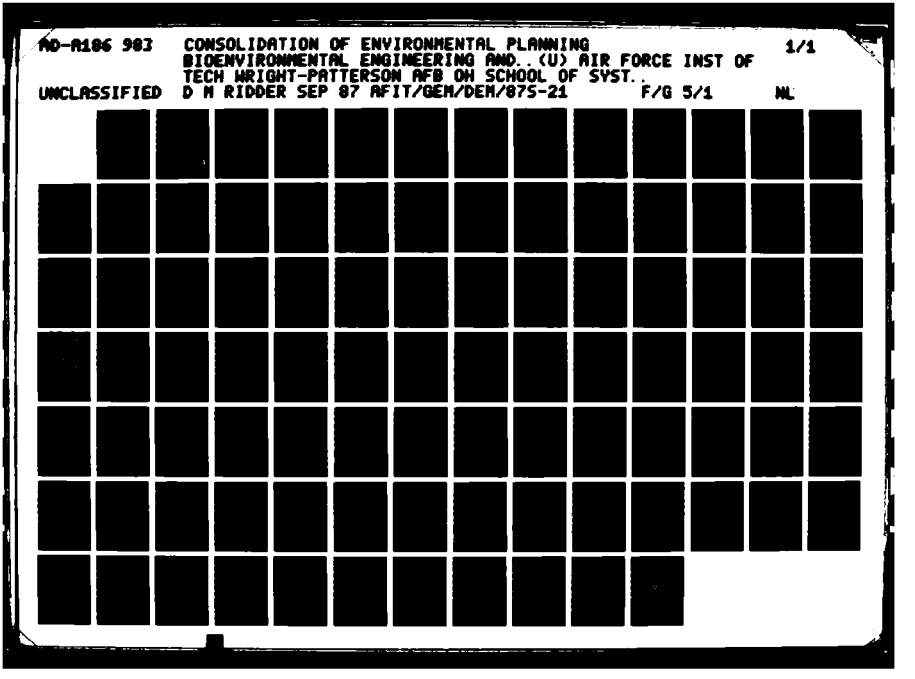
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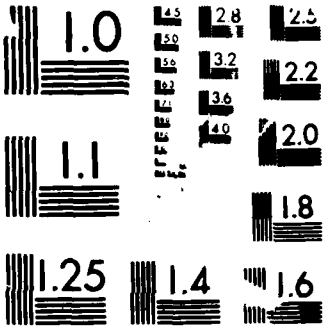

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CONSOLIDATION OF ENVIRONMENTAL PLANNING, BIOENVIRONMENTAL ENGINEERING AND BASE SAFETY INTO A SINGLE RESOURCE PROTECTION ORGANIZATION

THESIS

Daniel M. Ridder
First Lieutenant, USAF

AFIT/GEM/DEM/87S-21

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
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Wright-Patterson Air Force Base, Ohio

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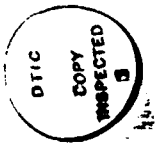

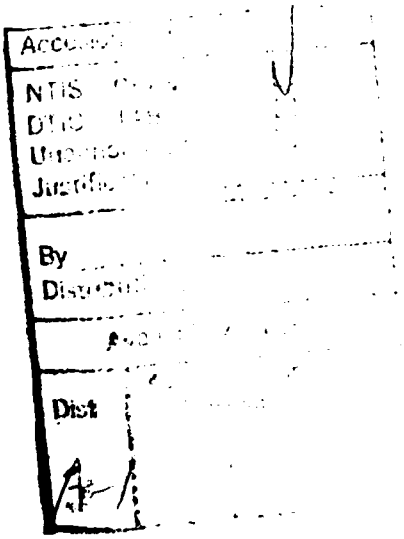

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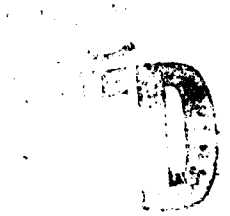

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CONSOLIDATION OF ENVIRONMENTAL PLANNING, BIOENVIRONMENTAL ENGINEERING, AND BASE SAFETY INTO A SINGLE RESOURCE PROTECTION ORGANIZATION

THESIS

Presented to the Faculty of the School of Systems
and Logistics of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Engineering Management

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First Lieutenant, USAF

September 1987

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Daniel M. Ridder

Table of Contents

List of Figures

List of Tables

Abstract

This study investigated how the U.S. Air Force may be able to establish a more effective control over the management of environmental quality, and human health and safety programs. The premise for this study was that consolidating Environmental Planning, Bioenvironmental Engineering, and Base Safety into a single Resource Protection organization may achieve a more effective control of the management of environmental quality, and human health and safety programs. This study was conducted to determine how these organizations could be consolidated in terms of organizational structure, functional responsibilities, and what effect the reorganization might have on the management of these programs.

The study found, from the analysis of the functional responsibilities currently being performed by the three organizations, that consolidating the three organizations could achieve a greater coordinated effort in the accomplishment of Air Force environmental quality, and occupational health and safety programs.

The organizational structure proposed in this study accomplishes three additional objectives, other than a higher degree of coordination. First, the Resource Protection organization was structured in a matrix organizational

design; allowing more flexibility for assigning personnel from different branches to the same high priority project. Second, the Resource Protection organization was positioned directly under the command of the senior installation commander; facilitating a higher level of decision making support for environmental compliance matters. Finally, the Resource Protection organization would obtain the delegated authority commensurate with the responsibility of enforcement of environmental laws and regulations.

CONSOLIDATION OF ENVIRONMENTAL PLANNING, BIOENVIRONMENTAL ENGINEERING, AND BASE SAFETY INTO A SINGLE RESOURCE PROTECTION ORGANIZATION

I. Introduction

Chapter Overview

This chapter describes the background and current status of the United States Air Force (USAF) environmental and natural resource protection policies and programs. The general issue and specific problem statement associated with the management of these programs are presented, as well as the research questions, justification for the study, operational definitions, and the scope and limitations of this study.

Background

The National Environmental Policy Act (NEPA) of 1969 was signed into law by the President on 1 January 1970. NEPA declared national environmental policy and established the Council on Environmental Quality (CEQ) (40:1). The CEQ was created to advise the President on any matters affecting the quality of the human environment (5:1). Several Federal, state and local environmental laws and regulations soon followed the signing of NEPA into law.

On 7 March 1970, the President issued Executive Order 11514, which directed each Federal agency to ". . . initiate

measures needed to direct their policies, plans and programs so as to meet national environmental goals" (32:1). In return, on 30 April 1970, the Council on Environmental Quality issued Interim Guidelines which required each Federal agency to establish internal procedures to implement NEPA policies (5:24). These regulations were revised, on 29 November 1978, to make the NEPA process more useful to Federal agencies, during the decision making process concerning environmental quality matters (6).

On 2 December 1970, the Environmental Protection Agency (EPA) was organized to act as the Federal regulatory agency to enforce Federal environmental laws and regulations (26). The EPA has been charged with the enforcement of several pieces of Federal legislation since its formation. The EPA's major areas of responsibility are air pollution, water pollution, hazardous waste management, and natural resource conservation (26). The EPA does not have the authority to enforce any laws on other Federal agencies; however, each residing Federal agency must comply with existing state, and local environmental laws and regulations (26).

Following NEPA policies, Executive Orders, and CEQ regulations, the Department of Defense (DoD) then issued DoD Directive 6050.1, directing each branch of the service to establish an environmental policy '14). In accordance with this DoD Directive, the U.S. Air Force developed and published AFR 19-1, Pollution Abatement and Environmental Quality, and AFR 19-2, Environmental Impact Analysis Process

(15; 20). This was the impetus of many USAF environmental and natural resource protection programs.

USAF Policy. In general, the Air Force policy is to comply not only with Air Force regulations relating to environmental quality, but also with the spirit and letter of the NEPA, all Federal environmental legislation, EPA standards, as well as state and local environmental laws and regulations (15:2). Environmental programs and actions are to be planned and carried out in a manner to avoid adverse effects on the quality of the human environment and they are to be fully coordinated with all agencies concerned, to avoid duplication and insure timely solutions to mutual problems. The installation commander of each USAF installation is personally liable for any violations of Federal, state and local environmental laws and regulations (15:2; 20:1).

Current Situation. In 1976, the Congress enacted the Resource Conservation and Recovery Act (RCRA) which provides for regulatory controls over the generation, transportation, treatment, storage and disposal of hazardous wastes (28). "Department of Defense (DoD) records show that it generated over 530,000 tons of hazardous waste . . . ", and that ". . . 333 of its 888 installations in the United States produced hazardous waste in 1984" (28:10). According to the U.S. General Accounting Office May 1986 report to Congress:

> DoD installations have made progress toward coming into compliance with RCRA requirements since EPA published its implementing regulations in May 1980. However, many installations were not in compliance with RCRA requirements. Twelve of the 14 installations we visited were out of compliance. In the seven states

> where the 14 installations are located, state regulatory officials considered 41 of the 75 DoD installations they inspected to be out of compliance with RCRA. This included the 12 installations we found to be out of compliance.
>
> Officials at the installations and state regulatory agencies attributed noncompliance to a number of factors, including the lack of command level emphasis on management of hazardous waste, . . . [28:18].

General Issue

Presently, responsibilities for the U.S. Air Force environmental planning, natural resource protection, and hazardous waste management programs are fragmented at the base level in three separate organizations. However, the base commander of each USAF installation is personally liable for any violations of Federal, state, and local environmental laws and regulations. The present organizational structure may not be the most efficient mode of management for the USAF environmental and natural resource protection programs.

Specific Problem Statement

The office of primary responsibility for environmental and natural resource protection programs exists within the Base Civil Engineering organization at the Environmental Planning section level (DEEV). A closely coordinated effort between DEEV, Bioenvironmental Engineering, and Base Safety is imperative for the effective management of environmental and natural resource protection programs, and to ensure compliance with Federal, state, and local laws and regulations. With each organization under a different chain of command, many functional responsibilities tend to be

either redundant, or nonexistent, which may create some barriers for accomplishing each organization's mission objectives. Reorganization of Environmental Planning, Bio-environmental Engineering, and Base Safety into a single Resource Protection organization under a single manager concept may result in a more efficient and coordinated effort to ensure conservation of natural resources, and compliance with Federal, state, and local laws and regulations.

Research Questions

The following research questions were posed on the basis of the theoretical formation of an installation level Resource Protection organization, comprised of Environmental Planning, Bioenvironmental Engineering, and Base Safety.

1. How is it physically feasible to consolidate these organizations into a single staff function?

2. How would consolidation affect present manpower and operating expenses?

3. How can redundant, or nonexistent functional responsibilities be consolidated, or redefined to ensure full compliance of environmental laws, and accomplish mission objectives?

4. How would consolidation of these organizations present better quality information, and decision making capability to senior installation commanders?

5. How would consolidation enhance the management of the USAF environmental and natural resource protection programs to result in fewer violations of environmental laws?

6. Were there any governmental agencies operating under this type of organizational structure? If so, what can be learned from their mode of operation?

Justification

The Air Force Engineering and Services Center (AFESC) contracted a civilian management analysis firm to assess the effectiveness of the Base Civil Engineering Environmental Planning section. The analysis was part of the Air Force 1986 program for Project IMAGE (Innovative Management Achieves Greater Effectiveness), which seeks to identify implementable improvements to the engineering functions and processes (10:II-2). The first finding of this analysis was that typically the Environmental Planning staff was overwhelmed by workload, and an air of crisis management prevailed in response to environmental matters. Second, the Environmental Planning section level is at the lowest organizational level at any installation, which forces the environmental planner to go through many echelons of command to coordinate an initiative, or to enforce a policy. Finally, the environmental planner must rely on the Hospital Commander to provide bioenvironmental staff support. In many cases, support was found to be incomplete, not timely, or simply not provided. As a result of these findings, the proposed change was to establish an environmental organization directly under the control of the senior installation commander (10:VI-3). The report concluded that the reorganization would accomplish the following:

> The proposed change would allow the senior installation commander to focus resources on a vital problem area and provide requisite authority to deal across all organizational boundaries on environmental policy. It would give the environmental planner the "clout" to get the total base populace cooperation and support needed to accomplish directed policy from EPA, State Environmental Agencies and within DoD [10:VI-3].

Operational Definitions

The following definitions for each term are intended to represent the most common usage in order to establish a common communications baseline. This listing is not a comprehensive list of all environmental terms and definitions, just the ones used in this study.

Abatement--the method of reducing the degree of intensity of pollution, also the use of such a method.

Air Pollution--the presence of contaminants in the air in concentrations that prevent the normal dispersive ability of the air and that interfere directly or indirectly with man's health, safety or comfort or with the full use and enjoyment of his environment.

Effectiveness--the degree of compliance with environmental laws, regulations, and directives.

Efficiency--the accomplishment of environmental objectives with maximum coordination and minimum effort, expense, or waste.

Environment--the sum of all ambient conditions and influences affecting the life, development, and ultimately, the survival of a living organism.

Environmental Protection--the care exhibited in

preserving the quality of the environment

Hazardous Waste Management--the process of controlling the generation, transportation, storage, and disposal of hazardous, and toxic waste materials.

Organizational Structure--the formally defined framework of task and authority including the processes of communication, coordination, and reporting within an organization.

Resource Protection--the sum of Environmental Protection with the consideration of human health and safety.

Scope and Limitations

This study was directed at the formation of a separately identifiable, theoretical organization with the name Resource Protection. This Resource Protection organization would collectively consist of existing USAF organizations tasked with missions of environmental protection, and human health and safety. The new Resource Protection organization would continue to provide the same type and degree of mission support, with the intent of greater efficiency, and effectiveness.

The scope of this research was limited to the consideration of consolidating three existing organizations; Environmental Planning, Bioenvironmental Engineering, and Base Safety. The consolidation of these three organizations were considered only at the installation level. Reorganization at the major command, or Air Staff level was not investigated in this study.

II. Methodology

Chapter Overview

This chapter describes the methodology used to answer the previously stated research questions. This description of the methodology consists of a list of research instruments used, the manner in which these instruments were used, along with a justification for applying these instruments in this study.

This research study was based on the theoretical formation of an organization; therefore, did not lend itself to a statistical hypothesis test. As such, interviews, literature reviews, and case studies were used to develop and support the findings of this study.

Research Instruments

The primary research instruments used in this study, to gather and analyze data, consisted of 1) interviews; 2) a literature review of existing operating plans, regulations, and directives; 3) case studies of similar organizations; and 4) organizational structure modeling.

Interviews. Interviews to obtain expert opinion were conducted in three phases. First, preliminary interviews with major command, and Air Staff representatives were used to determine the feasibility of the consolidation, and to identify similar functional responsibilities. A second set of interviews, with representatives from previously

consolidated resource protection type organizations, with a similar organizational structure, were instrumental in the development of case studies, and in determining the effectiveness of consolidated organizations. The final interviews were used to draw comments on the theoretical organizational structure model, and consolidated functional responsibilities.

The literature surveyed on interviews, as a data gathering device, showed that the method of interviews presented some advantages, which were attractive in this study. Borg and Gall (1976) state that one of the main advantages of personal interviews, in lieu of a questionnaire, is that interviews usually permit much greater depth than the other methods of collecting research data. This is because the interviewer is able to alter the questioning during the interview according to the responses given by the subject. Borg and Gall also state that respondents are more likely to divulge more information during an interview than on a questionnaire (2:211-212).

Emory (1985) suggests three conditions that must be met to have a successful personal interview. They are 1) availability of the needed information from the respondent; 2) an understanding by the respondent of his or her role; 3) adequate motivation by the respondent to cooperate (24:161). Emory maintains that developing a good rapport with the respondent, before the interview, would assist in setting these conditions (24:162).

Failure to obtain the three conditions stated above presents some disadvantages to personal interviews. Borg and Gall reasoned that the interpersonal situation leads to subjectivity and bias. This is contributed to the eagerness of the respondent to please the interviewer, and the tendency of the interviewer to seek answers to preconceived notions (2:213). Emory states that there are many unknown reasons for bias during interviews; at least unknown to the interviewer. In this light, he suggests the interviewer must recognize the fact that this type of error may occur (24:167).

Literature Review. Review of existing operating plans, regulations, and directives of each of the three organizations also assisted in identifying similar functional responsibilities. The plan for data collection was to develop three separate lists outlining the functional activities of the base level Environmental Planning, Bioenvironmental Engineering, and Base Safety organizations. The three lists were then compared to identify which functional activities appeared to be similar in two or more of the three organizations. The similar functional activities were examined in detail to determine whether these functional activities were duplicative in nature, or so nearly similar that the functional activities might be combined and performed jointly, rather than separately by the individual organizations. The determinations of the degree of similarity, and feasibility of combining functional

activities were based on the logic of the author, and through interviews and recommendations of knowledgeable officials.

Case Studies. Case studies of previously consolidated resource protection organizations, and review of past related studies were used to determine the effectiveness of the management of environmental and natural resource protection programs, as well as the quality and timeliness of information available to base commanders.

The results of the case studies were utilized to predict whether the Resource Protection organization, resulting from the consolidation of the individual Environmental Planning, Bioenvironmental Engineering, and Base Safety organizations might be more effective and efficient when responding to environmental matters, than when operating independently.

Organizational Structure Modeling. Contemporary organizational design theory presents two basic approaches to designing an organizational structure. The first approach, universalistic design, assumes that there exists one best design for an organization, regardless of the situation (23:190). The second approach, contingency design, is based on the premise that the best organizational design depends upon the situation (23:190).

The organizational structure modeling, performed in this study, utilized the contingency design approach. The situational factor, which mainly influenced the organizational design, was the organization's operating

environment. The organization's operating environment, as used in this study, is ". . . composed of those institutions or forces that affect the performance of the organization, but over which the organization has little control" (34:162).

III. Current Organizational Structure

Chapter Overview

This chapter presents the current mode of operation of three organizations with objectives concerning resource protection, at the base level, and supporting an operational flying mission. Presented is the normal mode of operation as depicted in the applicable regulations, and directives of each organization. Base level organizations supporting other Air Force missions were not considered in this study.

The current organizational structure, functional responsibilities, typical manpower requirements, and personnel education and training of the Environmental Planning, Bioenvironmental Engineering, and Base Safety organizations are described individually. The final discussion in this chapter presents two organizations related directly to the objective of environmental protection. The information in this chapter serves as a basis for the organizational model, and functional responsibilities developed for the theoretically consolidated Resource Protection organization presented in Chapter IV.

Environmental Planning

Organizational Structure. The Environmental Planning function resides at the section level within the Base Civil Engineering organization. The Environmental Planning function coexists with the Contract Planning function within

the same section. The Environmental Coordinator manages the functional responsibilities of the Environmental Planning section and reports directly to the Chief of Environmental and Contract Planning (DEEV). The DEEV section is under the direct control of the branch level Chief of Engineering and Environmental Planning (DEE). The Chief of DEE is also responsible for the Engineering and Technical Design section (DEEE), the Contract Management section (DEEC), and the Real Property Management section (DEER). The Chief of DEE reports directly to the Base Civil Engineer (DE). The Base Civil Engineer serves as the commander of the Civil Engineering Squadron and is under the command of the Combat Support Group Commander (CSG/CC) (19). The CSG/CC serves as the Base Commander at the deputy level to the Wing Commander (CC). This command structure represents three echelons of command from the Wing Commander to the Base Civil Engineer, and three further functional levels to the Environmental Coordinator.

The organizational chart depicting the chain of command from the Wing Commander to the Environmental Coordinator is presented in Figure 1. The Environmental Protection Committee (EPC) chairman, usually the Vice Wing Commander (CV), is also shown in this chart, and described later.

Functional Responsibilities. The Environmental Coordinator manages many environmental programs assigned by the applicable regulations, policies, and directives. The overall objective of the U.S. Air Force Environmental

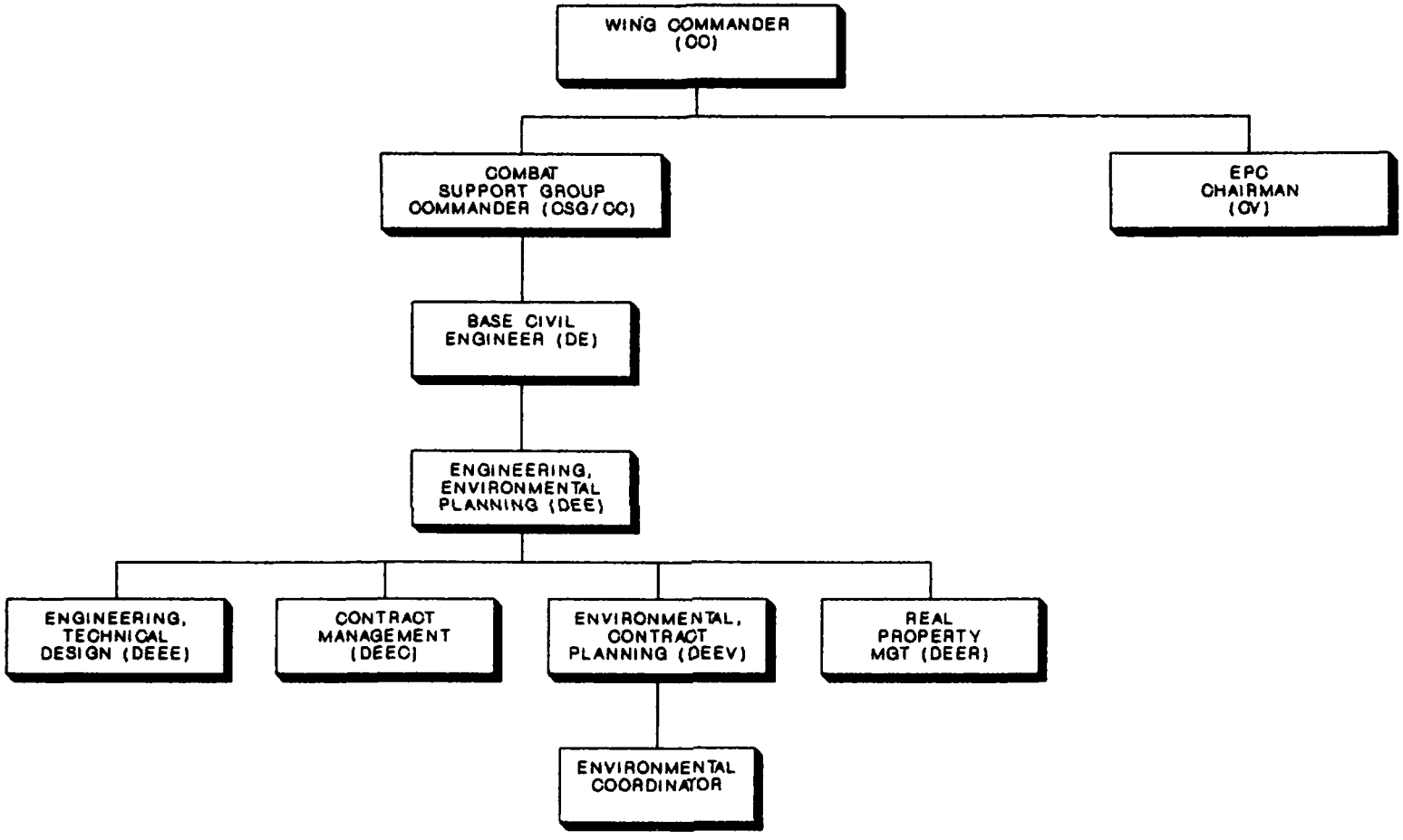

Figure 1.
Environmental Planning Function
(Source: Compiled from 9)

Planning program is to ". . . protect the quality of the human environment, insofar as practicable, and with appropriate consideration of assigned missions and of economic and technical factors" (20:2). The Environmental Planning function can be divided into three distinct activities; namely, Community Planning, Environmental Planning, and Natural Resource Planning.

Community Planning. The activities of Community Planning, as performed by the Environmental Coordinator, is similar to that of an urban planner. Community planning involves the analysis of community goals and objectives to reveal the community's needs and problems (3:587). Community Planning, as applied to the U.S. Air Force, is defined as the following:

> A process for insuring that each installation is able to support current and future missions, with emphasis on: the timely provision of physical development; the minimization of adverse environmental impacts resulting from base activities; and the proper use and management of natural resources [4:B-8].

The significant activities within the U.S. Air Force Community Planning program are as follows:

1. Base Comprehensive Planning (BCP). Base Comprehensive Planning involves the development and maintenance of a plan to direct the long term development of an installation, and provides the basis for all decisions on siting of facilities and setting priorities (11:1).

2. Air Installation Compatible Use Zone (AICUZ) Program. AICUZ is ". . . a program to ensure the continued

operational capability of each military air base while at the same time protecting the public from aircraft noise and accident hazards" (27:5).

3. Interagency/Intergovernmental Coordination for Environmental Planning (IICEP) Program. IICEP is ". . . a program to ensure coordination with state and local governments and federal agencies related to land, facility and environmental plans, programs, and projects" (18:1).

In summary, the significant activities of the Community Planning program are mainly committed to the analysis of future mission objectives and the impact on the community.

Environmental Planning. The Environmental Planning activity requires the majority of the Environmental Coordinator's attention in terms of time and energy (25). The Environmental Coordinator is designated as the single point of contact for all installation environmental quality matters (20:4) . The Environmental Planning function includes the responsibility for compliance with all environmental laws and regulations. The U.S. Air Force Environmental Planning function is defined as the following:

> A process for correlating all environmental quality standards, policies and requirements affecting existing and proposed installation activities and facilities, and for insuring that all Air Force actions are reviewed for environmental impact [25:B-8].

The significant activities within the U.S. Air Force Environmental Planning program are as follows:

1. Environmental Impact Analysis Process (EIAP). The Environmental Impact Analysis Process implements the NEPA of

1969, CEQ regulations, and DoD Directive 6050.1 discussed in Chapter I. "The Air Force EIAP provides a process for making decisions based on an understanding of potential environmental consequences of proposed actions and alternatives to enforce the Air Force Environmental Policy" (15:1).

2. The USAF Hazardous Waste Management Program (HWMP). The USAF Hazardous Waste Management Program was implemented by the Air Force in response to the Resource Conservation and Recovery Act of 1976 discussed in Chapter I. The objective of this program is to manage and minimize the generation, transportation, treatment, storage, and disposal of hazardous waste generated by the U.S. Air Force (28:2).

3. The Installation Restoration Program (IRP). The Installation Restoration Program was implemented in response to the Comprehensive Environmental Response, Compensation and Liability Act of 1980. The purpose of this program is to identify the locations and contents of past disposal sites of toxic and hazardous materials, and to eliminate the hazards to public health in an environmentally responsible manner (7:2).

4. Spill Prevention, Control, and Countermeasures (SPCC) Plan. The Environmental Coordinator is responsible for preparing and maintaining the installation contingency SPCC for accidental spills of hazardous and toxic substances (17:2).

5. Environmental Status Reports. The Environmental Coordinator is responsible for assessing and reporting the

current environmental status of the installation, semiyearly, to the appropriate major command. These reports include 1) The Environmental Pollution Prevention, Control, and Abatement Report submitted semiyearly; 2) The Defense Environmental Status Report submitted semiyearly (17:3).

6. Environmental Protection Committee (EPC). The Environmental Coordinator serves as secretary to the EPC. The Environmental Protection Committee is described later in this chapter, as a related organization.

7. Environmental Pollution Monitoring. The Environmental Coordinator performs selected pollution monitoring tasks, and collaborates with the installation Bioenvironmental Engineer in performing the base emissions survey, to determine compliance with all environmental standards (16:4).

Natural Resource Planning. The basis for the Natural Resource Planning activity derives from the National Environmental Policy Act. The NEPA states that mankind is responsible ". . . to create and maintain conditions under which man and nature can exist in productive harmony . . ." (40:1). The Air Force policy is to manage and conserve soil, water, forest, fish, wildlife, and outdoor resources in the accomplishment of mission objectives (13:1).

The significant activities of the U.S. Air Force Natural Resource Planning function are as follows:

1. Land Management Program. The Environmental Coordinator is responsible for preparing and maintaining a

plan of how installation land will be utilized, developed, and floodplains and wetlands will be managed (13:2).

2. Grazing Management Program. The Grazing Management Program provides for grazing or cropland outleases, within installation boundaries, when it does not interfere with the accomplishment of USAF mission objectives (13:2).

3. Forestry Management Program. The objective of forest resource management is to provide a sustained yield of timber products; maintain a desirable biological balance in the forest community; plan and coordinate the multiple uses of forest lands within installation boundaries (13:3).

4. Fish and Wildlife Management Program. The Environmental Coordinator is responsible for preparing and maintaining a five-year plan which manages, improves, and maintains the habitat of fish and wildlife, on USAF installations, by providing for their needs (13:3).

5. Outdoor Recreation Management Program. The Environmental Coordinator is responsible for preparing and maintaining a plan which classifies installation land suitable for outdoor recreation compatible with the USAF mission (13:3).

6. Natural Resources Working Group. The Environmental Coordinator serves as secretary to the Natural Resources Working Group; a subcommittee of the Environmental Protection Committee (13:3).

Education and Training. The U.S. Air Force environmental education courses are conducted at the School

of Civil Engineering and Services, Air Force Institute of Technology, Wright-Patterson AFB, Ohio. These courses are provided as professional continuing education for officers and officer-equivalent civilians in the civil engineering career field. The School of Civil Engineering and Services currently offers three courses concerning the environmental planning function (8).

The following is a brief description of each course available for environmental training:

1. Environmental and Contract Planning (MGT 520). The Environmental and Contract Planning course is a three week program designed to present the processes and responsibilities of the Environmental Coordinator; particularly, community planning, environmental planning, and natural resource planning (8).

2. Environmental Protection Committee Members (MGT 004). The Environmental Protection Committee Members course is a one week program designed for members of the EPC. The course provides broad familiarization with the Air Force Environmental Planning Program, as well as an understanding of EPC members functional responsibilities with respect to this program (8:13).

3. Hazardous Waste Management (MGT 521). The Hazardous Waste Management course is a two week program designed for environmental coordinators. The course describes hazardous waste management laws and regulations, and methods of treatment, handling, storage, transportation, and disposal of

hazardous waste (8:27).

In addition, the School of Civil Engineering and Services offers the following two non-resident programs:

1. Environmental Management Seminar. The Environmental Management Seminar is conducted at any base or command by the request of the Base Civil Engineer. Topics discussed are similar to the above two courses (8:55).

5. Teleteach Program. The teleteach program provides videotaped courses of instruction on topics in Environmental Management. Videotaped lessons are available to any base or command upon request (8:57).

Manpower Requirement. When the Air Force environmental policy was first implemented with Air Force Regulation (AFR) 19-1, no additional manpower authorizations were allotted. "Additional requirements, generated by this regulation, to the maximum extent possible, are satisfied from existing resources within the function that has the requirement" (20:4). Therefore, with AFR 19-1 implemented in 1974, the Base Civil Engineer was forced to assign all environmental matters to personnel presently employed within the engineering branch. Depending on the size of the installation, the Base Civil Engineer could only afford to reassign a few individuals to the Environmental Planning section. This is the current manpower status existing within the typical Environmental Planning section at the installation level (10).

Bioenvironmental Engineering

Organizational Structure. The Bioenvironmental Engineering (BEE) function exists at the section level within the U.S. Air Force Hospital organization. The USAF Hospital organization is a tenant unit to the operational wing of the installation. The senior Bioenvironmental Engineer is the Chief of the Bioenvironmental Engineering Service (SGPB). The Chief of SGPB is reportable to the branch level Chief of Aeromedical Services (SGP). The Chief of SGP is also responsible for the Environmental Health Service (SGPM), and the Flight Medicine Program (SGP). The Chief of SGP reports directly to the Director of Base Medical Services (DBMS); formerly the Base Surgeon General (SG). The DBMS is the commander of the installation Hospital Organization and serves as a staff advisor to the Wing Commander (CC) (21:5). This represents one echelon of command from the Wing Commander to the DBMS and two further functional levels to the Bioenvironmental Engineer.

The organizational chart depicting the chain of command from the Wing Commander to the Bioenvironmental Engineer is presented in Figure 2.

Functional Responsibilities. The Bioenvironmental Engineering function is responsible for evaluating and monitoring the community and workplace environments to keep environmental and occupational stresses within acceptable limits (21:17). These two significant activities, workplace evaluations and community environment monitoring, require

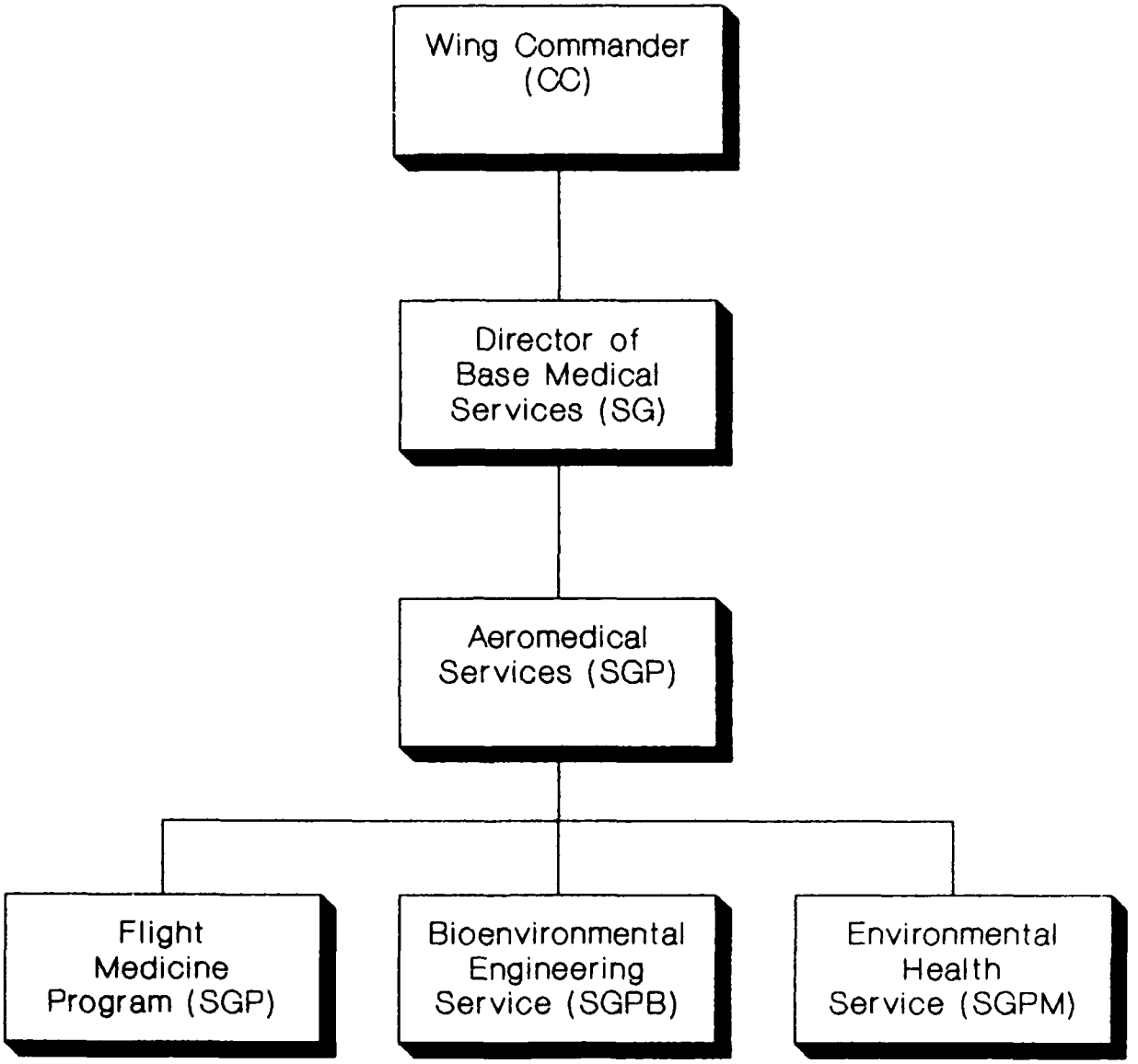

Figure 2.
Bioenvironmental Engineering Function
(Source: Compiled from 21)

close coordination with the Base Safety office for occupational safety evaluations, and the Environmental Coordinator for environmental protection monitoring (21:17-18).

Workplace Evaluations. The Air Force policy on Bioenvironmental Engineering workplace evaluations is as follows:

> To provide each employee with a safe and healthful work environment, and to control environmental pollution from weapon systems, operations, and other activities (AFRs 19-1 and 127-12, and Air Force directives in the 161 series). BEE evaluations of planned actions and continuing operations are required to make sure health and environmental quality are considered and included early in operational plans [21:17].

The Bioenvironmental Engineer is responsible for annual evaluations of all workplaces to make sure that workers are not exposed to physical, chemical, or biological health risks. These evaluations are required to meet the intent of the Occupational Safety and Health Act of 1970 (21:17). The Air Force responded to this Act with AFR 127-12, the U.S. Air Force Occupational Safety and Health (AFOSH) Program (9). The office of primary responsibility for the AFOSH program, at the Air Staff level, is the Surgeon General; however, the office of primary responsibility, at the base level, is the Chief of the Office of Base Safety (9:5-1). During the health evaluations of workplaces, the Bioenvironmental Engineer should always attempt to identify safety problems encountered and transmit the observations to the Base Safety office (21). Upon completion of the evaluation, the

Bioenvironmental Engineer sends a written report of the workplace evaluation to the official responsible for correcting the identified health risks (21:18).

Community Environment Monitoring. The Bioenvironmental Engineer is responsible for monitoring activities that affect the community environment. The effects of pollutants on human health are a major concern during environmental monitoring (21:18).

The significant activities of environmental monitoring, as performed by the Bioenvironmental Engineer, are as follows:

1. Environmental Quality. "The senior Bioenvironmental Engineer is designated the special assistant to the Director of Base Medical Services for environmental quality" (21:18). The Bioenvironmental Engineer is required to follow the guidelines specifically assigned in the Air Force Regulation 19 series; Environmental Protection (21:18). Responsibilities assigned to the Bioenvironmental Engineer in the AFR 19 series, Environmental Protection regulations, are as follows:

> a. Develops a comprehensive installation environmental monitoring program, together with the Environmental Coordinator. The monitoring program includes surveillance of surface and ground water quality, air pollution, and hazardous waste generation.
> b. Performs source and surrounding environment monitoring to meet Federal, state and local environmental quality regulations and recommends modification of operations if necessary.
> c. Maintains a master record of all environmental pollution monitoring locations.
> d. Submits analytical results to the USAF Occupational and Environmental Health Laboratory (OEHL)

for all monitoring analysis done on base, and coordinates the result and interpretation with the Environmental Coordinator.

e. Conducts and maintains an installation emission inventory, to the degree required by state and local regulatory requirements. The inventory consists of separate sections for air, water, and hazardous wastes.

f. Provides pollution monitoring support following pollution incidents.

g. Coordinates, as required, with Federal, state and local regulatory agencies on environmental monitoring matters [16:4,5].

2. Drinking Water Quality. The Bioenvironmental Engineer is responsible for monitoring installation potable water sources (21:18).

3. Public Swimming Areas. The Bioenvironmental Engineer is responsible for monitoring public swimming areas for sanitary conditions (21:18).

Education and Training. Personnel entering the Bioenvironmental Engineering career field attend technical training school upon completion of basic military training. Technical training is conducted at the U.S. Air Force School of Aerospace Medicine, Brooks AFB, Texas. This entry level course is a 6-1/2 week course designed to train personnel in the activities of Bioenvironmental Engineering. Course of instruction include fundamentals of science, anatomy and physiology, drinking water, waste water management, solid waste management, environmental pollution, occupational health, atmospheric sampling, respiratory protection, ventilation, illumination, ionizing radiation, noise, and medical readiness (12:43).

Manpower Requirement. The Chief of the Bioenvironmental Engineering section is typically a field grade officer. Depending on the size of the installation, one to three company grade officers serve as assistant(s) to the Chief of SGPB. The remaining staff is comprised of a few junior enlisted grade technicians with a senior non-commissioned officer as a supervisor (12:21).

Base Safety

Organizational Structure. The safety activity is a staff function existing within the Office of Base Safety. The Chief of Safety (SE) reports directly to the Wing Commander (CC). The Office of Base Safety is divided into four branch elements; the Flight Safety branch (SEF), the Ground Safety branch (SEG), the Traffic Safety branch (SET), and the Weapons Safety branch (SEW) (22:1-1). This represents one echelon of command from the Wing Commander to the Chief of Safety and one further functional level to each branch.

The organizational chart depicting the chain of command from the Wing Commander to each functional branch of the Office of Base Safety is presented in figure 3.

Functional Responsibilities. The Base Safety organization is responsible for implementing the U.S. Air Force Mishap Prevention Program at the installation level. The basic objective of the program is to help commanders accomplish the mission by preserving resources (22:1-1).

The specific objectives of the USAF Mishap Prevention

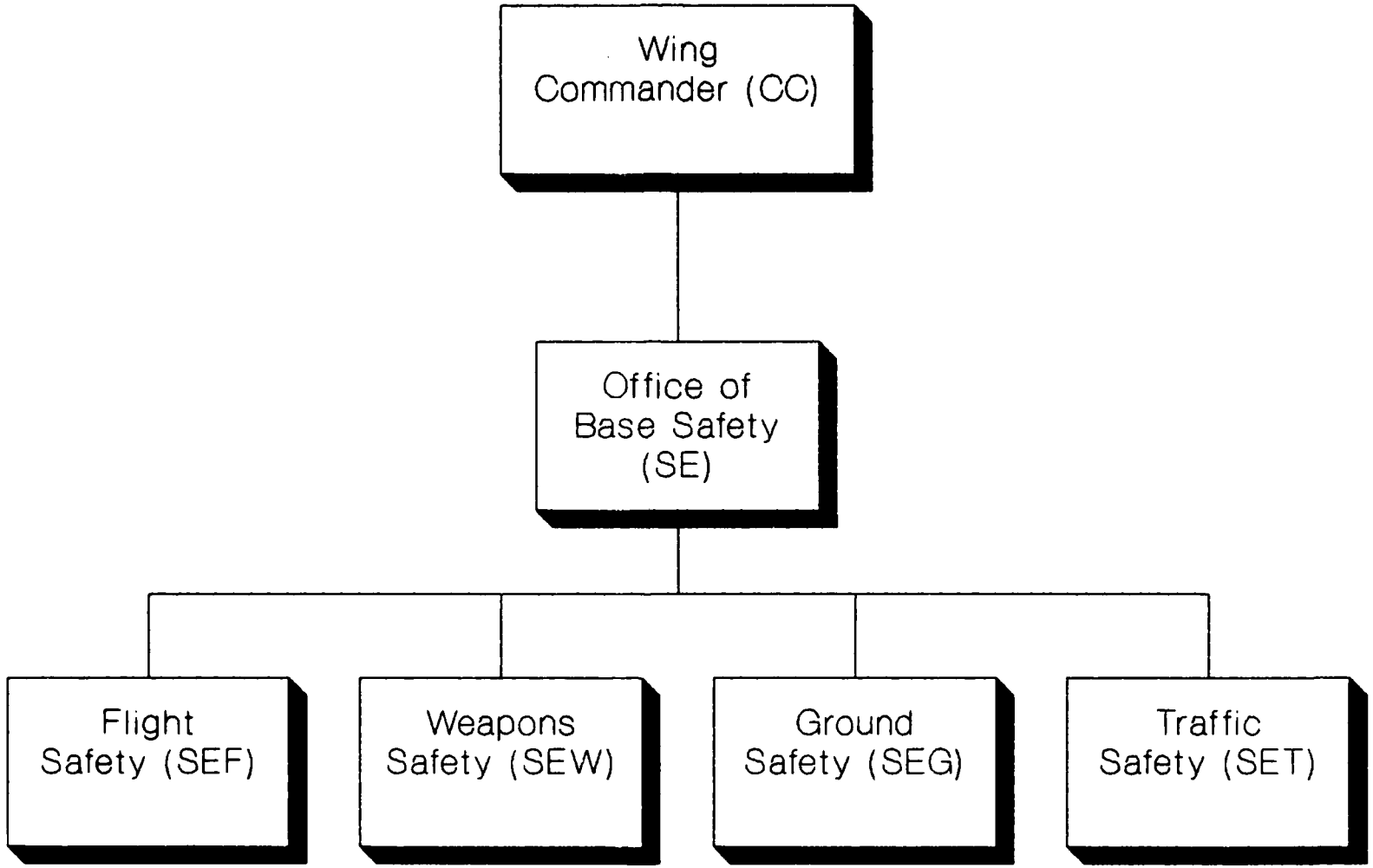

Figure 3.
Base Safety Organization
(Source: Compiled from 22)

program are as follows:

1. Provide a safe and healthful working environment for all Air Force people.
2. Prevent flight, ground, and weapons mishaps.
3. Minimize the extent of property damage and severity of personnel injuries caused by mishaps.
4. Prevent damage to private or public property and injuries to non-Air Force personnel as a result of Air Force operations.
5. Eliminate design deficiencies, unsafe acts, and unsafe conditions.
6. Prevent inadvertent or deliberate unauthorized prearming, arming, launching, firing, releasing, or detonation of nuclear weapons and nuclear weapon systems and provide adequate security for those weapons and systems.
7. Prevent nuclear weapons jettisoned or involved in mishaps from producing a nuclear yield [22:2-1].

The significant activities of the branches within the Base Safety Office are as follows:

Flight Safety. The responsibilities of the Flight Safety program are charged to the Flight Safety Officer; required to be a rated flying officer. The Flight Safety program includes all safety program elements which pertain to the prevention of aircraft mishaps (22:15-1). The following are specific activities the Flight Safety Officer is required to periodically monitor:

1. The Supervisor of the Flying Program.
2. The Runway Supervision Program.
3. The life support facilities and training programs.
4. Low-level routes, weapon ranges, and drop zones.
5. Aircraft maintenance procedures and facilities including transient maintenance.
6. Procedures for aircraft engine start or launch exercises.
7. Special exercises and special mission plans.
8. Snow removal plans.
9. Airfield manager's daily inspection.
10. reviews and helps develop plans and procedures for handling problems involving aircraft

emergencies.

11. Airfield maintenance and construction [22:15].

Weapons Safety. Explosives, missile, and nuclear safety responsibilities are combined under a single manager concept; namely, Weapons Safety. The responsibility for weapons safety is given to each unit on the installation as follows:

> Units from squadron level up, with an explosives, missile, or nuclear mission have a weapons safety program. At each base, the host manages an explosives safety program for the entire base. Each organization must tailor its weapons safety program to meet the explosives, missile, and nuclear safety requirements of its mission [22:16].

Ground Safety. "Since ground safety covers many functions, the safety staff should set its priorities so that time is spent where it will do the most good " (22:17). The Ground Safety staff is responsible for inspection of workplaces, as regulated by AFOSH standards and Occupational Health and Safety Administration (OSHA) standards; training and safety education programs; traffic safety programs; and the overall management of all unit safety programs (22:17).

The significant activities of the Ground Safety staff are as follows:

1. Industrial Safety Inspections. The safety staff inspects work areas annually, monitors safety programs, processes hazard reports, and gives advice on abating hazards (22:17).

2. Training Programs. The Ground Safety staff is responsible for training workers to do their job safely; how

to avoid hazards; and how to report hazards (22:17).

3. Traffic Safety. The Ground Safety staff is responsible for inspecting Air Force motor vehicles, and conducting a multimedia safety education program (22:17).

Education and Training. There are ten professional safety training courses offered by the Air Force Institute of Technology (AFIT), Wright-Patterson AFB, Ohio, and by Air Training Command (ATC) technical schools for safety officers and civilians. The courses offered by AFIT are conducted by civilian institutions and monitored by the AFIT Civilian Institutions Program/Professional Continuing Education office. The following is a list of courses offered:

1. Flight Safety Officers Course, (AFIT);
2. Ground Safety Officers Course, (AFIT);
3. Weapons Safety Officers Course, (ATC);
4. Aircraft Accident Investigation, (AFIT);
5. Jet Engine Accident Investigation, (ATC);
6. Crash Survival Investigators Course, (AFIT);
7. Systems Safety Course, (AFIT);
8. Missile Safety Officer Course, (ATC);
9. System Safety Analysis, (AFIT);
10. Advanced Safety Program Management Course-Chief of Safety, (AFIT) (22:13).

Manpower Requirement. Manpower requir-ments for the Office of the Base Safety vary widely with the size of the installation. Typically, the minimum personnel required consist of the Chief of Safety, one branch chief for each

branch element, and two to four enlisted grade technicians in each branch element. Additional personnel are acquired by designating a safety representative in each unit on the installation. The unit safety representatives are responsible for developing and maintaining a safety program for the unit which is congruent with the USAF safety programs (22:6).

Related Organizations

Currently, there exists two organizations, other than the organizations discussed above, directly related to the objective of environmental protection. These two organizations, the Environmental Protection Committee (EPC) and the Environmental Management Office (EMO), directly impacts one or more of the organizations discussed above.

Environmental Protection Committee. The EPC is established by AFR 19-8, Environmental Protection Committees and Environmental Reporting. "The EPC reviews environmental policy, facilitates coordination, and serves as a steering group to monitor the overall conduct of the environmental protection program" (17:2). At the installation level, the chairman of the EPC is typically the Vice-Wing Commander (CV). Each of the following staff elements are required to designate a representative for the EPC:

1. Base Civil Engineer;
2. Director of Base Medical Services;
3. Deputy for Requirements;
4. Deputy for Operations;

5. Staff Judge Advocate;

6. Public Affairs Office;

7. Comptroller;

8. Deputy for Personnel;

9. Weather Office;

10. Safety Office;

11. Tenant Organizations (17:2).

The EPC is required to meet at least quarterly to review the status of all unresolved notices of violation, regarding installation environmental compliance received from Federal, state, regional, and local agencies. The EPC reviews the progress of all environmental programs; such as, the Installation Restoration Program, the Installation Environmental Monitoring program, and the Hazardous Waste Management and Minimization programs.

Environmental Management Office. The Air Force Logistics Command (HQ/AFLC) has established a policy ". . . to provide a single point of contact to deal with environmental compliance issues" (1). All five Air Logistics Centers (ALCs) were required to organize an Environmental Management Office with Base Civil Engineering/Environmental Planning and Bioenvironmental Engineering personnel by order of General Earl T. O'Loughlin, Commander of the Air Force Logistics Command (1). Wright-Patterson AFB, Ohio, organized an Environmental Management Office on 23 February 1987, and is presented as a case study in Chapter V (36).

IV. The Resource Protection Organization

Chapter Overview

This chapter discusses the functional responsibilities within the three organizations, that were found to be similarly related to the accomplishment of the strategic objective of resource protection. The identification of similar functional responsibilities of the Environmental Planning function, Bioenvironmental Engineering function, and the Base Safety organizations led to the development of the organizational model for the theoretically consolidated Resource Protection organization.

Organizational Objectives

Before the functional responsibilities are determined for the Resource Protection organization, the strategic objectives of the organization must be established in order to govern the operational functions of the new organization (33:4). The strategic objectives of the Resource Protection organization were derived from the three existing organizational objectives that are presented in the following discussion.

Environmental Planning. AFR 19-1, Pollution Abatement and Environmental Quality, states the Environmental Planning organizational objective in two parts, as the following:

a. Comply not only with Air Force directives relating to environmental quality, but also with the spirit as well as

the letter of the National Environmental Policy Act, all other Federal environmental laws, executive orders, regulations, and with criteria and standards published by the Environmental Protection Agency (EPA). The intent of state and local pollution abatement laws, regulations, criteria and standards also apply.

b. Plan, initiate, and carry out environmental programs and actions to protect the quality of the human environment, insofar as practicable, and with appropriate consideration of assigned missions and of economic and technical factors (20:2).

These two objectives guide the actions of the Environmental Coordinator to comply with all environmental laws and to manage environmental programs, which protect the quality of the human environment. The objectives of the Environmental Planning function reveal the preventative nature of this organization, focused on the avoidance of environmental mishaps.

Bioenvironmental Engineering. AFR 161-33, The Aerospace Medicine Program, states the Bioenvironmental Engineering organizational objective in three parts, as the following:

a. Evaluate community and work environments and recommend controls to keep environmental and occupational stresses within acceptable limits for maintaining and promoting health and well-being (AFRs 19-1 and 127-12, Air Force publications in the 161 series, and AFOSH Standards).

b. Establish and conduct environmental monitoring programs to asses compliance with federal, state, and local pollution standards according to AFR 19-7.

c. Respond to disasters in peacetime and wartime, and to control health hazards and environmental impact according to AFRs 19-1 and 160-25 (21:17).

The three objectives above guide the actions of the Bioenvironmental Engineer to evaluate and monitor the environment to ensure a safe and healthful work environment. The objectives of the Bioenvironmental Engineering organization reveal the surveilant nature of this organization, focused on assessing the environmental influences on human health and safety.

Base Safety. AFR 127-2, The U.S. Air Force Mishap Prevention Program, states the Base Safety organizational objective in three parts, as the following:

a. Provide a safe and healthful working environment for all Air Force people.

b. Minimize the extent of property damage and severity of personnel injuries caused by mishaps.

c. Prevent damage to private or public property and injuries to non-Air Force personnel as a result of Air Force operations (22:2-1).

The three objectives above guide the actions of the Base Safety Manager to monitor Air Force operations, to prevent bodily injury, and environmental damage as a result of mishaps. The objectives of the Base Safety organization

reveal the surveilant and preventive nature of this organization, focused on the influences of Air Force operations on human health and safety, and environmental quality.

Resource Protection Objective

Resource protection was defined in Chapter I as the care exhibited in preserving the quality of the environment with the consideration of human health and safety. Therefore, any strategic objectives defined for the Resource Protection organization must be congruent with this definition. The following objective statements are a consolidation of the three existing organizations' objectives. The author has prioritized the objective statements according to what efforts the Resource Protection organization should logically focus on.

The Resource Protection organization strategic objectives are as follows:

a. Initiate, plan, and implement safety and environmental quality programs, congruent with assigned missions, for the protection of the quality of the human environment; sustaining safe and healthful surroundings.

b. Comply with all safety and environmental quality laws, regulations, and policies mandated by Federal, state, and local governments, and their agencies.

c. Enforce all safety and environmental quality laws, regulations, and policies within the Air Force community, with the authority delegated by the senior commander.

The above strategic objectives are not as specific as the objectives of the existing organizations. The author intended not to state specific operational tasks within the strategic objectives. The specific operational tasks are included within the functional responsibilities assigned later in this chapter. However, the new objectives developed for the Resource Protection organization maintain the preventative and surveilant nature of the original organizational objectives, and establish a framework for the development of the new functional responsibilities.

Strategic objective (a.) consolidates a common objective existing in the three current organizations; namely, sustaining safe and healthful surroundings by managing effective safety and environmental quality programs. The author rated this as the highest priority objective, since this objective received the major emphasis in the regulations and directives of the current organizations.

Strategic objective (b.) establishes the Resource Protection organization as the focal point for compliance of all safety and environmental quality matters. This gives the Resource Protection organization the responsibility for complying with EPA and OSHA standards. The compliance objective has been the most volatile; as Chapter I depicted a "crisis" management situation. The compliance objective stated for the Resource Protection organization consolidates Environmental Planning, Bioenvironmental Engineering, and

Base Safety into one coordinated effort for accomplishing this objective.

Strategic objective (c.) delegates the necessary authority to the Resource Protection organization for the accomplishment of strategic objectives (a.) and (b.). Currently, the responsibility for enforcing environmental quality standards exists six echelons of command down from the wing commander; the Environmental Coordinator. Delegating the enforcement authority would allow the Resource Protection organization the appropriate power to ensure compliance of environmental and safety standards within the installation boundaries.

Functional Responsibilities

The strategic objectives, defined for the Resource Protection organization, were used as a basis for deciding which existing functional responsibilities to consolidate into the new organization. Each existing functional responsibility, discussed in Chapter III, was reviewed, and a determination was made whether the existing functional responsibility was critical for achieving the strategic objectives set for the Resource Protection organization. Further review of the existing functional responsibilities, led to the determination of which tasks needed to be accomplished as a coordinated effort among the personnel of the existing organizations. This identified the functional responsibilities that were similar in achieving the strategic objectives; thus, being able to consolidate the organizations

for a more coordinated effort.

The existing functional responsibilities were found to be categorized according to three broadly defined elements of resource protection. These elements were 1) environmental quality; 2) human health; and 3) human safety. Table 1 depicts the environmental quality functional responsibilities; the organization tasked as the office of primary responsibility; and the existing organization assigned with secondary and tertiary responsibilities. Table 2 and Table 3 depict similar data for the human health, and human safety functional responsibilities, respectively. Strong relationships between existing organizations, representing a closely coordinated effort necessary for the accomplishment of a task, were also denoted in these three tables by an asterisk.

Legend For Tables 1, 2, and 3

A - Designates office of primary responsibility.

B - Designates organization with secondary responsibilities.

C - Designates organization with tertiary responsibilities.

(*) - Designates a strong relationship between organizations.

N/A - Deemed not applicable to the strategic objectives of the Resource Protection organization.

Table 1
Environmental Quality Functional Responsibilities

Task	Environmental Planning	Bioenvironmental Engineering	Base Safety
COMMUNITY PLANNING:			
1. Base Comprehensive Planning	N/A		
2. Air Installation Compatible Zone Use Program	A (*)		B (*)
ENVIRONMENTAL PLANNING:			
1. Environmental Impact Analysis	A (*)	B (*)	
2. Hazardous Waste Management Program	A (*)	B (*)	C
3. Installation Restoration Program	A (*)	A (*)	
4. SPCC Plan	A	B	C
5. Environmental Status Reports	A (*)	B (*)	
6. Environmental Pollution Monitoring	B (*)	A (*)	

(Continued--Next Page)

Table 1 (continued)
Environmental Quality Functional Responsibilities

Task	Environmental Planning	Bioenviron-mental Engineering	Base Safety
NATURAL RESOURCE PLANNING:			
1. Land Management Program	N/A		
2. Grazing Management Program	N/A		
3. Forestry Management Program	A		
4. Fish and Wildlife Management Program	A		
5. Outdoor Recreation Management Program	N/A		

Table 2
Human Health Functional Responsibilities

Task	Environmental Planning	Bioenviron-mental Engineering	Base Safety
WORKPLACE EVALUATIONS:			
1. Annual Inspections		A (*)	B (*)
2. AFOSH Program		B (*)	A (*)
COMMUNITY ENVIRONMENT MONITORING:			
1. Ground Water Quality	B (*)	A (*)	
2. Air Quality	B (*)	A (*)	
3. Hazardous Waste Gener-ation	B (*)	A (*)	
4. Environ-mental Quality Com-pliance	A (*)	B (*)	
5. Drinking Water Quality	B	A	
6. Public Swimming Areas		A	

Table 3
Human Safety Functional Responsibilities

Task	Environmental Planning	Bioenvironmental Engineering	Base Safety
FLIGHT SAFETY PROGRAM:			N/A
WEAPONS SAFETY PROGRAM:			N/A
GROUND SAFETY PROGRAM:			
1. Industrial Safety Inspections		B (*)	A (*)
2. Safety Training Programs	B		A
3. Traffic Safety Programs			N/A

Comparison of the existing functional responsibilities, and identification of the necessary coordination among the existing organizations, reveals that not every existing functional responsibility is totally congruent with the strategic objectives of the Resource Protection organization. Tables 1, 2, and 3 show that the existing Environmental Planning and Base Safety organizations share one functional responsibility in a strong relationship, and three functional responsibilities in a weak relationship. The existing Environmental Planning and Bioenvironmental Engineering organizations share eight functional responsibilities in a strong relationship, and three functional responsibilities in a weaker relationship. The existing Bioenvironmental Engineering and Base safety organizations share three functional responsibilities in a strong relationship, and two functional responsibilities in a weaker relationship. Table 4 summarizes these relationships in a matrix form, and depicts the strength of the relationships, requiring a coordinated effort.

The following is a summary of which functional responsibilities were assigned to the Resource Protection organization:

1. Base Comprehensive Planning (BCP). Base comprehensive planning, managed by the Environmental Coordinator, was deemed not applicable to the accomplishment of the Resource Protection organization's strategic objectives. Base comprehensive planning was determined to

remain a responsibility of the Base Civil Engineer, since BCP directs the long term development of an installation, and aids decision making for the siting of facilities.

Table 4
Relationships of Functional Responsibilities

Organization	Environmental Planning	Bioenviron-mental Engineering	Base Safety
Environmental Planning	(4 N/A)	8 Strong 3 Weak	1 Strong 3 Weak
Bioenviron-mental Engineering	8 Strong 3 Weak	(0 N/A)	3 Strong 2 Weak
Base Safety	1 Strong 3 Weak	3 Strong 2 Weak	(3 N/A)

2. Air Installation Compatible Use Zone (AICUZ) Program. The AICUZ program was determined to correspond to the Resource Protection objectives. The AICUZ program protects the public from aircraft noise and accident hazards. The Environmental Planning and Base Safety organizations share a strong relationship in this program, with the Environmental Planning function being the office of primary responsibility.

3. Environmental Impact Analysis Process (EIAP). The Environmental Impact Analysis Process was determined to directly correspond to the strategic objectives of the Resource Protection organization. This process implements the NEPA of 1969, and serve as the basis for all decision making concerning proposed Air Force operations, and their effect on the environment. The Environmental Planning and Bioenvironmental Engineering organizations share a strong relationship in this functional responsibility, with the Environmental Planning function being the office of primary responsibility.

4. The USAF Hazardous Waste Management Program (HWMP). This program directly relates to the strategic objectives of the Resource Protection organization. The objective of this program is to manage and minimize the generation, transportation, treatment, storage, and disposal of hazardous waste owned by the Air Force. The Environmental Planning function is the office of primary responsibility for this program. The Bioenvironmental Engineering organization shares a strong secondary responsibility for this program, by monitoring the generation, and treatment phases of this program. Base Safety shares a weak tertiary responsibility for safety inspections of workplaces. Currently, the Environmental Planning function is responsible for training personnel handling hazardous waste. The author believes that the Base Safety organization is better trained and equipped to conduct the hazardous waste handling training, and assigns

this responsibility to Base Safety in the new Resource Protection organization.

5. The Installation Restoration Program. The Installation Restoration Program corresponds directly with the strategic objective of the Resource Protection organization. The objective of this program is to identify the locations and contents of past disposal sites containing toxic and hazardous materials, and to eliminate the hazards to public health. The Environmental Planning function is primarily responsible for phase I, records search and site identification; and phase IV, remedial actions. The Bioenvironmental Engineering organization is primarily responsible for phase II, testing, and confirmation of hazardous material quantities. As depicted in Chapter I, this program requires a closely coordinated effort by these two organizations; therefore, would be best served by a consolidated Resource Protection organization.

6. Spill Prevention, Control, and Countermeasures (SPCC) Plan. The SPCC functional responsibility directly corresponds to the strategic objectives of the Resource Protection organization. The Environmental Planning function is primarily responsible for this activity; however, Bioenvironmental Engineering is responsible for monitoring toxic and hazardous waste spills, and Base Safety is responsible for personnel safety during a crisis.

7. Environmental Status Reports. The Environmental Status Reports are semiannual reports stating the quality of

the installation's environment. These reports are related to the strategic objectives of the Resource Protection organization. The Environmental Coordinator is primarily responsible for these reports; however, the Bioenvironmental Engineer assists by developing the installation emission survey, and submitting data to the Environmental Coordinator for these reports.

8. Land Management Program. The Land Management Program was deemed not applicable to the strategic objectives of the Resource Protection organization. The program was determined to remain a responsibility of the Base Civil Engineer, since the program is related to the Base Comprehensive Plan by stating how installation land will be utilized.

9. Grazing Management Program. The Grazing Management Program was deemed not applicable to the strategic objectives of the Resource Protection organization. The program was determined to remain a responsibility of the Base Civil Engineer, since the program is related to the Land Management Program.

10. Forestry Management Program. The Forestry Management Program corresponds to the strategic objectives of the Resource Protection organization. The Environmental Coordinator is primarily responsible for the program. The program is intended to maintain a desirable biological balance in the forestry community within installation boundaries.

11. Fish and Wildlife Management Program. The Fish and Wildlife Management Program corresponds to the strategic objectives of the Resource Protection organization. The Environmental Coordinator is primarily responsible for the program. The program is intended to maintain the habitat of fish and wildlife on installation boundaries.

12. Outdoor Recreation Management Program. The Outdoor Recreation Management Program was determined to remain a responsibility of the Base Civil Engineer, since the program classifies land suitable for recreation purposes.

13. Bioenvironmental Annual Workplace Inspections. This Bioenvironmental Engineering functional responsibility corresponds directly with the strategic objectives of the Resource Protection organization. The Bioenvironmental Engineer evaluates all workplaces to ensure that workers are not exposed to physical, chemical, or biological health risks. The Bioenvironmental Engineer coordinates any safety violations found during the evaluations with the Base Safety manager. The author determined that consolidating this functional responsibility would achieve closer coordination, and possibly eliminate any redundant inspections by either organization.

14. Air Force Occupational Safety and Health (AFOSH) Program. The AFOSH Program was established by the Air Force to meet the intent of the Occupational Safety and Health Act of 1970. The Base Safety organization is the office of

primary responsibility at the base level; however, the Bioenvironmental Engineering organization is tasked with an equal amount of functional responsibilities by the AFOSH Program. The Bioenvironmental Engineer relies on AFR 127-12, The U.S. Air Force Occupational Safety and Health (AFOSH) Program, for established Air Force health standards. The author determined that consolidating the AFOSH program, under the Bioenvironmental Engineer and the Base Safety Manager, could achieve a more efficiently coordinated program.

15. Environmental Quality Monitoring. The functional responsibilities of environmental quality monitoring corresponds closely with the strategic objectives of the Resource Protection organization. The Bioenvironmental Engineer is tasked, by regulation, to manage an environmental quality monitoring program, together with the Environmental Coordinator. The monitoring program is paramount to a successful environmental protection program, and requires a closely coordinated effort by the Bioenvironmental Engineer and the Environmental Coordinator.

16. Flight Safety Program. The objectives of the Flight Safety Program were not found to directly correspond with the strategic objectives of the Resource Protection organization. The Flight Safety Program pertains to the prevention of aircraft mishaps, and is under the control of a rated officer. The author relates this program directly to the operational flying mission, and suggests that this program be restructured directly under the responsibility of

the Airfield Manager and/or the flying mission commanders.

17. Weapons Safety Program. The objectives of the Weapons Safety Program were not found to directly correspond with the strategic objectives of the Resource Protection organization. The responsibilities of the Weapons Safety Program are currently tasked, by regulation, to each unit commander tasked with such a mission. The author relates this program directly to the unit currently requiring a Weapons Safety Program, and suggests that the program be delineated to each unit commander.

18. Industrial Safety Inspections. The Industrial Safety functional responsibilities correspond directly with the strategic objectives of the Resource Protection organization. The Ground Safety staff inspects work areas annually, monitors safety programs, processes hazard reports, and gives advice on abating hazards. This functional responsibility requires close coordination with the Bioenvironmental Engineering organization, as discussed earlier.

19. Training Programs. The training programs, a functional responsibility of the Ground Safety staff, corresponds directly with the objectives of the Resource Protection organization. The Ground Safety staff is responsible for training workers to do their job safely; how to avoid hazards; and how to report hazards. The author determined this functional responsibility as imperative to the success of the Resource Protection organization. The

training programs could include training of personnel handling hazardous waste, and would require assistance from the Environmental Coordinator.

20. Traffic Safety. The Traffic Safety functional responsibility was found not to directly correspond with the strategic objectives of the Resource Protection organization. Currently, the Ground Safety staff is responsible for inspecting Air Force motor vehicles, and conducting a multimedia safety education program. The author suggests to retain a Traffic Safety office separate from the Resource Protection organization, or to reassign these responsibilities to organizations with similar objectives. For example, the Transportation organization, which is responsible for Air Force vehicles, could be reassigned the responsibility of inspection of Air Force vehicles; and the Security Police organization, could be reassigned the responsibility for traffic safety education.

To summarize the functional responsibilities of the Resource Protection organization, the author identified existing functional responsibilities that were congruent only with the strategic objectives of the Resource Protection organization. Many of the functional responsibilities identified for consolidation seemed likely to be performed as a more coordinated effort if the current organizations were consolidated with no organizational boundaries.

Some of the existing functional responsibilities of the Environmental Planning function, and the Base Safety

organization were found not to apply to the strategic objectives set for the Resource Protection organization. Therefore, the author suggests that most of the functional responsibilities of the Environmental Planning function be reassigned to the Resource Protection organization, leaving behind some of the Community Planning responsibilities to the Base Civil Engineer. The entire Bioenvironmental Engineering functional responsibilities would be reassigned to the new organization. Base Safety would only contribute the Industrial Safety functional responsibilities, minus Traffic Safety, leaving the functional responsibilities of Flight Safety, and Weapons Safety to the appropriate units with that type of mission. Further study would be necessary to justify the reassignment of the non-applicable functional responsibilities suggested by the author.

Organizational Structure

The literature by management science, and organizational behavior researchers discuss many variables that determine the most suitable organizational design for an organization. The organizational design for the Resource Protection organization depends on one prominent variable; the organization's environment. The organization's environment, as used here, is ". . . composed of those institutions or forces that affect the performance of the organization, but over which the organization has little control" (34:162). The organization's environment is usually classified according to the degree of uncertainty; stable, changing, or

turbulent (23:200). A stable environment is ". . . one in which there is little unpredictable change" (23:200). A changing environment is one in which ". . . changes are rather frequent and somewhat expected" (23:200). "A turbulent environment exists when changes are unexpected and unpredictable" (23:200).

Organizations are structured in a matrix organizational design when facing an environment high in uncertainty, and need an efficient response to environmental changes (23:203). Matrix designs are often found in technical organizations where specialists are grouped together from various departments to work on complex projects (23:203). "The critical point is that a rapid response to a changed circumstance is required" (23:203).

Structuring the Resource Protection organization in a matrix design would present three major advantages. First, the characteristics of the typical Air Force organizational design could be maintained; such as, a definite chain of command, and departmentalization. Assigning personnel from different departments to the same project, however, would be necessary. Second, as depicted in Chapter I, enforcement of Federal, state, and local environmental regulations by several agencies poses a changing, if not turbulent, environment on the Re ource Protection organization. Structuring the organization in a matrix design would allow the chief of the Resource Protection the flexibility to assign the personnel, from different departments, to

collectively respond rapidly to this changing environment and possibly clear the air of "crisis" management. Finally, several echelons of command would be eliminated, allowing a more expedient flow of information from the project leader, to the chief of the organization, to the senior installation commander. Loss of managerial control is often stated in the literature as a major disadvantage of a matrix design; however, this disadvantage would be minimized by maintaining a relatively small manpower status for the Resource Protection organization. The organization would comprise of the collective manpower authorizations of the current organizations with the addition of administrative personnel. The author suggests that an Air Force manpower study would be necessary to confirm this assumption.

Figure 4 displays the organizational model for the Resource Protection organization. The reader should note that the author renamed two of the existing organizations to reflect that department's chief functional responsibilities. The Environmental Planning function was renamed Environmental Quality, since most of the Community Planning responsibilities were left behind with the Base Civil Engineer, leaving the environmental quality responsibilities assigned to the Resource Protection organization. The Base Safety organi ation was renamed Industrial Safety, since the only functional responsibilities transferred to the Resource Protection organization dealt with occupational safety and health standards and regulations. Renaming these two

departments of the Resource Protection organization would make them more readily identifiable to the appropriate agencies, as well as Air Force personnel; emphasizing the single point of contact philosophy.

Also depicted in Figure 4 is the chain of command structure. The Project IMAGE report, described in Chapter I, suggests that the environmental quality responsibilities be assigned directly under the command of the senior installation commander. The report states that this would give the Environmental Coordinator the necessary "clout" to enforce environmental regulations on the installation. Therefore, the Resource Protection organization is placed directly under the wing commander's command. Also, the present command level of the Base Safety office is maintained, while the Bioenvironmental Engineering, and Environmental Planning organizations are moved to a higher command level.

Assigned under each of the three departments, Environmental Quality; Bioenvironmental Engineering; and Industrial Safety are the functional responsibilities of each department assigned in a matrix organizational design format, as depicted by the arrows.

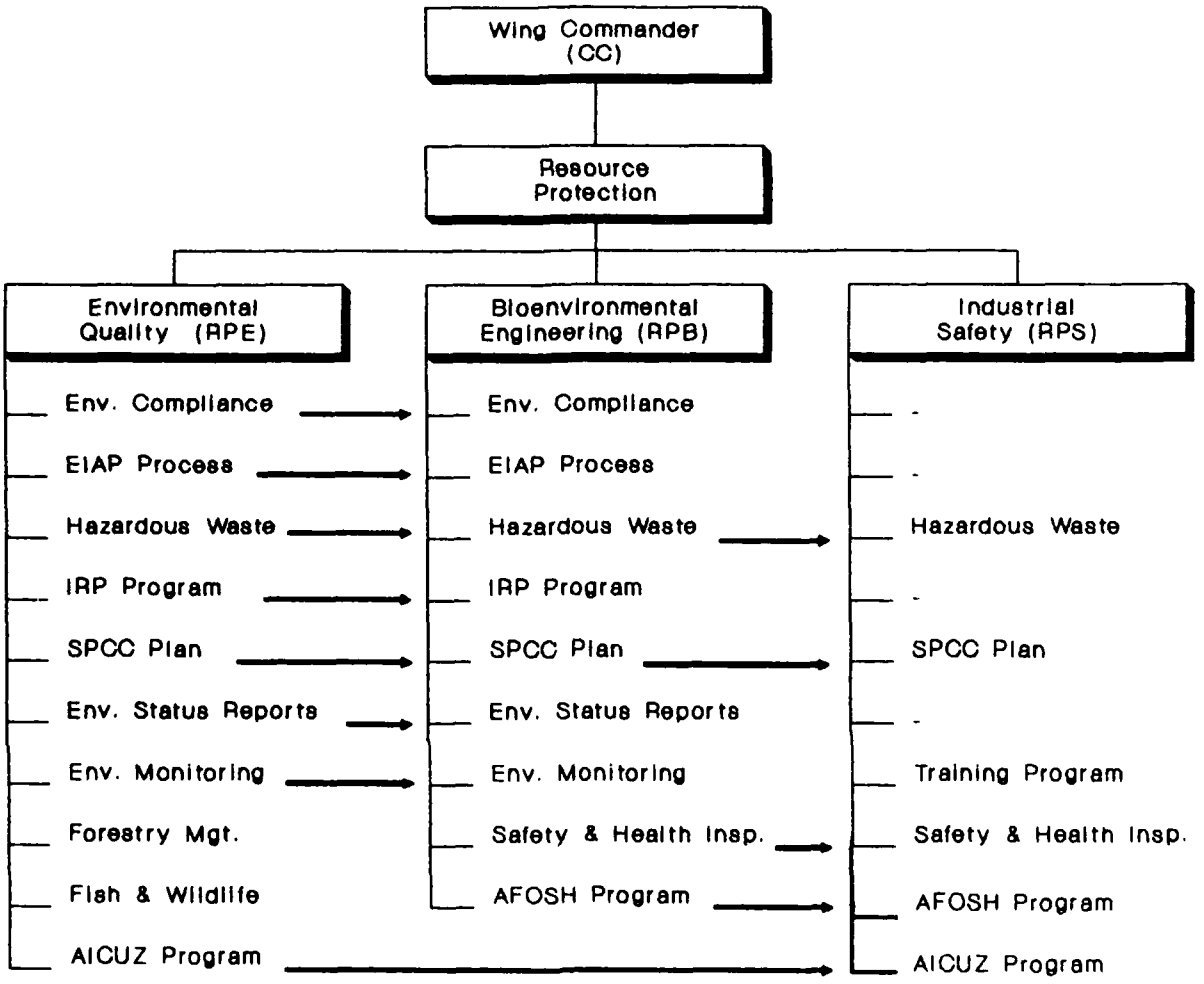

Figure 4.
Resource Protection Organization

V. Case Studies of Similar Organizations

Chapter Overview

This chapter presents three case studies of organizations, within the Air Force, which have consolidated the Environmental Planning, and Bioenvironmental Engineering functions. These case studies were used to determine the effect of consolidation on the management of environmental and natural resource protection programs, as well as the quality and timeliness of information available to the senior installation commanders. Although these organizations were in their infancy, less than 18 months old, many factors which affected the reorganization were of particular interest to what may be expected during the consolidation of the Resource Protection organization.

Air Force Logistics Command

The Air Force Logistics Command (HQ/AFLC) has established a policy ". . . to provide a single point of contact to deal with environmental compliance issues" (1). All five Air Logistics Centers (ALCs) were required to organize an Environmental Management Office with Base Civil Engineering, and Bioenvironmental Engineering personnel by order of General Earl T. O'Loughlin, Commander of the Air Force Logistics Command (1). The size and staffing of the Environmental Management Offices were determined by each ALC

commander (1). The following case studies are comprised of three of the installations under this order.

McClellan AFB, CA

According to the U.S. General Accounting Office November 29, 1983 report to Congress, McClellan AFB was experiencing considerable problems with groundwater contamination from industrial solvents since 1979 (30:5). The General Accounting Office stated that some progress had been made; however, McClellan AFB was criticized by state, and local environmental regulatory agencies for not responding in a timely manner to requests for information on the extent of the base's environmental contamination problems (30:23).

By order of the HQ/AFLC Commander, McClellan AFB established an Environmental Management Office to be the focal point for environmental quality matters (35). Figure 5 displays the organizational structure of the Environmental Management Office (EMO) at McClellan AFB. The Chief of the EMO is positioned directly under the command of the senior installation commander, the Sacremento Air Logistics Center Commander (SM-ALC/CC) (39). The EMO consists of fifty one personnel from the former Environmental Planning, and Bioenvironmental Engineering organizations (39). The EMO is divided into four branches according to their function, as follows: 1) Installation Restoration Program (SM-ALC/EMI); 2) Environmental Quality Compliance (SM-ALC/EME); (3) Environmental Monitoring (SM-ALC/EMC); 4) Bioenvironmental Inspections (SM-ALC/EMB) (39).

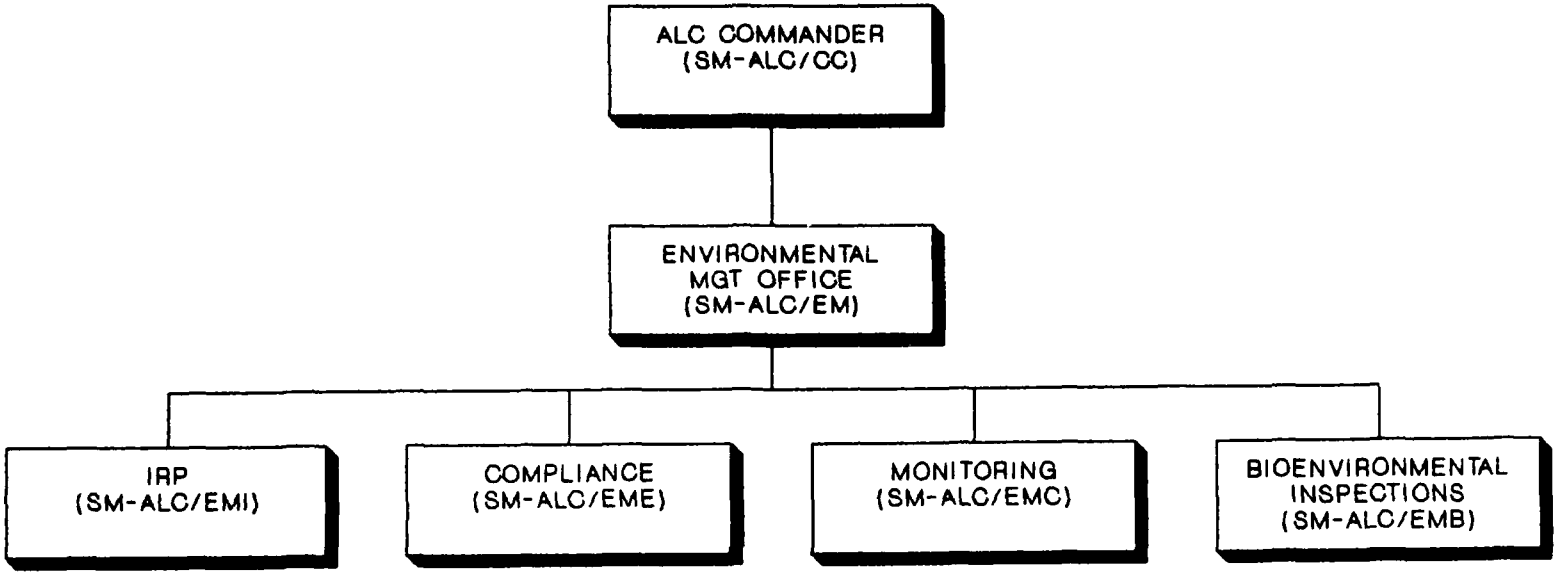

Figure 5.
Environmental Management Office
McClellan AFB, CA (Source: 39)

Each branch, named above, performs the duties corresponding to the branch title; however, any coordination necessary between the branches is expedited by the consolidated structure of the organization (39). The EMI branch is primarily responsible for the management of the Installation Restoration Program, with the assistance of the EMC branch for monitoring and testing of environmental samples (39). The EME branch is essentially the former Environmental Planning function; responsible for complying with the National Environmental Protection Act, and the Resource Conservation and Recovery Act (39). The EMB branch was added four months after the initial structuring of the EMO (39). The EMB branch has the functional responsibility of industrial inspections, industrial hygiene, and asbestos sampling (39). The EMO has the capability of planning, programming, designing, and inspecting environmental quality related construction projects (39).

According to the personnel at the McClellan AFB Environmental Management Office, the consolidated organization is performing more effectively than before the consolidation (39). "Previous duplicated responsibilities of the Environmental Planning, and Bioenvironmental have been streamlined" . . . and . . . "the areas where the previous organizations claimed no responsibility, have been identified and assigned to the appropriate branch" (39). The personnel interviewed also believed that the ALC Commander had more immediate access to

environmental quality information, to aid in his decision making (39).

Kelly AFB, TX

Kelly AFB organized an Environmental Management Office by order of the HQ/AFLC Commander (38). The office was staffed with personnel from the former Environmental Planning function; however, no Bioenvironmental Engineering personnel were consolidated into the new organization (38). The Chief of the Environmental Management Office was still seeking Bioenvironmental Engineering personnel to join the new organization from the local Air Force Medical Centers (38). Gaining support from the Air Force Hospital community near Kelly AFB, was pointed out as one of the major hurdles for organizing the new office (38). During the same time period that the Environmental Management Office at Kelly AFB was forming, the Air Force Human Medicine organizations were also reorganizing in the San Antonio area (38). Progress for the consolidation of Environmental Planning, and Bioenvironmental Engineering was hindered, since both organizations were undergoing a major restructuring (38).

The Environmental Management Office at Kelly AFB consisted of eleven personnel. The office was directly under the chain of command of the senior installation commander, the San Antonio Air Logistics Center Commander (SA-ALC/CC) (38). The new organization was formed to act as the single point of contact for all environmental quality matters, with the authority delegated by the ALC Commander (38). The

Environmental Management Office was structured as a single office with no branches (SA-ALC/EM) (38). The office would be divided into two branches if any Bioenvironmental Engineering personnel joined the organization (38).

Personnel from the Kelly AFB Environmental Management Office stated that the major advantage to the reorganization was the authority delegated by the ALC Commander to enforce environmental regulations (38). Furthermore, the personnel interviewed supported the addition of Bioenvironmental Engineering personnel for improved coordination between the two organizations (38).

Wright-Patterson AFB, OH

Wright-Patterson AFB organized an Environmental Management Office on 23 February 1987. The Wright-Patterson Environmental Management Office was the most recently established environmental organization in the Air Force Logistics Command (35). The Environmental Management Office was established directly under the command of the 2750th Air Base Wing Commander (36). The office was staffed with personnel from the former Environmental Planning function (36). The EMO has yet to gain the support from the Wright-Patterson Medical Center for the re-assignment of Bioenvironmental Engineering personnel (36).

The office was intended to be structured with three branches, as follows: 1) Environmental Compliance; 2) Technical section; and 3) Programs (36). The Environmental

Compliance section would be responsible for ensuring compliance with environmental policies (36). The Technical section would be responsible for environmental monitoring, and inspections (36). The Programs section would be responsible for planning, programming, funding, and contracting environmental quality type projects (36).

Currently, the entire Environmental Planning function has moved from the Base Civil Engineering organization (36). The only functional responsibilities, from the former Environmental Planning section, left behind with the Base Civil Engineer were base comprehensive planning, and natural resources planning (36).

The personnel of the Wright-Patterson AFB Environmental Management Office believe that the restructuring under the Air Base Wing Commander will enhance all of the environmental quality programs (36). However, there are some factors that remain to be settled during the structuring of the new organization. First, the number of manpower authorizations will need to be studied by manpower specialists (36). Second, establishing a budget and funding authorizations are a major concern of the new organization (36). Finally, gaining the support of other organizations, to be consolidated, are another major concern for the new organization (36).

Chapter Summary

The preceding case studies reveal some of the consequences that may be realized during the consolidation of

the Environmental Planning, and Bioenvironmental Engineering organizations. First, there is strong support for a more coordinated effort between the Environmental Coordinator, and the Bioenvironmental Engineer. Every person interviewed agreed that a consolidated Environmental Management Office was more effective in achieving their mission objectives. Second, full cooperation, from all organizations involved in a reorganization process, is necessary for a successful consolidation of the new organization. Organizational behavior researchers caution that any efforts to bring about a change in an organization will frequently meet resistance (34:183). The organizational behavior researchers suggest that the changes are more likely to be accepted by personnel who have been given a voice in determining the content and process of the change (34:184). Finally, manpower requirements, and the funding process would need to be studied by manpower and budget analysts, prior to the consolidation of the Resource Protection organization.

VI. Conclusions and Recommendations

Conclusions

Since the enactment of the National Environmental Policy act of 1969, the U.S. Air Force has drawn much criticism, from many governmental agencies, for the apparent mismanagement of environmental quality programs (28; 29; 30). Certain professional management studies, conducted to analyze the allegations of mismanaged environmental quality programs, identified three factors hindering the management of Air Force environmental quality programs. First, responsibilities for environmental quality programs are dispersed throughout various organizations with different levels, and chains of command (10:II-2). This organizational structure perpetuates poor coordination among the organizations with environmental quality responsibilities (10:VI-2). Secondly, the designated single point of contact for environmental quality matters is positioned at the lowest organizational level, with little authority to enforce environmental quality regulations (10:VI-2; 28:24). Finally, although a single point of contact is designated for environmental quality matters, Federal, state, and local environmental regulatory agencies are forced to consult with additional Air Force organizations for environmental compliance, and monitoring matters (28:23).

During the course of this study, it became apparent to the author that the theory of consolidating three organizations to improve organizational effectiveness was an emotional, and politically agitating issue. The original organizations involved in the restructuring ". . . feel like their empire is crumbling" by allowing personnel from their organization to join another organization (35). The intent of this study was not to scrutinize the underlying political aspects of organizational change; but rather, to perceive how these organizations might be consolidated, and to speculate on what effect consolidation might have on the management of the Air Force environmental quality programs.

This study investigated how the U.S. Air Force may be able to establish a more effective control over the management of environmental quality programs. The premise for this study was that consolidating Environmental Planning, Bioenvironmental Engineering, and Base Safety into a single Resource Protection organization would achieve a more effective control of the management of environmental quality programs. This study was conducted to determine how these organizations could be consolidated in terms of the organizational structure, functional responsibilities, and what effect the reorganization might have on the management of environmental quality programs.

From the analysis of the functional responsibilities currently being performed by the three organizations--Environmental Planning, Bioenvironmental Engineering, and

Base Safety--for accomplishing a resource protection type of mission, the following conclusions were drawn:

1. Consolidating Environmental Planning, and Bioenvironmental Engineering into a single organization was not a totally novel concept. The concept had been analyzed by Air Staff, and many major commands for quite some time (37). On 12 March 1986, one major command in particular, the Air Force Logistics Command, took the initiative to implement the concept of consolidation. The concept of including Base Safety in the consolidation, however, is a somewhat more novel idea. Admittedly, Environmental Planning, and Base Safety do not share a strong relationship in their functional responsibilities; however, Bioenvironmental Engineering, and the ground safety section of Base Safety do share a strong relationship. The author concludes that in order to achieve the strategic objectives of the Resource Protection organization established in Chapter IV, the ground safety section of the Base Safety organization should be considered in the reorganization effort. To summarize this conclusion, the consolidation of Environmental Planning, Bioenvironmental Engineering, and Base Safety into a single Resource Protection organization would achieve a greater coordinated effort in the accomplishment of Air Force environmental quality, and occupational health and safety programs.

2. The Resource Protection organization should be structured in a matrix type of organizational design. This

would allow the Chief of Resource Protection the flexibility to assign the necessary personnel to accomplish high priority projects in the most efficient manner.

3. Elevating the responsibilities for enforcing environmental quality regulations, directly under the chain of command of the senior installation commander, would grant the necessary authority commensurate with the responsibility. Most of the personnel interviewed, from the Environmental Management Offices, supported this conclusion. The senior installation commander would attain a higher level of decision making support for environmental compliance matters; a most likely welcomed improvement, since he is ultimately responsible for violations of environmental laws.

4. Consolidation of the three organizations--Environmental Planning, Bioenvironmental Engineering, and Base Safety--would achieve a greater coordination of environmental quality, and occupational safety matters with other governmental regulatory agencies. Federal, state, and local regulatory agencies would have a single point of contact, without having to consult other Air Force organizations.

5. The author concludes that not all existing functional responsibilities should be consolidated into the new Resource Protection organization. Base comprehensive planning, and related land use programs currently assigned to Environmental Planning, should remain a functional responsibility of the Base Civil Engineer. These programs

are more congruent with the mission objectives of the Base Civil Engineer, and do not relate directly to the strategic objectives of the Resource Protection organization. All of the functional responsibilities of the Bioenvironmental Engineering organization are congruent with the strategic objectives of the Resource Protection organization. However, only the ground safety functional responsibilities of the Base Safety organization relate to the strategic objectives of the Resource Protection organization. Therefore, the remaining functional responsibilities of the Base Safety organization--flight safety, weapons safety, traffic safety--should be reassigned to those units assigned with that mission, or retained in a single safety office.

Recommendations

The following recommendations were based on the contents of this study, and the preceding conclusions

1. A comprehensive, longitudinal study of the Environmental Management Offices, recently organized within the Air Force Logistics Command, should be conducted to evaluate the effectiveness of consolidating Environmental Planning, and Bioenvironmental Engineering. The study should include all five Air Logistics Centers, and Wright-Patterson AFB, OH.

2. The organizational model for the Resource Protection organization developed in this study should be validated, and scrutinized by all personnel in the three existing

organizations, throughout the Air Force. A survey of all personnel in the existing organizations would draw valuable comments from those individuals involved in the reorganization. These comments would be used to determine the validity of the Resource Protection organizational model.

3. A manpower study should be conducted to determine the actual authorizations necessary for the Resource Protection organization. Conclusions were unable to be made in this study as to whether the manpower authorizations currently assigned to three organizations were appropriate for the Resource Protection organization.

4. The Air Force regulations for the three existing organizations should be consolidated. The existing regulations overlap, and cross-reference each other; leaving some functional responsibilities undefined, or redundantly assigned.

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This study investigated how the U.S. Air Force may be able to establish a more effective control over the management of environmental quality, and human health and safety programs. The premise for this study was that consolidating Environmental Planning, Bioenvironmental Engineering, and Base Safety into a single Resource Protection organization may achieve a more effective control over the management of these programs. This study was conducted to determine how these organizations could be consolidated in terms of organizational structure, functional responsibilities, and what effect the reorganization might have on the management of the programs.

The study found, from the analysis of the functional responsibilities currently being performed by the three organizations, that consolidating the three organizations could achieve a greater coordinated effort in the accomplishment of Air Force environmental quality, and occupational health and safety programs.

The organizational structure proposed in this study accomplishes three additional objectives, other than a higher degree of coordination. First, the Resource Protection organization was structured in a matrix organizational design; allowing more flexibility for assigning personnel from different branches to the same high priority project. Second, the Resource Protection organization was positioned directly under the command of the senior installation commander; facilitating a higher level of decision making support for environmental compliance matters. Finally, the Resource Protection organization would obtain the delegated authority commensurate with the responsibility of enforcement of environmental laws and regulations.

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