$5,279	$2,747,448
2040	N/A	$176,875	N/A	$386,525	$563,399	.009	$4,799	$2,752,247
Total	N/A	$8,843,727	N/A	$11,182,232	$20,025,959		$2,752,247	

FORM S-1

Total Life-Cycle Costs

Alternative: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
*1990							$0 *	1.000	$0	$0
**1991	($27,280)	($1,963,600)	$26,765	$0	$0	$715,408	($1,248,707)	.909	($1,135,189)	($1,135,189)
1992	($27,280)	($112,800)	$26,765	$0	$0	$375,880	$262,565	.826	$216,996	($918,193)
1993	($27,280)	($759,600)	$26,765	$0	$0	$375,880	($384,235)	.751	($288,682)	($1,206,875)
1994	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.683	$256,379	($950,496)
1995	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.621	$233,072	($717,424)
1996	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.564	$211,884	($505,540)
1997	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.513	$192,621	($312,919)
1998	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.467	$175,110	($137,808)
1999	($27,280)	$0	$26,765	$0	$0	$375,880	$375,365	.424	$159,191	$21,383
2000	($16,120)	($530,800)	$26,765	$0	$0	$375,880	($144,275)	.386	($55,624)	($34,241)
2001	($16,120)	($754,400)	$26,765	$0	$0	$715,408	($28,347)	.350	($9,936)	($44,177)
2002	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.319	$123,159	$78,982
2003	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.290	$111,962	$190,944
2004	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.263	$101,784	$292,728
2005	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.239	$92,531	$385,259
2006	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.218	$84,119	$469,378
2007	($16,120)	($92,000)	$26,765	$0	$0	$375,880	$294,525	.198	$58,270	$527,648
2008	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.180	$69,520	$597,168
2009	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.164	$63,200	$660,368
2010	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.149	$57,454	$717,822
2011	($16,120)	($1,099,600)	$26,765	$0	$0	$715,408	($373,547)	.135	($50,478)	$667,345
2012	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.123	$47,483	$714,828
2013	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.112	$43,166	$757,994
2014	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.102	$39,242	$797,236
2015	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.092	$35,675	$832,911

* Program year; include capital investment in first row of Column (7).

** First Year of Occupancy

FORM S-1

Total Life-Cycle Costs

Alternative: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS

Fiscal Year	(1) Annual Maintenance (Worksheet 1)	(2) Periodic M&R (Worksheet 2)	(3) Utilities (Worksheet 3)	(4) Misc. O&M (Worksheet 4)	(5) Misc. User (Worksheet 5)	(6) Lease (Worksheet 6)	(7) Total Sum (1)-(6)	(8) Present Value Mult. (10% Disc.)	(9) Present Value (7) x (8)	(10) Cumulative Present Value (Annual Sum)
2016	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.084	$32,432	$865,342
2017	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.076	$29,483	$894,826
2018	($16,120)	($759,600)	$26,765	$0	$0	$375,880	($373,075)	.069	($25,870)	$868,955
2019	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.063	$24,366	$893,322
2020	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.057	$22,151	$915,473
2021	($16,120)	($1,334,400)	$26,765	$0	$0	$715,408	($608,347)	.052	($31,694)	$883,779
2022	($16,120)	($92,000)	$26,765	$0	$0	$375,880	$294,525	.047	$13,949	$897,728
2023	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.043	$16,643	$914,371
2024	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.039	$15,130	$929,500
2025	($16,120)	($766,800)	$26,765	$0	$0	$375,880	($380,275)	.036	($13,532)	$915,968
2026	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.032	$12,504	$928,472
2027	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.029	$11,367	$939,839
2028	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.027	$10,334	$950,173
2029	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.024	$9,394	$959,567
2030	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.022	$8,540	$968,107
2031	($16,120)	($1,383,600)	$26,765	$0	$0	$715,408	($657,547)	.020	($13,208)	$954,900
2032	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.018	$7,058	$961,958
2033	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.017	$6,416	$968,374
2034	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.015	$5,833	$974,207
2035	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.014	$5,303	$979,510
2036	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.012	$4,821	$984,331
2037	($16,120)	($92,000)	$26,765	$0	$0	$375,880	$294,525	.011	$3,339	$987,670
2038	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.010	$3,984	$991,654
2039	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.009	$3,622	$995,276
2040	($16,120)	$0	$26,765	$0	$0	$375,880	$386,525	.009	$3,293	$998,569
Total	($906,440)	($9,741,200)	$1,338,240	$0	$0	$20,491,632	$11,182,232		$998,569	

FORM S-2

Total Life-Cycle Benefits

Alternative: COMBINATION NEW/EXISTING BUILDINGS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$63,977	N/A	N/A	$63,977	.909	$58,161	$58,161
1992	N/A	$63,977	N/A	N/A	$63,977	.826	$52,874	$111,035
1993	N/A	$63,977	N/A	N/A	$63,977	.751	$48,067	$159,102
1994	N/A	$63,977	N/A	N/A	$63,977	.683	$43,697	$202,800
1995	N/A	$63,977	N/A	N/A	$63,977	.621	$39,725	$242,525
1996	N/A	$63,977	N/A	N/A	$63,977	.564	$36,114	$278,638
1997	N/A	$63,977	N/A	N/A	$63,977	.513	$32,831	$311,469
1998	N/A	$63,977	N/A	N/A	$63,977	.467	$29,846	$341,315
1999	N/A	$63,977	N/A	N/A	$63,977	.424	$27,133	$368,447
2000	N/A	$63,977	N/A	N/A	$63,977	.386	$24,666	$393,113
2001	N/A	$63,977	N/A	N/A	$63,977	.350	$22,424	$415,537
2002	N/A	$63,977	N/A	N/A	$63,977	.319	$20,385	$435,922
2003	N/A	$63,977	N/A	N/A	$63,977	.290	$18,532	$454,454
2004	N/A	$63,977	N/A	N/A	$63,977	.263	$16,847	$471,301
2005	N/A	$63,977	N/A	N/A	$63,977	.239	$15,316	$486,617
2006	N/A	$63,977	N/A	N/A	$63,977	.218	$13,923	$500,540
2007	N/A	$63,977	N/A	N/A	$63,977	.198	$12,658	$513,198
2008	N/A	$63,977	N/A	N/A	$63,977	.180	$11,507	$524,705
2009	N/A	$63,977	N/A	N/A	$63,977	.164	$10,461	$535,166
2010	N/A	$63,977	N/A	N/A	$63,977	.149	$9,510	$544,676
2011	N/A	$63,977	N/A	N/A	$63,977	.135	$8,645	$553,321
2012	N/A	$63,977	N/A	N/A	$63,977	.123	$7,859	$561,180
2013	N/A	$63,977	N/A	N/A	$63,977	.112	$7,145	$568,325
2014	N/A	$63,977	N/A	N/A	$63,977	.102	$6,495	$574,820
2015	N/A	$63,977	N/A	N/A	$63,977	.092	$5,905	$580,725

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: COMBINATION NEW/EXISTING BUILDINGS

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$63,977	N/A	N/A	$63,977	.084	$5,368	$586,093
2017	N/A	$63,977	N/A	N/A	$63,977	.076	$4,880	$590,973
2018	N/A	$63,977	N/A	N/A	$63,977	.069	$4,436	$595,410
2019	N/A	$63,977	N/A	N/A	$63,977	.063	$4,033	$599,443
2020	N/A	$63,977	N/A	N/A	$63,977	.057	$3,666	$603,109
2021	N/A	$63,977	N/A	N/A	$63,977	.052	$3,333	$606,442
2022	N/A	$63,977	N/A	N/A	$63,977	.047	$3,030	$609,473
2023	N/A	$63,977	N/A	N/A	$63,977	.043	$2,755	$612,227
2024	N/A	$63,977	N/A	N/A	$63,977	.039	$2,504	$614,731
2025	N/A	$63,977	N/A	N/A	$63,977	.036	$2,277	$617,008
2026	N/A	$63,977	N/A	N/A	$63,977	.032	$2,070	$619,078
2027	N/A	$63,977	N/A	N/A	$63,977	.029	$1,881	$620,959
2028	N/A	$63,977	N/A	N/A	$63,977	.027	$1,710	$622,670
2029	N/A	$63,977	N/A	N/A	$63,977	.024	$1,555	$624,224
2030	N/A	$63,977	N/A	N/A	$63,977	.022	$1,414	$625,638
2031	N/A	$63,977	N/A	N/A	$63,977	.020	$1,285	$626,923
2032	N/A	$63,977	N/A	N/A	$63,977	.018	$1,168	$628,091
2033	N/A	$63,977	N/A	N/A	$63,977	.017	$1,062	$629,153
2034	N/A	$63,977	N/A	N/A	$63,977	.015	$965	$630,119
2035	N/A	$63,977	N/A	N/A	$63,977	.014	$878	$630,997
2036	N/A	$63,977	N/A	N/A	$63,977	.012	$798	$631,795
2037	N/A	$63,977	N/A	N/A	$63,977	.011	$725	$632,520
2038	N/A	$63,977	N/A	N/A	$63,977	.010	$659	$633,179
2039	N/A	$63,977	N/A	N/A	$63,977	.009	$599	$633,779
2040	N/A	$63,977	N/A	N/A	$63,977	.009	$545	$634,324
Total	N/A	$3,198,869	N/A	N/A	$3,198,869		$634,324	

FORM S-2
Total Life-Cycle Benefits
Alternative: COMBINATION NEW/LEASING

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
**1991	N/A	$63,977	N/A	N/A	$63,977	.909	$58,161	$58,161
1992	N/A	$63,977	N/A	N/A	$63,977	.826	$52,874	$111,035
1993	N/A	$63,977	N/A	N/A	$63,977	.751	$48,067	$159,102
1994	N/A	$63,977	N/A	N/A	$63,977	.683	$43,697	$202,800
1995	N/A	$63,977	N/A	N/A	$63,977	.621	$39,725	$242,525
1996	N/A	$63,977	N/A	N/A	$63,977	.564	$36,114	$278,638
1997	N/A	$63,977	N/A	N/A	$63,977	.513	$32,831	$311,469
1998	N/A	$63,977	N/A	N/A	$63,977	.467	$29,846	$341,315
1999	N/A	$63,977	N/A	N/A	$63,977	.424	$27,133	$368,447
2000	N/A	$63,977	N/A	N/A	$63,977	.386	$24,666	$393,113
2001	N/A	$63,977	N/A	N/A	$63,977	.350	$22,424	$415,537
2002	N/A	$63,977	N/A	N/A	$63,977	.319	$20,385	$435,922
2003	N/A	$63,977	N/A	N/A	$63,977	.290	$18,532	$454,454
2004	N/A	$63,977	N/A	N/A	$63,977	.263	$16,847	$471,301
2005	N/A	$63,977	N/A	N/A	$63,977	.239	$15,316	$486,617
2006	N/A	$63,977	N/A	N/A	$63,977	.218	$13,923	$500,540
2007	N/A	$63,977	N/A	N/A	$63,977	.198	$12,658	$513,198
2008	N/A	$63,977	N/A	N/A	$63,977	.180	$11,507	$524,705
2009	N/A	$63,977	N/A	N/A	$63,977	.164	$10,461	$535,166
2010	N/A	$63,977	N/A	N/A	$63,977	.149	$9,510	$544,676
2011	N/A	$63,977	N/A	N/A	$63,977	.135	$8,645	$553,321
2012	N/A	$63,977	N/A	N/A	$63,977	.123	$7,859	$561,180
2013	N/A	$63,977	N/A	N/A	$63,977	.112	$7,145	$568,325
2014	N/A	$63,977	N/A	N/A	$63,977	.102	$6,495	$574,820
2015	N/A	$63,977	N/A	N/A	$63,977	.092	$5,905	$580,725

** First year of occupancy.

FORM S-2
Total Life-Cycle Benefits
Alternative: COMBINATION NEW/LEASING

Fiscal Year	(1) Increased Productivity (Worksheet 7)	(2) Personnel Cost Savings (Worksheet 7)	(3) Fuel Cost Savings (Worksheet 7)	(4) Other Cost Savings (Worksheet 7)	(5) Total Sum (1)-(4)	(6) Present Value Mult. (10% Disc.)	(7) Present Value (5) x (6)	(8) Cumulative Present Value (Annual Sum)
2016	N/A	$63,977	N/A	N/A	$63,977	.084	$5,368	$586,093
2017	N/A	$63,977	N/A	N/A	$63,977	.076	$4,880	$590,973
2018	N/A	$63,977	N/A	N/A	$63,977	.069	$4,436	$595,410
2019	N/A	$63,977	N/A	N/A	$63,977	.063	$4,033	$599,443
2020	N/A	$63,977	N/A	N/A	$63,977	.057	$3,666	$603,109
2021	N/A	$63,977	N/A	N/A	$63,977	.052	$3,333	$606,442
2022	N/A	$63,977	N/A	N/A	$63,977	.047	$3,030	$609,473
2023	N/A	$63,977	N/A	N/A	$63,977	.043	$2,755	$612,227
2024	N/A	$63,977	N/A	N/A	$63,977	.039	$2,504	$614,731
2025	N/A	$63,977	N/A	N/A	$63,977	.036	$2,277	$617,008
2026	N/A	$63,977	N/A	N/A	$63,977	.032	$2,070	$619,078
2027	N/A	$63,977	N/A	N/A	$63,977	.029	$1,881	$620,959
2028	N/A	$63,977	N/A	N/A	$63,977	.027	$1,710	$622,670
2029	N/A	$63,977	N/A	N/A	$63,977	.024	$1,555	$624,224
2030	N/A	$63,977	N/A	N/A	$63,977	.022	$1,414	$625,638
2031	N/A	$63,977	N/A	N/A	$63,977	.020	$1,285	$626,923
2032	N/A	$63,977	N/A	N/A	$63,977	.018	$1,168	$628,091
2033	N/A	$63,977	N/A	N/A	$63,977	.017	$1,062	$629,153
2034	N/A	$63,977	N/A	N/A	$63,977	.015	$965	$630,119
2035	N/A	$63,977	N/A	N/A	$63,977	.014	$878	$630,997
2036	N/A	$63,977	N/A	N/A	$63,977	.012	$798	$631,795
2037	N/A	$63,977	N/A	N/A	$63,977	.011	$725	$632,520
2038	N/A	$63,977	N/A	N/A	$63,977	.010	$659	$633,179
2039	N/A	$63,977	N/A	N/A	$63,977	.009	$599	$633,779
2040	N/A	$63,977	N/A	N/A	$63,977	.009	$545	$634,324
Total	N/A	$3,198,869	N/A	N/A	$3,198,869		$634,324	

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: EMF-536 Office Spaces

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.62
Number of Square Feet of Building Space	(X)	68,500
Total Annual Maintenance Cost	(=)	$42,470

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1990	
Building Age Multiplier During Years:	1991-1999	1.00
Building Age Multiplier During Years:	2000-2009	1.40
Building Age Multiplier During Years:	2010-2019	1.90
Building Age Multiplier During Years:	2020-2029	2.10
Building Age Multiplier During Years:	2030-2040	2.10

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $0.60 * 0.87 * 1.188 = $.62 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: EMF COST SAVINGS BY VACATING 56 LEASED TRAILERS

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.62
Number of Square Feet of Building Space	(X)	40,000
Total Annual Maintenance Cost	(=)	$24,800

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1981	
Building Age Multiplier During Years:	1991-2040	1.00
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $0.60 * 0.87 * 1.188 = $.62 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1

Annual Maintenance Costs

(In Program-Year Dollars)

Alternative: EMF, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-18,000 SF Conf Space

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.59
Number of Square Feet of Building Space	(X)	18,000
Total Annual Maintenance Cost	(=)	$10,620

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1990	
Building Age Multiplier During Years:	1991-1999	1.00
Building Age Multiplier During Years:	2000-2009	1.40
Building Age Multiplier During Years:	2010-2019	1.90
Building Age Multiplier During Years:	2020-2029	2.10
Building Age Multiplier During Years:	2030-2040	2.10

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $0.57 * 0.87 * 1.188 = $.59 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1

Annual Maintenance Costs

(In Program-Year Dollars)

Alternative: STATUS QUO, COMB NEW/EXISTING BLDGS, COMB NEW/LEASE-Existing Permanent Facilities

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.62
Number of Square Feet of Building Space	(X)	40,000
Total Annual Maintenance Cost	(=)	$24,800

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1950	
Building Age Multiplier During Years:	1991-1999	2.10
Building Age Multiplier During Years:	2000-2040	1.65
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $0.60 * 0.87 * 1.188 = $.62 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1

Annual Maintenance Costs

(In Program-Year Dollars)

Alternative: COMB NEW/EXISTING BLDGS-240 Office Spaces

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.62
Number of Square Feet of Building Space	(X)	30,685
Total Annual Maintenance Cost	(=)	$19,025

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1990	
Building Age Multiplier During Years:	1991-1999	1.00
Building Age Multiplier During Years:	2000-2009	1.40
Building Age Multiplier During Years:	2010-2019	1.90
Building Age Multiplier During Years:	2020-2029	2.10
Building Age Multiplier During Years:	2030-2040	2.10

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:

Annual maintenance cost per square foot calculation: $0.60 * 0.87 * 1.188 = $.62 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: STATUS QUO, COMB NEW/LEASE-Existing 13 Trailers

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.62
Number of Square Feet of Building Space	(X)	9,282
Total Annual Maintenance Cost	(=)	$5,755

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1982	
Building Age Multiplier During Years:	1991-2040	1.00
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $0.60 * 0.87 * 1.188 = $.62 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

WORKSHEET 1
Annual Maintenance Costs
(In Program-Year Dollars)
Alternative: COMB NEW/LEASE-30 Additional Trailers

Annual Maintenance

Annual Maintenance Cost per Square Foot		$.62
Number of Square Feet of Building Space	(X)	21,420
Total Annual Maintenance Cost	(=)	$13,280

Escalation Factor (Method 1 - Building Age Multiplier)

Year of Construction or Renovation of Facility:	1990	
Building Age Multiplier During Years:	1991-2040	1.00
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A
Building Age Multiplier During Years:		N/A

Escalation Factor (Method 2 - Average Annual Change)

Year of Construction or Renovation of Facility:		
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %
Average Annual Change in Maintenance Costs During Years:		N/A %

Assumptions, Additional Calculations, and Data Sources:
Annual maintenance cost per square foot calculation: $0.60 * 0.87 * 1.188 = $.62 (base cost * area cost factor * OSD inflation multiplier = Annual Maintenance Cost per Square Foot). Source: Economic Analysis Manual Data Base System.

INTERNAL DISTRIBUTION

1. T. D. Anderson
2. S. I. Auerbach
3. D. J. Bjornstad
4. R. B. Braid, Jr.
5. M. A. Broders
6. R. S. Burns
7. R. A. Cantor
8. J. B. Cannon
9. S. A. Carnes
10. E. D. Copenhaver
11. R. B. Craig
12. T. R. Curlee
13. S. Das
14. H. B. Davidson
15. R. M. Davis
16. L. D. Eyman
17. C. S. Fore
18. W. Fulkerson
19. S. G. Hildebrand
20. E. A. Hirst
21. R. B. Honea
22. D. B. Hunsaker
23. C. R. Kerley
24. J. M. Kraemer
25. J. R. Merriman
26. D. C. Parzyck
27. E. B. Peele
28. L. W. Rickert
29. R. D. Roop
30. T. H. Row
31. M. Schweitzer
32. R. B. Shelton
33. D. H. Stitt
34. D. P. Vogt
35. T. J. Wilbanks

36-37. Central Research Library

38-39. Document Reference Section

40-60. HAZWRAP Library

61-62. Laboratory Records Department

63-64. Laboratory Records Department—C

65. ORNL Patent Section

EXTERNAL DISTRIBUTION

66. R. Brandin, URS Corporation, 1421 Chapala Street, Santa Barbara, CA 93101
67. C. Clayton, URS Corporation, 1421 Chapala Street, Santa Barbara, CA 93101
68. E. Dunlap, URS Corporation, 1421 Chapala Street, Santa Barbara, CA 93101
69. W. L. Ellersieck, URS Corporation, 1421 Chapala Street, Santa Barbara, CA 93101

70-71. R. Gregory, U.S. Air Force, HQ AFESC/DEC, Tyndall AFB, FL 32403-6001

72. D. S. Jansing, U.S. Air Force, 3750 ABG/DE, Sheppard AFB, TX 76311
73. W. A. Nixon, U.S. Air Force, HQ AFESC/DEMB, Tyndall AFB, FL 32403-6001
74. L. Owens, URS Corporation, 1421 Chapala Street, Santa Barbara, CA 93101

75-84. P. A. Parker, U.S. Air Force, HQ USAF/LEEPR, Pentagon, Room 5D376, Washington, DC 20330-5130

85. Major K. L. Small, U.S. Air Force, HQ USAF/LEEV, Bolling AFB, Washington, DC 20332

EXTERNAL DISTRIBUTION (Continued)

86. R. D. Thomson, URS Corporation, 1421 Chapala Street, Santa Barbara, CA 93101
87. R. E. Van Tassel, URS Corporation, 1421 Chapala Street, Santa Barbara, CA 93101
88. Office of Assistant Manager for Energy Research and Development, U.S. Department of Energy, Oak Ridge Operations Office, P.O. Box E, Oak Ridge, TN 37831
89-90. Office of Scientific and Technical Information, U.S. Department of Energy, P.O. Box 62, Oak Ridge, TN 37831
91-316. U.S. Air Force Headquarters/LEH, Pentagon, Room 5D431, Washington, DC 2033-5130

☆U.S. GOVERNMENT PRINTING OFFICE 1987—548-118/60117