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UNITED STATES GENERAL ACCOUNTING OFFICE

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GAO contact

REGIONAL OFFICE
ROOM 1903 JOHN F. KENNEDY FEDERAL BUILDING
GOVERNMENT CENTER
BOSTON, MASSACHUSETTS 02203
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BEST DOCUMENT AVAILABLE

Colonel Forrest S. Rittgers, USA
Post Commander
Fort Devens, Massachusetts 01433



Dear Colonel Rittgers:

We have completed a review of energy use at Fort Devens. The purpose of this review was to find out how effectively Government field installations were implementing the energy reduction program. The review included the:

- results of the energy conservation program,
- methods used to gather and report data on energy use,
- management of the energy conservation program,
- measures taken to reduce energy use in buildings,
- measures taken to reduce energy used by vehicles, and
- impact of energy conservation on mission and training operations.

RESULTS OF THE ENERGY CONSERVATION PROGRAM

Fort Devens is responsible for energy used in about 800 buildings on-post, family housing off-post, and former NIKE missile sites located throughout New England. Electricity, natural gas and heating oil are the main types of energy used by Fort Devens. Electricity is used for lighting and to power equipment while natural and propane gas as well as various types of fuel oil are used for heating. Vehicles are powered by gasoline and diesel fuel. Helicopters are powered by aviation gas and jet fuel.

In June 1973, the President directed all Federal agencies to use 7 percent less energy in fiscal year 1974 than in fiscal year 1973. Our review showed that during fiscal year 1974 Fort Devens used less energy than in fiscal year 1973 except for jet fuel. Also, during the first three quarters of fiscal year 1975, Fort Devens used less energy, except for jet fuel, than in the corresponding period in fiscal year 1973.

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CURRENT AVAILABLE

<u>Type of Energy</u>	<u>Fiscal Year</u>		<u>Decrease/(Increase)</u>	
	<u>1973</u>	<u>1974</u>	<u>Amount</u>	<u>Percent</u>
Electricity (000 of kilowatt hours)	62,464	55,836	6,628	11
Natural gas (000 of cubic feet)	683,873	600,067	83,806	12
Fuel oil #2,4,5 (000 of gallons)	5,921	4,545	1,376	23
Propane gas (000 of gallons)	46	39	7	15
Gasoline (000 of gallons)	1,259	895	364	29
Diesel fuel (000 of gallons)	356	340	16	5
Aviation gasoline (000 of gallons)	36	30	6	17
Jet fuel (000 of gallons)	151	264	(113)	(75)

<u>Type of Energy</u>	<u>Three Quarters Of</u>		<u>Decrease/(Increase)</u>	
	<u>Fiscal Year</u>	<u>1973</u>	<u>1974</u>	<u>Amount</u>
Electricity (000 of kilowatt hours)	47,489	42,949	4,540	10
Natural gas (000 of cubic feet)	573,728	543,185	30,543	5
Fuel oil #2,4,5 (000 of gallons)	4,642	4,153	489	11
Propane gas (000 of gallons)	36	14	22	61
Gasoline (000 of gallons)	786	590	196	25
Diesel fuel (000 of gallons)	267	206	61	23
Aviation gasoline (000 of gallons)	27	21	6	22
Jet fuel (000 of gallons)	87	211	(124)	(143)

METHODS USED TO GATHER AND REPORT ENERGY USE DATA

The system used by Fort Devens to gather and report data on energy use needs to be improved. As required by the Defense Energy Information System (DEIS), Fort Devens submits two reports to the Defense Supply Agency.

--The DEIS I report is submitted weekly showing the fuel oil, automobile gasoline, diesel fuel, aviation gas, and jet fuel used during the week.

--The DEIS II report is submitted monthly showing the electricity, natural gas and propane gas used during the month.

Fort Devens also submits quarterly energy consumption statistics on all energy used to U.S. Army Forces Command, Fort McPherson, Georgia. These reports show the amount of energy used during the current period and during the corresponding period in fiscal year 1973. Data for the weekly, monthly, and quarterly reports is obtained from:

--the utilities division of the Post Engineer, which provides information on the amount of electricity, natural and propane gas used,

--the supply department, which provides information on fuel oil, diesel fuel, gasoline, aviation gasoline and jet fuel used.

Our review showed that the energy use statistics in the weekly DEIS I reports and the monthly DEIS II reports did not agree with those reported quarterly. Moreover, the reported energy use statistics generally did not agree with the periodic bills for the various forms of energy used at Fort Devens. An engineering official told us that energy used was estimated for the DEIS II reports because actual bills are not available when the reports are due. He also told us that the estimates are not revised when the bills are received because energy use reporting is only a part-time job.

A supply department official told us that the differences were partly due to inaccuracies in the weekly measurement of fuel inventories. In addition, from the inception of the DEIS reporting requirements to January 1975, Fort Devens reported the difference between beginning inventory and purchases less ending inventory as fuel used. Starting in January 1975, however, Fort Devens reported fuel received as fuel used. Although data for all of fiscal year 1975 was adjusted to reflect this change, usage in prior periods was not corrected. Thus, a valid comparison between fiscal year 1973 and current use is not possible.

We believe that Fort Devens should revise the methods used to gather data on energy use to ensure that accurate usage data is reported. If estimates must be used to meet reporting deadlines, they should be adjusted when actual data becomes available.

MANAGEMENT OF THE ENERGY
CONSERVATION PROGRAM

In addition to being responsible for the energy used in about 800 buildings on-post, family housing off-post, and former NIKE missile sites scattered throughout New England, on April 1, 1975, Fort Devens became responsible for energy used at the South Boston, Massachusetts, Army Support Activity and on July 1, 1975, for energy used at the Fargo Building in Boston, Massachusetts (formerly Headquarters of the Commandant of the First Naval District). Fort Devens energy conservation statistics includes about 60 Army Reserve centers throughout New England. However, Fort Devens has no management control over the energy used by the centers. Army Reserve units are managed by Fort George Meade, Maryland, through the Army Readiness Region I (ARR I) located at Fort Devens.

In April 1972, Fort Devens established unit conservation officers for each subordinate command, tenant command, and off-post energy supported activity. The unit conservation officers meet periodically with the post energy conservation director to assure compliance with the post conservation program in their respective units and discuss ways to attain further energy reductions. This group has developed a plan to conserve electric power and heating fuel through improved utility management. We noted no potential energy savings were attributed to the actions that may be taken under the plan. However, we were advised by an engineering official that electric and heat consumption had decreased as a result of this group's effort.

In January 1974, Fort Devens issued a six phase energy conservation contingency plan progressively reducing its operations to mission essential only. According to a Fort Devens official, phases I and II, which do not involve personnel actions, had been implemented by March 1975. We noted that the plan does not estimate the energy savings that could be attained by implementing phases III to VI.

In January 1974, Fort Devens established an Energy Task Group to manage the conservation program. This group consists of the Post Commander, Program Directors and a representative of ARR I. They meet periodically to plan future energy conservation efforts and review and evaluate present energy consumption reduction efforts. They have developed a fuel allocation program for on and off-post activities and an energy conservation contingency plan.

As of September 1974, Fort Devens had submitted 14 special energy projects estimated to cost about \$3.6 million to FORSCOM headquarters. Fort Devens has several in-house energy conservation projects which it plans to implement as funds become available.

The Fort Devens energy conservation program director is a Lieutenant Colonel who is assisted on a full-time basis by a Junior Officer.

Actions taken by Fort Devens to make employees aware of the need for energy conservation have included:

- issuing directives for equipment operation to reduce energy,
- placing posters, announcements, and bulletins concerning energy conservation throughout the buildings,
- establishing a car pool program covering 1,300 of the 9,100 people at Fort Devens which saves an estimated 250,000 gallons of gasoline yearly, and

--printing articles on energy conservation in the Post Dispatch.

Fort Devens energy reduction program was reviewed by the Forces Command Inspector General in September 1974 and the Federal Energy Management Team in April 1975.

MEASURES TAKEN TO REDUCE ENERGY USE IN BUILDINGS

Electricity, natural gas and fuel oils are the main types of energy used in Fort Devens buildings. As stated previously, Fort Devens had reduced its use of these energy forms by various actions including:

- controlling use of existing and purchase of new air cooling equipment,
- intensifying periodic preventive maintenance inspections of all heating equipment and electrical systems to correct problem areas in a timely manner,
- reducing lighting intensity to meet standards,
- providing a light meter and instructions for units to survey their individual areas,
- closing about 250 buildings in the winter of 1974-1975,
- restricting use of washers and dryers in enlisted barracks, bachelor officers' quarters and guest houses,
- prohibiting use of electric space heaters,
- revising the Wherry Housing heating plant to use #4 instead of #2 heating fuel, and
- buying a boiler tube cleaner to permit more frequent tube cleaning and improve plant efficiency.

As mentioned previously, Fort Devens generally used less energy in buildings during fiscal year 1974 than in fiscal year 1973. As shown below, this was done mainly by reducing the energy used by activities on the post. We believe there is a potential for reducing the energy used by off-post family housing and the Army Reserve Centers.

<u>Fort Devens On-Post Activities</u>	<u>Fiscal Year</u>		<u>Decrease/(Increase)</u>	
	<u>1973</u>	<u>1974</u>	<u>Amount</u>	<u>Percent</u>
Electricity (000 of kilowatt hours)	44,773	39,583	5,190	12
Natural Gas (000 of cubic feet)	674,696	590,747	83,949	11
Fuel Oil (000 of gallons)	3,670	2,996	674	18
<u>NIKE Sites</u>				
Electricity (000 of kilowatt hours)	5,210	4,228	982	19
Fuel Oil (000 of gallons)	176	201	(25)	(14)
<u>Off-Post Housing</u>				
Electricity (000 of kilowatt hours)	7,232	6,862	370	5
Fuel Oil (000 of gallons)	1,011	669	342	34
<u>Army Reserve Centers</u>				
Electricity (000 of kilowatt hours)	5,398	5,163	235	4
Natural Gas (000 of cubic feet)	9,228	9,310	(82)	(1)
Fuel Oil (000 of gallons)	821	1,124	(303)	(37)

The Energy Conservation Director told us that the NIKE sites were in the process of being closed. He also told us that Fort Devens recognizes the need to improve energy conservation in the off-post family area and has been authorized five additional positions to monitor energy use at off-post housing areas.

As for the Army Reserve Centers, however, Fort Devens has no management control over their energy reduction program. The Centers report to First Army at Fort George Meade, Maryland, through ARR I located at Fort Devens. Although Fort Devens has the energy use data for each of Centers, ARR I has management control over them. We believe there is a need for better coordination between Fort Devens and ARR I to insure that ARR I is aware of the amount of energy used by the reserve centers and can take action to reduce energy use. Since a representative of ARR I participates in the Energy Task Group which meets periodically, this could possibly be an effective mechanism for achieving better coordination.

MEASURES TAKEN TO REDUCE ENERGY USED BY VEHICLES

Fort Devens has taken various measures to reduce vehicle use including:

--using Fort Devens-operated vehicles on a consolidated basis,

--establishing reimbursement limitation for the use of privately-owned vehicles,

--using motor scooters for Post security patrols,

--publishing and revising the Post shuttle bus schedule.

Fort Devens has encouraged its employees to reduce their use of motor vehicles by establishing a computer matching car pool program.

In December 1973, the Department of the Army directed a 15 percent reduction in motor vehicle mileage from that driven in fiscal year 1973. Fort Devens has motor pool agency-owned vehicles and reimburses privately-owned automobiles (POA) authorized for official travel. A schedule below shows the mileage in thousands of miles during fiscal year 1973, 1974, and the first half of fiscal year 1975.

<u>Type of Vehicle</u>	<u>Fiscal Year</u>		<u>Decrease/(Increase)</u>	
	<u>1973</u>	<u>1974</u>	<u>Amount</u>	<u>Percent</u>
Agency-owned	2,996	3,728	(732)	(24)
POA	197	244	(47)	(24)
Total miles (in 000)	<u>3,193</u>	<u>3,972</u>	<u>(779)</u>	<u>(24)</u>

<u>Type of Vehicle</u>	<u>1st Half of Fiscal Year</u>		<u>Decrease/(Increase)</u>	
	<u>1973</u>	<u>1975</u>	<u>Amount</u>	<u>Percent</u>
Agency-owned	1,341	1,917	(576)	(42)
POA	109	126	(17)	(16)
Total miles (in 000)	<u>1,450</u>	<u>2,043</u>	<u>(593)</u>	<u>(41)</u>

Rather than achieving the 15 percent mileage reduction directed by the Army, mileage increased 24 percent in fiscal year 1974 and 41 percent through the first half of fiscal year 1975.

A transportation official told us that reimbursable mileage will be limited to about 2,000 miles a month starting in January 1975 in order to reduce POA mileage by 180,000 miles a year. We believe that some additional efforts are needed to reduce the miles driven by both agency-owned and POA vehicles.

IMPACT OF ENERGY CONSERVATION ON
MISSION AND TRAINING OPERATIONS

The Deputy for Training and Security told us the current conservation goal has had no impact on Fort Devens' readiness, training and proficiency level or ability to carry out its mission. He also told us there have been no studies to determine if mission or training requirements could be reduced without adverse effects. He stated, however, that he informally evaluates each planned training exercise to determine the most economical means of ground or air transportation to use.

Gasoline, diesel fuel, aviation gas, and jet fuel are the types of energy used in training exercises. As previously shown, Fort Devens has reduced the use of these fuels except for jet fuel. The Deputy for Training and Security told us that increased training requirements for pilots limits the possible energy savings in this area.

As shown below, during fiscal year 1974 the number of aircraft using jet fuel increased by 145 percent and the hours flown increased by 165 percent; however, Fort Devens used only 75 percent more jet fuel. On the other hand, during the first two quarters of 1975, Fort Devens used 60 percent more jet fuel than in the corresponding period in fiscal year 1974, despite only a 7 percent increase in the number of aircraft and a 17 percent decrease in hours flown.

	<u>Fiscal Year</u>		<u>Increase (Decrease)</u>	
	<u>1973</u>	<u>1974</u>	<u>Amount</u>	<u>Percent</u>
Aircraft using jet fuel	11	27	16	145
Hours flown	2,202	5,840	3,638	165
Gallons of jet fuel used	151,000	264,000	113,000	75
	<u>1st 2 Quarters Of</u>		<u>Increase (Decrease)</u>	
	<u>Fiscal Year</u>		<u>Amount</u>	<u>Percent</u>
	<u>1974</u>	<u>1975</u>		
Aircraft using jet fuel	27	29	2	7
Hours flown	3,385	2,811	(574)	(17)
Gallons of jet fuel used	97,000	155,000	58,000	60

CONCLUSIONS

Fort Devens implementation of the Federal energy reduction program has generally been effective. Through various measures, Fort Devens has been able to exceed the Presidential energy reduction goals in most forms of energy without adversely affecting its operations in fiscal year 1974. Also, Fort Devens reduced its energy use during the first three quarters of fiscal year 1975.

The system used by Fort Devens to gather data on energy use needs to be improved. For reporting purposes, Fort Devens should assure that accurate usage data is reported. If estimates must be used to meet reporting deadlines, such estimates should be adjusted when actual data becomes available.

The various energy conservation plans developed by Fort Devens should include estimates of the energy savings to be derived from the various actions proposed to facilitate evaluations of the proposed changes.

Fort Devens should analyze usage data to identify problem areas where management actions could possibly result in further energy savings. The use of electricity in off-post family housing, for example, has not met the 1974 energy reduction goal; the amount of miles driven on administrative vehicles continues to increase, rather than decrease; and jet fuel consumption for Fort Devens aircraft continues to rise. We believe these areas offer potential for additional energy use reductions.

The Army Reserve Centers have not reduced the use of natural gas and fuel oil in buildings and have not met the energy reduction goal for 1974 for electricity usage. We believe the Energy Task Group could be used at Fort Devens to provide energy use data to ARR I, which has management responsibility over the Centers, so that action could be taken to reduce energy use.

RECOMMENDATIONS

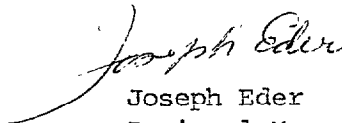
We recommend that Fort Devens:

- revise the method used to gather and report energy use information to insure that accurate data is reported,
- develop procedures to estimate the potential energy savings which can be achieved by the various proposed conservation plans to facilitate evaluation of proposed changes,

- analyze the energy used by various components such as off-post housing and Army Reserve Centers to identify areas where further reductions can be made,
- coordinate with ARR I to provide them with energy use data so that ARR I can take steps to reduce energy use by the Reserve Centers and units,
- analyze the use of administrative vehicles to determine if a 15 percent reduction in mileage can be attained, and
- analyze the use of jet fuel and take steps to reduce jet fuel consumption.

We would appreciate receiving your comments on the matters discussed in this report within 30 days. I would like to express my appreciation for the cooperation given my staff by Fort Devens personnel during our review.

Sincerely yours,



Joseph Eder
Regional Manager

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