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HANDBOOK

FOR EVALUATING ECOLOGICAL EFFECTS OF POLLUTION  
AT DARCOM INSTALLATIONS

VOLUME 2

ESSENTIAL BACKGROUND DATA  
(INSTALLATION ENVIRONMENTAL IMPACT ASSESSMENT)

DECEMBER 1979

**SDTIC ELECTE**  
**MAR 10 1981**

**A**

**U.S. ARMY DUGWAY PROVING GROUND**  
**Dugway, Utah 84022**

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| 18. SUPPLEMENTARY NOTES<br>Volume 2 of seven volumes dealing with evaluating ecological effects of pollution at DARCOM installations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |                                                                      |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)<br>pollution monitoring                      installation environmental impact assessment<br>ecology                                              information systems<br>terrestrial ecosystems                      military activities<br>aquatic ecosystems                                                                                                                                                                                                                                                                                                                           |                                     |                                                                      |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>This handbook provides the DARCOM commander with a tool whereby he can respond quickly to a potential or actual pollution incident with a decisive program to evaluate the ecological effects of the pollution. To implement the procedures as set forth in the handbook, the commander will enlist the help of an environmental team composed of DARCOM scientists (or other suitable personnel) and individuals with limited ecological training (paraecologists) who will do much of the manual labor. With a given volume, the team can perform the required functions.<br>(con't) |                                     |                                                                      |

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Item 20 (con't)

This handbook covers the following areas in seven volumes of which this is Volume 2: (1) basic questions that need answering, (2) conducting the preliminary investigations of the problem, (3) determining the specific effects of a pollutant (the first three volumes are essentially library efforts), (4) terrestrial sampling, (5) aquatic sampling, (6) unexpected declines in animal populations and (7) handling data.

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## CONCEPT

After the command has identified a pollution problem at an installation and has answered the Checklist of Basic Questions (Volume 1), a team of one to three environmental scientists will initiate the in-depth investigation of the problem.

The team members will use this volume to identify that essential background data on habitat, accessibility, operations, etc., which will help them design the sampling program. The team members also may find it necessary to use Volume 3 to identify more specific data that will be required to model the fate of the pollutant in the environment of the installation.

The scientists will turn to the installation environmental impact assessment (IEIA) (refer to Appendix A) to determine whether it contains the required information. If the IEIA does not contain all the required information, Volumes 2 and 3 will be used to fill data gaps. Refer to Volume 3 for instructions on its use.

After the data gaps specific to the IEIA have been identified, the team members can use Appendixes B and C to request information from sources external and internal to the installation, respectively. Once the requested data arrives, the team members will determine whether the data meet their needs.

If these data do not meet the needs of the problem, the following procedures will be used to the extent necessary to acquire the appropriate information.

Two or three scientists will make the first installation visit, lasting 1 to 2 weeks. The first day there, the scientists will:

- (1) Obtain the names of people at the installation who can act as "paraecologists" while the pollution ecology survey is underway. These people will be interviewed during the first day, and two or three paraecologists per scientist will be selected. The scientists and the paraecologists will constitute the "team" during the remainder of the survey. Only one or two paraecologists will be required to spend all of their time at the job.
- (2) Call a meeting of the environmental representatives of appropriate directorates, offices and tenant activities to brief them on the functions of the team (to ensure the future cooperation of these representatives). It is appropriate for the commander of the installation to provide a disposition form (DF) stating the importance of the survey to the installation and requesting full cooperation of all his personnel.

(3) Identify the confines of the "surrounding area" - generally, that area within 48 air-kilometers (30 air-miles) of the boundary of the installation or polluting activity. In most situations, describing the facilities and resources within 48 air-kilometers of the installation boundary will provide all the information needed to properly identify the ecological effects of the pollution. In those situations where the effect can be felt farther than 48 air-kilometers, or (conversely) in a more restricted area, the team leader can identify the confines of the "surrounding area," based upon an evaluation of the topography, climatic conditions, source strength and toxicity on the dispersal and effect of the pollutant. In any event, it may be necessary to provide more resolution in the vicinity of the activity where the major effect of the pollution may be felt. In the case of electromagnetic radiation, a greater distance will probably be required. The rule for aquatic pollutants is much simpler: They should be traced 4 flow days (using the average flow) below the effluent and the same distance above the effluent, to identify all sources which might affect the water before it enters the installation.

Starting on the second day of the first installation visit, the team will question the responsible personnel, as required, to complete the information called for in this volume.

## USE OF THIS VOLUME

Most of the sections below are organized as follows:<sup>1</sup>

Section title  
(As in IEIA<sup>2</sup>)

I. Purpose (Identifies the reason for including that section.)

II. Provide the following information (Identifies the information to be provided.)

III. Suggested sources (Lists the primary sources of the information.)

The reference-identifier letters in "Suggested Sources" are included in parentheses after the appropriate requirement in "Provide the Following Information". Page A.1-7 provides an example: "(III A and B)" at the end of Part II.A.2 refers to the references A and B identified in "Suggested Sources". The detailed references to the sources can be found in the appendixes.

During interviews to obtain information required by this volume careful records should be kept. Appendix D provides a form for recording the information obtained.

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<sup>1</sup>In some cases the purpose applies to several related areas. In such cases, the purpose is provided in the section containing the related areas.

<sup>2</sup>If this volume is used independently to prepare an IEIA, each section of the IEIA should have a lead sentence presenting an introductory overview of that section. The remainder of the section should also be prepared in prose form. Headings can be used if appropriate, but the procedure of filling in the information as a format outline is to be avoided. The information required in the Discuss, Tabulate and Illustrate subparts of Part II generally should be provided in the suggested form. However, if it is easier to convey the required tabulated information in a discussion, or vice versa, then do so. Every effort should be made to avoid repetition of information in two sections of the IEIA. Some repetition will be necessary, but where conflicts arise that are not already accommodated in this volume, one section should contain the bulk of the material, and the other section should refer to that section.

## FOREWORD

This volume was prepared by Dr. Carlos F.A. Pinkham and David A. Gauthier. The following people and organizations have contributed written material to Volume 2:

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NOTES



ESSENTIAL BACKGROUND DATA (IEIA)

SECTION A. INTRODUCTION

1. DESCRIPTION

a. General

(1) Background

I. Purpose

The background discussion will include the rationale for the installation environmental impact assessment, as well as its purpose and objectives.

Section A.1.a.(2)

Summary Description of  
Installation

I. Purpose

It is necessary for the reader to be introduced thoroughly, but briefly, to the installation.

(a) Location and size

I. Provide the Following Information

A. Discuss

1. The name of the installation and the distance and direction of the installation from the nearest major cities (II A, D, E and F)
2. The boundaries of the installation and the major geographical (II A, D and E) or man-made features forming these boundaries
3. The total size of the installation square kilometers (II B, C and F)
4. Major geographic and man-made features within the boundaries of the installation (II A, D and E)
5. The names of major operational areas and a brief description of their functions (II B, C and F)

B. Illustrate<sup>1</sup>

1. On an area map (II E)
  - a. The surrounding area (refer to page A.1-7
  - b. The installation boundary
2. On an installation map (II D and E)
  - a. The features identified in I.A.2, 4 and 5
  - b. The major improved, semi-improved and unimproved areas (II C)

II. Suggested Sources

- A. State and county maps
- B. Installation public affairs office

---

<sup>1</sup>An adequate number of area and installation maps will be prepared for use as required throughout Volume 2.

C. Installation management plans  
(especially land management plan)

D. U.S. Geological Survey topograph-  
ical maps, 1:24,000

E. U.S. Geological Survey topograph-  
ical maps, 1:250,000

F. DARCOM Installation Summary-102  
for the installation

Section A.1.a.(2)(b)

Organization and mission

I. Provide the Following Information

A. Discuss

1. Organization

- a. The chain of command up to DARCOM  
(II A and F)
  - b. The military and civilian strength of the installation and any offices, directorates or tenant activities assigned 200<sup>1</sup> or more personnel  
(II G and H)
  - c. The chain of command of any tenant activities assigned 200<sup>1</sup> or more personnel (II A, F, G and H)
2. Mission
- a. The mission of the installation (II A, D, E and F)
  - b. The mission of each of the offices and directorates unique to the installation (II B, C and F)
  - c. The mission of each of the tenant activities identified in I.A.1.c (II F)

B. Illustrate

- 1. The organization chart identifying offices, directorates and tenant activities referred to above (II A, D and E)
- 2. The locations of the headquarters for those activities identified in I.A.1.b., on the installation map (refer to page A.1-2)(II A and D)

II. Suggested Sources

- A. Installation public affairs office
- B. Chief, operations review division
- C. Chief, contractor operations
- D. Plans and analysis office

---

<sup>1</sup>In most cases 200 is an appropriate cut-off point. However, the situation may dictate a higher or lower number.

- E. Installation commander
- F. Installation Regulation 10-3
- G. Installation strength card
- H. Chief, manpower office - manning  
and personnel information roster

Section A.1.a.(2)(c)

History

I. Provide the Following Information

A. Discuss

1. A history of the installation

functions

a. The chronological development of the major installation facilities and functions and the reason(s) for the particular facilities and functions (II A, B, D and E)

b. The significance of the installation in past national and international affairs (II, A, C and D)

II. Suggested Sources

A. Public affairs office

B. Veteran (long-time) employees

C. State historical groups

D. Post historian

E. DARCOM Installation Summary-102 for the installation

Section A.1.b.

Description of the Area

(1) General

I. Purpose

The information required by this section will provide an understanding of the environmental setting of the installation by identifying the resources and features that could be influenced by the installation and vice versa.

II. Provide the Following Information

A. Discuss (III C, D, F and G)

1. The names of the counties in the surrounding area
2. The total population of each of these counties and the latest census date (III A and B)
3. The distribution of this population between rural, suburban and urban components in the surrounding area (III A and B)
  - a. Approximate location of each component
  - b. Relative size of each component in square kilometers
  - c. Approximate population density for each component
  - d. Projected growth for each component (III E)
  - e. The cities in the surrounding area with a population of 1,000 or greater (III H)
    - (1) Their name
    - (2) Their population
    - (3) The latest census date
4. The name of the county seat for each of the counties in II.A.1 and its location relative to the area if outside the surrounding area (III A and H)

B. Illustrate

1. The location and names of the counties identified in II.A.1 on a state map (possible as insert on II.B.2)
2. The locations and names on the area map (refer to page A.1-2) of the:
  - a. County seats

b. Major areas identified in II.A.3

III. Suggested Sources

- A. Chamber of commerce of the county
- B. County community colleges or local universities
- C. U.S. Geological Survey, topographical maps
- D. Highway maps
- E. Regional Economic Activity in the United States
- F. American Statistical Index (ASI)
- G. Economic Impact Forecast System (EIFS at CERL)
- H. Encyclopedia, atlas or world almanac



Section A.1.b.(2)

Topography

I. Purpose

The topography of the area profoundly affects the types, locations and population sizes of life forms, including man, and greatly influences natural phenomena such as wind, cloud cover, temperature, rainfall, and waterflow. All of these are important in determining location and degree of effect of environmental disturbances such as air and water pollution.

II. Provide the Following Information

A. Discuss (III A, B and C)

1. The major topographic features in the area
- a. Physiographic sections
  - b. Mountain ranges and passes
  - c. Range in elevation (identify lowest and highest points for each of the features in II.A.1.b)

B. Illustrate

1. The features identified in II.A.1, on an area map (refer to page A.1-2) showing contour lines at intervals sufficient to break the range in elevation into five intervals (III A).

III. Suggested Sources

- A. U.S. Geological Survey, topographical maps
- B. Encyclopedia
- C. Natural Regions of the United States and Canada

Section A.1.b.(3)

Transportation

I. Purpose

The installation requires transportation facilities to operate properly. In some cases, transportation facilities exist to serve the installation almost exclusively.

II. Provide the Following Information

A. Discuss

1. The major roads in the surrounding area (III A) Route 96)
  - a. Their route numbers (e.g. State
  - b. Their surface types
  - c. Their locations and junctions with other routes
2. The airports and airstrips in the surrounding area (III A, B and C)
  - a. Their names
  - b. The names of the cities they are in
  - c. Their sizes in square kilometers
3. The flight paths in the surrounding area (III B and C) area
  - a. Their routes over the surrounding
  - b. The number of annual flights
4. The railroads in the surrounding area (III A and D) freight trains per year
  - a. Their names
  - b. Their locations
  - c. The approximate number and size of
  - d. The peak flow (annual and daily)
5. The shipping facilities in the surrounding area (III A and F) vessels utilizing the facilities per year
  - a. Their names
  - b. The names of the cities they are in
  - c. The approximate number and size of

B. Illustrate

1. The features identified in II.A on the area map (refer to page A.1-2)

C. Tabulate

1. The traffic flow on the roads identified in II.A.1 (III E)

III. Suggested Sources

- A. Highway maps
- B. Local airports
- C. The National Atlas of the United States of America
- D. Railroad company offices
- E. State highway department
- F. Harbormasters

Section A.2.a.

ENVIRONMENTAL SETTING

Climate

I. Purpose

Many activities are influenced either directly or indirectly by weather elements and the weather elements can vary the impact these activities have on the environment. Weather elements also profoundly affect the types of habitats and species of organisms found in an area. Long-period data records of these weather elements in the form of climatological summaries are essential for environmental surveys.

II. Provide the Following Information  
(III A through J)

A. A narrative summary by season of the various climatic zones in the vicinity of the installation, including as appropriate

1. Pressure systems, including air masses and storm tracks influencing the area
2. Average total precipitation, frequency of occurrence, extremes and areal distribution
  - a. Rain
  - b. Snowfall
3. Daily average maximum and minimum temperatures, extremes and areal distribution
4. Growing season, or freeze-free period, with latest and earliest freezing. Any seasonal variations with terrain features
5. The daily average minimum and maximum relative humidity
6. Wind distribution, including prevailing directions, mean speed and fastest mile<sup>1</sup>
7. Average surface pressure and extremes
8. Average sky conditions, including sky coverage, cloud height, visibility restriction, and solar radiation intensity (Langleys<sup>2</sup>)

<sup>1</sup>Fastest mile: fastest average wind speed observed during a 1-minute period

<sup>2</sup>A unit of solar radiation equivalent to 1 gram calorie per square centimeter of irradiated surface

9. Occurrence and severity of hurricanes, typhoons, tornadoes, waterspouts, thunderstorms, ice storms, hailstorms, blizzards, flooding and droughts

10. Average sunrise and sunset

11. Average and extreme sea conditions, including length, height, speed, period and direction of swell and wind-generated waves, surf, currents, water temperature, tides, freeze and thaw dates, and drift ice

12. Atmospheric diffusion factors, including stability, depth of mixing layer, and persistency of air stagnation periods

13. Other combinations of weather elements with synergistic influences, such as wind chill discomfort index, and heating and cooling degree days<sup>1</sup>

B. Tabulate data for the area under survey. Data should be tabulated, preferably, by month, to show normals, means, and extremes. Where feasible, frequency distribution and persistency should also be tabulated. In some instances, it may be necessary to show combinations of parameters occurring simultaneously. A climatological tabulation, as a minimum, must be based on daily, around-the-clock observations for 12 consecutive months. An ideal climatological record would be based on 10 or more years of full annual cycles. Each tabulation must be identified with source of information, to include period of record, station location and altitude, elevation of sensor above ground, type of equipment used, and units of measurement. Include as appropriate:

1. Precipitation amounts: total, rain, snowfall: normal, maximum monthly, minimum monthly, maximum in 24 hours, and maximum per single storm (millimeters)

2. Temperature normals for daily maximum, daily minimum, and monthly: extremes for highest and lowest; frequency distribution of daily temperatures each month by degrees Celsius (C)

3. Mean number of days with maximum temperatures 32° C (90°F) and above, 0°C (32°F) and

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<sup>1</sup>One heating degree-day is given for each degree Fahrenheit (F) that the daily mean temperature departs below the base of 19°C (65°F). One cooling degree-day is given for each degree that they daily mean temperature departs above the base of 24°C (75°F).

below, and minimum temperatures 0°C (32°F) and below, -18°C (0°F) and below (number of days)

4. Normal relative humidity for four equally spaced hours of local time (percent at a specified hour)

5. Wind direction and speed distribution. This may be either in the form of a table or wind rose. Direction categories - minimum of eight compass points, 16 compass points preferred. Speed categories - six categories, including calm, 0.5 to 1 meters per second (mps), 2 to 3 mps, 4 to 6 mps, 7 to 10 mps, and 11 mps and above. The table or wind rose must show combinations of wind direction categories versus speed categories occurring simultaneously. A table showing the highest speed and associated direction measured during each month (fastest mile) (speed in mps, direction in degrees or cardinal points). Frequency of occurrence of wind direction persistency within a 45° sector. Crossover times of windshifts associated with land and sea, and mountain and valley breezes will be required at some locations.

6. Average station pressure and extremes (millibars)

7. Mean number of days showing clear, partly cloudy, and cloudy. Mean number of days with visibility one kilometer or less, including cause of obstruction to vision (number of days). Surveys involving energy studies will require tabulation by time of day and cloud types, such as low, middle, and high. When aviation operations are involved in surveys, tables are required showing the frequencies of various combinations of the following parameters

a. cloud amounts (clear, scattered, broken, overcast, and obscuration)

b. ceiling heights, (critical limits in feet such as IFR<sup>1</sup> takeoff, IFR landing, VFR<sup>2</sup> takeoff and landing, and no alternate airport required)

c. visibility ranges (critical limits in kilometers and fractions of kilometers as for ceiling heights)

d. time of day (hours)

e. wind speed

f. wind direction categories

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<sup>1</sup>IFR - instrument flight rules

<sup>2</sup>VFR - visual flight rules

8. Frequency of severe storms to include average number of thunderstorms, hurricanes or typhoons, tornadoes and waterspouts per month (occurrences)

9. Average sunrise and sunset times (hours and minutes)

10. State of ground in general terms, such as dry, moist, wet, frozen, snow covered, etc., giving frequency of occurrence at four designated times of day

11. Frequency of occurrences of various sea conditions. Furnish sea, state and direction; swell, height and direction; swell period; surf and direction; occurrences of drifting or solid ice, thickness, freeze and thaw dates, and normal water temperatures (C°)

12. Percent frequency of occurrences of Pasquill stability categories,<sup>1</sup> frequency occurrence of morning and afternoon mixing layer depths (meters). Frequency of occurrence on the duration of air stagnation periods

13. Frequency of occurrence of wind chill factor groups and discomfort index groups. Normal and range of degree days for heating and cooling

### III. Suggested Sources

A. National Climatic Center

B. National Weather Service Office, at most major airports or in major cities

C. U.S. Army Atmospheric Sciences Laboratory

D. U.S. Air Force Environmental Technical Applications Center

E. U.S. Naval Oceanographic Office

F. State climatology offices

G. Meteorology or geography departments of local universities or colleges

H. Private industry in area which may have conducted special studies

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<sup>1</sup>Pasquill Categories A through G, where A is extremely unstable, D is neutral, and G is extremely stable.

I. Standard references such as :

1. Meteorological and Geostrophysical Abstracts, American Meteorological Society (METEOR/GEO ABS)
2. Monthly Weather Review, National Oceanographic and Atmospheric Administration

J. Limited detailed information may be available from other sources such as:

1. Department of Agriculture, Soil Conservation Service, regional offices
2. U.S. Forrest Service, regional offices
3. Bureau of Land Management, state office
4. National Park Services
5. Cooperative observers



Section A.2.b.

Air Quality

I. Purpose

The first step in evaluating the effects of current and future installation emissions on local air quality is to describe that air quality and identify noninstallation sources of pollution and local air-monitoring programs. The former provides a baseline for future comparisons; the second identifies others which may be polluting, and the latter reveals programs which can assist in determining the sources of pollution.

II. Provide the Following Information

A. Discuss

1. Environmental Protection Agency Region and the address of the regional office (III A)
2. Federal Air Quality Control Region in which installation is located (III A)
3. An estimate of the severity of pollution and the trends in air pollution (III C, D, H and I)
4. Target dates for obtaining primary and secondary standards (III D)
5. The past, present, and future local and state air-monitoring programs with monitoring sites within the area (III C, D and G)
  - a. Their nature
  - b. The number of sites
6. Major noninstallation sources of air pollution in the area (III C, D, and F)
  - a. Power plants
  - b. Manufacturing facilities
  - c. Highways (refer to Section A.1.b.(3), page A.1-10)
  - d. Others
7. The air pollution potential, considering elements such as climate and topography which may affect the pollution loading of the area (III A, C, D and E)
8. Pertinent federal, state and local air quality regulations and standards (III C, D, I and J)

B. Illustrate

1. On an area map (refer to page A.1-2)

a. The locations of the monitoring sites identified in II.A.5

b. The locations of the sources of air pollution identified in II.A.6

C. Tabulate

1. The primary and secondary standards for the pollutants in Table A.2.b-1 (III B)

2. The required information on the local, state and federal air-monitoring sites in Table A.2.b-2 (III B, C and D)

3. The present levels of the pollutants identified in Table A.2.b-1 (III C and D)

III. Suggested Sources

AP-102 A. Federal Air Quality Control Regions,

B. 40 Code of Federal Regulations (CFR), 50 and amendments

C. County department of health

D. State department of health, division of air quality

E. Local meteorologists at universities, weather bureaus or on the installation

F. National Emissions Data Systems (NEDS), Regional Office, EPA

G. National Aerometric Data Base, Regional Office, EPA

H. The National Air Monitoring Program: Air Quality and Emission Trends. Annual Report

I. Environment Reporter

J. Environment Regulation Handbook

Table A.2.b-1. The Primary and Secondary Ambient Air Quality Standards and the Present Levels of Pollutants in the Surrounding Area

|                   | Particulates<br>( $\mu\text{g}/\text{m}^3$ ) | Sulfur<br>Oxides<br>( $\mu\text{g}/\text{m}^3$ ) | Nitrogen<br>Oxides<br>( $\mu\text{g}/\text{m}^3$ ) | Carbon<br>Monoxide<br>( $\text{mg}/\text{m}^2$ ) | Photochemical<br>Oxidants<br>( $\mu\text{g}/\text{m}^3$ ) | Hydrocarbons<br>( $\mu\text{g}/\text{m}^3$ ) |
|-------------------|----------------------------------------------|--------------------------------------------------|----------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------|----------------------------------------------|
| Primary           | AGM<br>24HM                                  | AAM<br>24HM                                      | AAM                                                | 8HM<br>1HM                                       | 1HM                                                       | 3HM                                          |
| Secondary         | AGM<br>24HM                                  | 3HM                                              | AAM                                                | 8HM<br>1HM                                       | 1HM                                                       | 3HM                                          |
| Present<br>Levels | AGM<br>24HM                                  | AAM<br>24HM                                      | AGM                                                | 1HM                                              | 1HM                                                       | 3HM                                          |

AAM: Annual arithmetic mean  
 AGM: Annual geometric mean  
 24HM: 24-hour maximum  
 8HM: 8-hour maximum  
 3HM: 3-hour maximum  
 1HM: 1-hour maximum

Table A.2.b-2. Local, State and Federal Air-Monitoring Sites Within the Area

| Program<br>Title and Agency<br>Name | Site<br>Identification<br>Number | Parameters<br>Monitored | Frequency and<br>Duration of<br>Monitoring | Monitoring<br>Equipment |
|-------------------------------------|----------------------------------|-------------------------|--------------------------------------------|-------------------------|
|                                     |                                  |                         |                                            |                         |
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Section A.2.c.

Background Noise, Odor  
and Electromagnetic  
Levels

I. Purpose

Background noises, odor and electromagnetic levels exist in almost all natural and man-made environments. Knowledge of their existence will prevent them from being confused with noise, odor or electromagnetic forces originating from activities within the installation.

II. Provide the Following Information

A. Discuss (III A, B, C and D)

1. The location of natural and noninstallation man-made sources of noise, odor and electromagnetic radiation

2. The nature of this problem

a. Noise

(1) Source  
(2) Schedule and duration  
(3) Level (dBA for continuous noise, and peak sound pressure level for impulse noise) at positions likely to be affected (III E)

b. Odor

(1) Source  
(2) Schedule and duration

c. Electromagnetic (microwaves, in particular 1 to 30 gigahertz) (III J)

(1) Source  
(2) Schedule and duration  
(3) Bandwidth  
(4) Pulse duration and frequencies  
(5) Rate of rotation  
(6) Power in milliwatts per square centimeter at positions likely to be affected  
(7) Limited occupancy zones  
(a) Location  
(b) Nature of the limitation

3. Pertinent federal, state and local noise and odor and electromagnetic regulations and standards (III F through I and K)

III. Suggested Sources

A. Installation safety office

- B. Installation public affairs office
- C. Installation employees
- D. Personal observation
- E. Noise contour maps [Construction  
Engineering Research Laboratory (CERL)]
- F. State Department of Health, Division  
of Air Quality
- G. County Department of Health
- H. Environment Reporter
- I. Environment Regulation Handbook
- J. Electromagnetic Compatibility Analysis  
Center (ECAC)
- K. TB Med 270

Section 4.2.d.

Water Quality

I. Purpose

The first step in evaluating the effects of current and future installation discharges on local water quality is to describe that water quality, identify noninstallation sources of pollution, and local water monitoring programs. The former provides a baseline for future comparisons; the second identifies others which may be polluting, and the latter reveals programs which can assist in determining the sources of pollution.

II. Provide the Following Information

A. Discuss

1. The identity of the surface and ground waters which enter or leave the installation and those which are within 4 flow days of the installation (III B, C, E, I, J and P)

a. Usage classification (III A)

b. Current and projected noninstallation uses (III B)

c. Major noninstallation discharges and the details of their National Pollutant Discharge Elimination System (NPDES) permits (III C and H)

d. The major past, present, and future<sup>1</sup> local, state and federal water quality monitoring programs (both biological and physical-chemical) on these waters (III C, D, E, F and O)

(1) Description of each program

(a) The type of program

(b) The number of sites

(2) General interpretation of results in relation to recent trends in water quality

e. The region of ground water aquifer recharge

2. The maximum average 5-day low flow rate and the 10-year 5-day low flow rate of the relevant waters identified in II.A.1 (III F, H, J and O)

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<sup>1</sup>Excluding the program that may be established as a result of this survey

3. The pertinent federal, state and local water quality standards and regulations (III A through G and N)

4. Additional information on larger bodies of water (III C, D, J, L, and M)

a. Depth contours

b. Temperature

Celsius

(1) Daily temperature in degrees

temperature

(2) Seasonal and daily trends in tem-

thousand

c. Dissolved oxygen

(1) Dissolved oxygen in parts per

solved oxygen

(2) Seasonal and daily trends in dis-

and H)

d. State of eutropnication (III E, F

e. Salinity

(1) Salinity in parts per thousand

(2) Seasonal trends in salinity

f. Tidal flow

(1) Presence or absence of tidal flow

(2) Presence or absence of salt wedge<sup>1</sup>

B. Illustrate

1. On an area map (refer to page A.1-2)

a. The drainage systems of the surface waters and the drainage pattern of the subsurface waters identified in II.A.1. If applicable to the area map include regions of ground water aquifer recharge.

b. The discharge sites in II.A.1.c

c. The sample locations identified in

II.A.1.d

C. Tabulate

1. The required information on the local, state and federal water-monitoring programs in Table A.2.c-1 (III C through F and J)

### III. Suggested Sources

A. State water quality regulations

<sup>1</sup>A salt wedge is created during flood tides when the denser salt water pushes upriver as a wedge beneath the lighter fresh water.



- B. County water use planning board
- C. State department of water resources
- D. Biology, agriculture, or life sciences departments of local universities and colleges
- E. Environmental Protection Agency, Regional Offices
- F. County and state boards of health
- G. Environment Reporter
- H. EPA STORET data retrieval system
- I. U.S. Geological Survey, topographical maps
- J. District Engineer, Army Corps of Engineers
- K. Installation civil engineer or facilities engineering directorate
- L. National Oceanic and Atmospheric Administration, charts
- M. Consulting firms
- N. Environment Regulation Handbook
- O. U.S. Geological Survey, office in the state
- P. Natural Regions of the United States and Canada

Table A.c.c.-1. Local, State and Federal Water-Monitoring Sites Within the Area.

| Program<br>Title and Agency<br>Name | Site Location<br>Identification<br>Number | Parameters<br>Monitored | Frequency and<br>Duration of<br>Monitoring | Monitoring<br>Equipment |
|-------------------------------------|-------------------------------------------|-------------------------|--------------------------------------------|-------------------------|
|                                     |                                           |                         |                                            |                         |
|                                     |                                           |                         |                                            |                         |
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Section A.2.e.

Natural Resources

I. Purpose

Identification of the natural resources on and around the installation is critical to a proper evaluation of installation impact.

(1) Fauna and Flora

I. Provide the Following Information

A. Append as lists or provide reference to lists of the following organisms found in the area (II A through G, and L)

1. Mammals
2. Birds
3. Reptiles and amphibians
4. Fish
5. Invertebrates
6. Algae
7. Fungi
8. Lichens
9. Mosses
10. Ferns and horsetails
11. Gymnosperms (conifers)
12. Angiosperms (grasses, trees, and wild

flowers)

B. Discuss

1. Species in each of the categories in I.A which are dominant (II A through G)
2. Species with recreational value and the reason for their value (II A through G)
3. Species protected<sup>1</sup> by federal or state law (II E, H, I and K, L through R); known details of past and present breeding sites and home ranges (II A, D, E, F, G and K)
4. Species found in the area which are unusual but not included in the above categories (especially those that breed in the area) (II A and C through G)

<sup>1</sup>Protected species include those animals whose taking is regulated by federal or state statutes.

C. Illustrate

1. Concentrations of any of the species identified in I.B 2 through 4 on the area map (refer to page A.1-2)

D. Tabulate

1. The relative abundance, habitat preference, period of occurrence (year-round resident, fall migrant, spring migrant, winter resident, summer resident), and breeding status of any species identified in I.B (II A through G)

II. Suggested Sources

A. Installation agronomist, forester, game warden, etc

B. Management plans

1. Woodland
2. Wildlife
3. Land

C. Rod and gun clubs

D. State and local conservation societies

E. State department of natural resources or its equivalent

F. Local university departments of biology, zoology and botany

G. Nearby national wildlife refuges

H. Federal Endangered Species Act of 1973 and supplements

I. Migratory Bird Treaty Act

J. Public affairs office

K. A User Accessed Computer Information System for Environmentally Sensitive Wildlife, U.S. Army Engineer Waterways Experiment Station

L. Selected Legally Protected Animals,  
U.S. Army Engineer Waterways Experiment Station and re-  
ference contained therein

M. Federal Regulations 40, No. 127; pp.  
27824-27924 (vascular plants)

N. Cornell Colonial Bird Register

O. Regional Director, Fish and Wildlife  
Service

P. Marine Mammal Protection Act of 1972

Q. Wild Free-Roaming Horses and Burros  
Act

R. Protection of Bald and Golden Eagles

Section A.2.e.(2)

Habitats

I. Provide the Following Information

A. Discuss

1. The dominant plant species in each of the habitats identified in I.B.1 (II A, B, D, E and F)

2. The nature of any unique or protected habitats in the surrounding area, including lands draining into rivers protected by the Wild and Scenic Rivers Act or tributaries thereto (II A, D, E, F and H through P)

a. Type

b. Reason for uniqueness or protection

c. Details of the past, present and future efforts at preservation (II C, D, H and K)

3. The sensitivity of the habitats identified in I.B.1.d (II A, C and D)

B. Illustrate on the area map (refer to page A.1-2)

1. The location of

a. Habitat types comprising more than 5 percent of the total area (II B, D, E and F)

(1) Wetlands

(2) Woodlands

(3) Fields

(4) Deserts, etc

(5) Open water, etc

b. Those habitats identified in I.A.2

c. Areas approaching or at climax (II A, D, F and H)

d. The habitats sensitive to physical disturbance (II A, D, F, H and K)

II. Suggested Sources

A. Installation forester, agronomist, game warden, etc

B. Installation management plan

C. Installation environmental quality coordinator

D. Environmental study programs, such as those conducted by university botany departments, local environmental and conservation groups and state agricultural agencies

E. A reference material delineating habitat types, such as manual to accompany the map, Potential Natural Vegetation of the Conterminous United States

F. Recent aerial photos or topographical maps showing forested areas, marshes, etc

G. DARCOM Installation Summary-102 for the installation

H. Game or wildlife preserves, state or national parks within the area

I. Map, "Wild and Scenic Rivers Act, Public Law 90-542

K. Bureau of Land Management, Regional office

L. National Wetlands Inventory, U.S. Fish and Wildlife Service

M. State Critical Habitat Inventory (at CERL)

N. Reference material delineating endangered habitats such as can be found in :

1. The Federal Register
2. Local Libraries

O. National Park Service, Natural History Theme Studies

P. Private holdings of the National Audubon Society and the Nature Conservancy

Section A.2.e.(3)

Geology

I. Provide the Following Information

A. Discuss

1. A brief geological history of the surrounding area
2. The minerals in the area (II A through F and H)

- a. Type
- b. Relative value (How used?)
- c. Annual amount extracted
3. The unusual landforms in the surrounding area (abandoned quarries, canyons, gorges, distinctive mountain features, cliffs, bluffs, rock formations, evidence of volcanic activity, caverns, caves, salt flats, badlands, islands, dunes, reefs, etc (II A, F and G)

- a. Type
- b. Name
- c. Age
- d. How created
- e. How often visited by man
4. The outcrops or fossil sites in the area (II A, B, C, D and F)
- a. Name
- b. Formation
- c. Age
- d. Types of fossils
- e. How often visited by man

- B. Illustrate on the area map (refer to page A.1-2)

- I.A.2 1. The mineral sites identified in
- I.A.3 2. The unusual landforms identified in
3. The outcrops or fossil sites identified in I.A.4

II. Suggested Sources

A. U.S. Geological Survey, maps and articles on the geology of the area

B. Installation agronomist, forester or facilities engineering



- C. Local geology buffs, especially employees of the installation
- D. University geology departments
- E. Land management plan
- F. GEOREF Data Base
- G. Geothermal Energy Resources Map, National Oceanic and Atmospheric Administration
- H. Natural Regions of the United States and Canada

Section A.2.e.(4)

Soils

I. Provide the Following Information

A. Discuss (II A through G)

1. The general soil mapping units in the area
2. The soil associations that make up the mapping units
3. The areas which require more detailed soils information for specific uses
4. Average and extreme ground conditions and soil trafficability (II G and H)

B. Illustrate on the area map (refer to page A.1-2)

1. The location of the soil mapping units, described in I.A.1

C. Tabulate (II A, C, D, F and G)

1. Taxonomic classification and properties of representative soil series (II I)
  - a. Classification
  - b. Hydrologic Soil Group. The hydrologic soil groups are used to estimate runoff from rainfall. Soil properties considered are those that influence the rate of infiltration obtained from a bare soil after prolonged wetting. Soil properties considered are: (1) depth of seasonally high water table, (2) intake rate and permeability after prolonged wetting, (3) depth to very slowly permeable layer. The soils have been classified into four groups, A through D. Group A soils have low runoff potential; Group B soils have moderately low runoff potential; Group C soils have moderately high runoff potential; and Group D soils have high runoff potential.

c. Drainage. The relative rapidity and extent of the removal of water from on and within the soil under natural conditions. Terms commonly used to describe drainage are

(1) Excessively drained. Water is removed from the soil rapidly. The soils are typically sandy and porous.

(2) Well drained. Water is removed from the soil readily but not rapidly. There is no evidence of wetness above a depth of 40 inches.

(3) Moderately well drained. Water is removed from the soil somewhat slowly so that the soil is wet for short, but significant periods of time.

(4) Somewhat poorly drained. Water is removed from the soil slowly enough to keep it wet for significant periods but not all the time. Wetness is apparent between a depth of 20 and 40 inches.

(5) Poorly drained. Water is removed from the soil so slowly that the water table is near the surface most of the time. Wetness is apparent within 20 inches of the surface.

(6) Very poorly drained. Water is removed from the soil so slowly that the water table is at or on the surface most of the time. These soils are generally in low areas or depressions.

d. Permeability. The quality of the soil that enables it to transmit water or air. Terms used to describe permeability in inches of water per hour are

- (1) Very slow, less than 0.06 inch
- (2) Slow, 0.06 to 0.2 inch
- (3) Moderately slow, 0.2 to 0.6 inch
- (4) Moderate, 0.6 to 2.0 inches
- (5) Moderately rapid, 2.0 to 6.0

inches

- (6) Rapid, 6.0 to 20.0 inches
- (7) Very rapid, more than 20 inches

e. Slope (%)

f. K value (erosion). A value used to estimate runoff from rainfall over bare soil. Values range from 0.10 to 0.64. Low values indicate low erodibility.

g. WEG (Wind erosion group). WEG is a grouping of soils by textural classes. It is directly related to the percentage of dry soil aggregates that are larger than 0.84 mm (0.033 inch). Eight groups are recognized; one subgroup indicated by the letter L denotes the presence of lime. The rating is applied to bare soil.

## II. Suggested Sources

A. U.S. Geological Survey, maps and articles on the geology of the area

B. Installation agronomist, forester or game warden



- C. University geology departments
- D. Soil Conservation Service district headquarters
- E. Installation land management plan
- F. GEOREF Data Base
- G. Soil maps and texts of the administrative regions, USDA, such as Soils of the Western United States, Soils of the North Central Regions of the United States, etc
- H. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi
- I. Military Standard Unified Soil Classification System, MIL-STD-6198

Section A.2.e.(5)

Ecological Surveys

I. Purpose

Besides providing a source of information for use in other sections, independent ecological surveys conducted in the area might provide excellent opportunities to share efforts, thereby effecting cost savings for the pollution ecology survey.

II. Provide the Following Information

A. Discuss (III A through E)

1. The responsible agency
2. The objective of the program
3. The techniques involved
  - a. Species studied
  - b. Major equipment used
  - c. Sampling methods
  - d. Sampling schedule
  - e. Numbers of collected specimens
  - f. Disposition of collected specimens
4. The results and their relationship to the pollution ecology survey

B. Illustrate on the area map prepared on page A.1-2

1. The locations of the study areas

III. Suggested Sources

A. Environmental quality coordinator

B. Chemical Systems Laboratory/Dugway Proving Ground Ecological Research Team or local contractors

C. Annual Status Report on Environmental Programs and Activities

D. Local universities

E. Comprehensive Dissertation Abstracts (COMP DISS ABS)

Section A.2.f.

Cultural Resources

(1) Archaeological Sites I. Provide the Following Information

A. Discuss

1. Brief summary of the periods of man's occupation (II A, C, D and E)
  - a. Culture
  - b. Age
  - c. Distinguishing characteristics
2. Excavations of archaeological sites in the surrounding area (II A through D)
  - a. Group responsible for excavation
  - b. Date of excavation
  - c. Summary of findings
  - d. How often visited by modern man

B. Illustrate

1. The sites identified in I.C.1 on an installation map (refer to page A.1-2) (Note: to protect the sites, this map may be excluded from the report and a copy kept on file.)
2. The sites identified in I.A.2 on an area map (refer to page A.1-2) (Note as in I.B.1)

C. Tabulate

1. In Table A.2.f-1, information on pictographs, petroglyphs, burial grounds or mounds, village sites, ruins, artifact sites, middens, domiciliary mounds, surface collecting sites or other archaeological remains on the installation (II A, B, C and D). Include under status as a protected site, whether it is or is not protected; and if the former, the responsible agency, the requirement for protection, and the nature of the protection.

II. Suggested Sources

A. Archaeology and anthropology departments of nearby universities

B. Installation public management office or public affairs office

C. State archaeologist and state and  
local archaeological societies

D. Archaeology buffs on the installation

E. Standard reference materials, such as  
The Native Americans

Table A.2.f-1. Known Archaeological Sites on the Installation

| Site Identification Number* | Culture or Tribe | Period | Status as a Protected Site | Nature of the Site and/or Artifacts |
|-----------------------------|------------------|--------|----------------------------|-------------------------------------|
|                             |                  |        |                            |                                     |
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\*Refers to site identification number used in Figure called for in I.B.



Section A.2.f.(2)

Historical Sites

I. Provide the Following Information

A. Discuss

1. A brief history of the surrounding area before the establishment of the installation (II A, B, F, H and J)

a. The events of historical sites, with emphasis on sites nominated for or on the state or federal register of historical sites (II J and K)

2. Whether any of the features identified in I.C are unique for the area (II A, B, C, E, F and H), and if so, the past, present and future attempts at their preservation (II E and H)

B. Illustrate

1. The sites identified in I.A.1 on an area map (refer to page A.1-2)

2. The sites identified in I.C.1 on an installation map (refer to page A.1-2) (II A through I)

C. Tabulate

1. In Table A.2.f-2, historical sites including monuments, old structures, transportation features (trestles, covered bridges, etc.), trails, canals, bridges, communities, dumps, cemeteries and home sites found on the installation. Include features that were constructed as part of the installation if of historical interest. Include under status as a protected site, whether it is or is not protected; and if it is protected, the responsible agency, the requirement for protection, and the nature of the protection.

II. Suggested Sources

A. Published history books on area

B. Local museums

C. Local chambers of commerce

D. Installation records

E. Installation public affairs office

- F. Local history buffs
- G. Old aerial photos
- H. Post historian
- I. Local university history departments
- J. State historical society
- K. National Register of Historic Places

Table A.2.f-2. Known Historical Sites on the Installation

| Site Identification Number* | Age | Status as a Protected Site | Historical Significance |
|-----------------------------|-----|----------------------------|-------------------------|
|                             |     |                            |                         |
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\*Refers to site identification number used in Figure called for in I.B.

Section A.2.f.(3)

Aesthetics

I. Provide the Following Information

A. Discuss

1. Nature trails (II A through G)
  - a. Their extent
  - b. Their founders
  - c. What they identify
2. Panoramic vistas (II A and D). The extent of the view
3. Any other local attractions with consideration to the four seasons. DARCOM administers thousands of acres in many states, with high aesthetic value in terms of setting, topography, climate and vegetation
4. The past, present and future attempts at preserving these aesthetic resources (II A, C and D)
5. The frequency of human visitors to any of the above

B. Illustrate on an installation map (refer to page A.1-2)

1. The location of (II A through F)
  - a. Nature trails
  - b. Panoramic vistas
  - c. Other local natural attractions not discussed elsewhere

II. Suggested Sources

- A. Installation agronomist, forester, game warden, etc
- B. Other installation personnel, especially the out-of-doors types
- C. Public affairs office
- D. Installation management plan
- E. Boy Scout troop
- F. Local chambers of commerce
- G. Wives club

Section A.2.g.

Recreational Resources

I. Provide the Following Information

A. Discuss

1. For hunting, trapping, fishing, boating, golf courses, athletic fields, picnicking, camping, flying, horseback riding, swimming, skiing, hiking etc., on the installation (II A through J)

a. The types of personnel that may use the facility (general public, military only, etc)

b. The periods of use

c. How use of facility is regulated (including governing regulations)

d. Whether these resources are unique for the area (II A, B, D, E, J, K and L) and if not, the location of the other resources in the area

2. In addition to above, provide for

a. Hunting and trapping

(1) The game sought

(2) The number of hunting sites for upland game, waterfowl, deer, etc., and trapping sites for muskrat etc.

(3) The sizes and activities of the

Rod and Gun Clubs

b. Fishing and Boating

(1) The fish sought

(2) The number of boat clubs and docks available

c. Golf courses and athletic fields

(1) The number of holes per golf

course

(2) The number of tennis courts and other types of athletic fields

other types of athletic fields

d. Picnicking and Camping

(1) The number of picnic and camping

areas

(2) The number of tables, camp sites,

and other facilities at each

e. Flying and Riding Clubs

(1) The number of airfields and

stables

(2) The number and sizes of planes

(3) The number of horses

(4) The length of the bridal paths

f. Swimming and Skiing

(1) The number of swimming pools (details will be provided in Section C.4.d, page C.4-9) and the areas other than swimming pools where swimming is allowed

(2) Ski slopes, their lift facilities and sizes

B. Illustrate

1. The features discussed in I.A.1 on an installation map (refer to page A.1-2)

2. The features discussed in I.A.1.d on an area map (refer to page A.1-2)

C. Tabulate

1. The recreational boats on the installation

a. Type (power, sail)  
b. Operation (boat club, Special Services)

c. Numbers of each type  
2. The recreational aircraft on the installation

a. Type (number of engines and passengers)  
b. Numbers of each type

II. Suggested Sources

A. Public affairs office

B. Personal observation

C. Land and wildlife management plan

D. Installation agronomist, forester, game warden, etc.

E. Out-of-doors buffs

F. Rod and gun club

G. Boat club

H. Boots and saddles club

I. Local chamber of commerce

- J. Recreation services office
- K. State and federal recreation plans
- L. National Trails System

Section A.2.h.

Agricultural Resources

I. Provide the Following Information

A. Discuss

1. The types of agricultural activity in the surrounding area<sup>1</sup> (II A through E)
  - a. The major cash crops (do not forget honeybees)
  - b. Their locations in the surrounding area, especially those adjacent to the installation
2. The percentage of the land committed to agricultural use (II B and C)
3. The extent of irrigation (II B, C, D and E)
  - a. Seasonal schedule
  - b. Magnitude
4. The extent of grazing and the live-stock involved (II B, C, D and E)
  - a. Seasonal schedule
  - b. Livestock drives
  - c. Size of herds
5. The locations of Class I and Class II agricultural land in the surrounding area (II B and C)

B. Illustrate on an area map (refer to page A.1-2)

1. Livestock drives, irrigation areas, or other pertinent information discussed in I.A
2. The primary farmland discussed in I.A.5

II. Suggested Sources

- A. Encyclopedia
- B. State department of agriculture
- C. Agricultural extension agent
- D. Personal observation
- E. Local farmers and ranchers

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<sup>1</sup>Similar activities on the installation are addressed in Section B.1.d, page



SECTION B. LAND-USE  
RELATIONSHIPS

I. Purpose

This section provides detail on major land-use factors on and around the installation. Many other land-use factors are covered in Section C.

1. CONFORMITY OR CONFLICT WITH  
OTHER LAND-USE PLANS, POLICIES  
AND CONTROLS

Section B.1.a.

Land Ownership,  
Use and Zoning

I. Purpose

It is important to know land-use and zoning restrictions, because they can impact upon future expansion or operation of the installation

II. Provide the Following Information

A. Discuss (III A through E)

Zoning laws and land-use laws on land adjacent to the installation (III C, D and E)

1. The title of the law
2. The authority for the law (local, state or regional)
3. The effect of the law on installation expansion and activities

B. Illustrate (II A, B, and F)

Land ownership on an area map (refer to page A.1-2) showing military reservations, national forests, wildlife management areas; Bureau of Land Management, Bureau of Reclamation land, Indian reservations, state property, private property and any other ownership. Include lands leased by the Army and the conditions of the lease.

III. Suggested Sources

A. Bureau of Land Management, district office land-use maps

B. Bureau of Land Management, district office recreation maps

C. County clerk's office, zoning maps, laws and land-use regulations

D. State land-use planning office

E. Local chamber of commerce

F. Facilities engineer

Section B.1.b.

Access

I. Purpose

It is essential to know which areas have restricted access at any time during the year, so that sampling stations can be placed elsewhere if at all possible.

II. Provide the Following Information

A. Discuss

1. All areas with permanently restricted access (II A, B and C)

a. Their nature  
b. Whether access can be granted to an ecological survey team

c. Requirements for entry

2. All areas with intermittently restricted access (II A, B and C)

a. Their nature (e.g., hunting, recreation, fishing and seasonal operations)  
b. The period of the restricted access  
c. Whether access can be granted to an ecological survey team during the period in II.A.2.b  
d. Requirements for entry

B. Illustrate on an installation map (refer to page A.1-2)

All areas with restricted access identified in part II.A

III. Suggested Sources

- A. Provost Marshal's office
- B. Facilities engineer
- C. Range control office

Section B.1.c.

Airspace

I. Purpose

It is important to know the restrictions on airspace, because they can impact upon commercial and private aviation.

II. Provide the Following Information

A. Discuss

1. The restricted and dedicated airspace over the installation (III A, B, C and D)
  - a. Restricted airspace identifiers
  - b. The responsible agencies (installation, Federal Aviation Administration, Continental Air Defense Command) and the elevations above mean sea level (MSL) where their responsibilities begin and end
  - c. Joint-use agreements and their conditions
2. The restricted airspaces adjacent to the installation, as in II.A.1.a and b

B. Illustrate the restricted airspaces on an installation or area map (refer to page A.1-2)

III. Suggested Sources

- A. Range control office
- B. Installation airfield office
- C. Local airport office
- D. FAA Air Route Traffic Control Center

Section B.1.d.

Woodland, Wildlife,  
Land and Other  
Management Practices

I. Provide the Following Information

A. Discuss

1. The woodland management plan (II A, D and E)
  - a. The management techniques used (planting, harvesting, others) managed accomplished and value of the timber harvested
    - (1) The basic goals of the plan
    - (2) The size in acres of the area
    - (3) A summary of how the plan is accomplished
      - (a) The species harvested
      - (b) The annual amount in boardfeet
      - (c) Identify any control measures used such as fire protection, open-burning and pesticide applications (details should be provided in Section C.1.b, C.3.b and C.4.a, pages C.1-4, C.3-11 and C.4-1 respectively
2. The fish and wildlife management plan (II B, D and E)
  - a. The management practices and habitat improvement projects accomplished
    - (1) The basic goals of the plan
    - (2) A summary of how the plan is accomplished
      - (a) Agencies accomplishing the tasks
      - (b) Major or unusual stocking programs of the last 10 years, species and numbers stocked, and the apparent success (II I)
      - (c) Areas planted for wildlife forage, and type of crop and acreage involved (II B, D, F and I)
      - (d) The predator control programs, the predators controlled and the annual numbers harvested (II N)
    - (3) Major wildlife or domestic animal kills in the past<sup>1</sup> (II D, E, G, H, J and K)
      - (a) The nature of the kill
      - (b) The cause, if known

<sup>1</sup>The high-water line for a flood that can be expected to occur once every 100 years

- D and E):
3. For the land management plan (II C,
    - a. The maintenance programs
      - (1) Mowing
        - (a) The types of areas mowed and their size in acres
        - (b) The frequency of mowing
      - (2) Irrigation
        - (a) The types and sizes of the areas irrigated
        - (b) The amount of irrigation
    - b. The erosion, flood and siltation control programs
      - (1) The types of areas of high erosion and siltation, including the land below the one percent chance flood line<sup>1</sup> elevation (II M)
      - (2) The control measures taken
    - c. The land leasing policy
      - (1) Number of areas leased and their total acreage
      - (2) The conditions of the lease; e.g., specific practices governing tilling, mowing, fertilizers and pesticides
    - d. Mining or quarrying operation (II C, D, H and K)
      - (1) The method of extraction
      - (2) The supporting operations, such as stone crushing, washing, etc
      - (3) The equipment used
        - (a) The types
        - (b) The number of each type
  4. Other management programs
  5. For all of the above, the responsible agencies or individuals
- B. Illustrate
1. On an installation map (refer to page A.1-2)
    - a. The managed woodlands
    - b. The areas planted
    - c. The areas stocked discussed in I.A.2.a.(2)
    - d. The areas planted for wildlife forage

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<sup>1</sup>The high-water line for a flood that can be expected to occur once every 100 years.

- e. The areas of wildlife or domestic animal kills identified in I.A.2.a.(3)
- f. The major areas mowed
- g. The major areas fertilized
- h. The major areas irrigated
- i. The major areas of high erosion and siltation. Include the one percent chance flood line elevation
- j. The areas leased

II. Suggested Sources

- A. Woodland management plan
- B. Fish and wildlife management plan
- C. Land management plan
- D. Facility engineering directorate
- E. Management agronomist, forester or game warden
- F. Installation conservation and beautification committee
- G. Safety office
- H. Public affairs office
- I. Rod and gun club
- J. Ecological surveys conducted by the CSL/DPG Ecological Research Team or other contractors
- K. Office of the commander
- L. Environmental quality coordinator
- M. Master Plan, one percent chance flood line elevation map
- N. Pest control officer

Section B.1.e.

Clean Air and Federal  
Water Pollution Control  
Acts<sup>1,2</sup>

I. Purpose

This section identifies the need for, and extent of, compliance with the Clean Air Act and the Federal Water Pollution Control Act.

II. Provide the Following Information

A. Discuss (III A and B)

1. Single sources on the installation which emit more than 100 tons per year of a given pollutant (detailed discussion will be given in Section C)
2. Compliance of these sources with the Clean Air Act and state regulations
3. Sources of discharge into navigable waters (detailed descriptions will be given in Section C)
4. Compliance of these sources with the Federal Water Pollution Control Act and state regulations

III. Suggested Sources

- A. Environmental quality coordinator
- B. State regulations

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<sup>1</sup>U.S. Congress, The Clean Air Act, as amended, Public Law (PL) 91-604 (42 U.S. Code 1857 et seq.), 1963.

<sup>2</sup>U.S. Congress, The Federal Water Pollution Control Act, as amended, PL 92-500 (33 U.S. Code 4251 et seq.), 1972.



Section B.2.

CONFLICTS AND/OR  
INCONSISTENT LAND-  
USE PLANS

I. Purpose

This section identifies conflicts which could cause litigation or other problems. Because the problems could vary considerably, there is no guidance other than to check with the environmental quality coordinator, judge advocate and public affairs office.

NOTES

B.2-2

SECTION C. PROBABLE IMPACT OF THE  
PROPOSED ACTION ON THE ENVIRONMENT

I. Purpose

This section provides detailed descriptions of operations that have a potential impact on the environment, either adverse or beneficial. Each of these descriptions will be in a part entitled "Description."

Another part called "Probable Impact" will follow each description. The latter must be ascertained by the environmental scientists, therefore, it is not included here.<sup>1</sup>

1. INSTALLATION - COMMUNITY INTERACTIONS

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<sup>1</sup>In this regard, a valuable tool is available from the Army Construction Engineering Research Laboratory (CERL), which has developed an Environmental Impact Computer System (EICS). Using the data called for in this volume, the system will predict the likely impacts and ways to mitigate these impacts. User manuals have been published for predicting the impact of (1) construction activities (2) mission change, operations and maintenance and training activities and (3) economic changes. Others are planned.

Section C.1.a.

Socio-Economic Factors

I. Purpose

An installation may have an economic effect on the environment in several ways. By offering jobs to the community, the installation may improve the human environment by stimulating the general economic growth of the area. This may result in population increases as people move in to fill the jobs. If uncontrolled, population increase and poorly planned development may cause permanent damage, which may be attributed in part to the installation's economic effects.

II. Provide the Following Information

A. The annual wage totals and numbers employed for military and civilian personnel during the current fiscal year (III A and C)

B. The average military and civilian salary compared to the average county salary (III A, B and C)

C. The number of government housing and trailer units on and off the installation and the percentage of these occupied (III F)

D. The number of military families not living in on-and off-post government housing compared to II C above, and the impact this has on local housing demands (III A, B and F)

E. The post exchange, commissary and club system sale outlets (III G, J and K)

1. Types (e.g., retail outlets, gas stations, beauty shop, etc)
2. Annual sales

F. The local contracts let (III E)

1. Annual dollar value

G. The sum of II.A and II.F less the amount in item II.E.2 compared to the area's net buying income (III B, H and I), as an approximate measure of the total economic effect of the installation on the surrounding area

H. Has the installation stimulated development in the area (III A, B, H and I)?

I. The socio-economic factors in the surrounding area. These factors are identified in III.H (III B, H and I)

III. Suggested Sources

- A. Public affairs office
- B. Local chamber of commerce
- C. Payroll department, comptroller's office
- D. County land office
- E. Procurement directorate
- F. Housing office, logistics directorate
- G. Post exchange manager
- H. Construction Engineering Research Laboratory (CERL), Economic Impact Forecast System (EIFS)
- I. American Statistical Index (ASI)
- J. Commissary manager
- K. Club system manager

Section C.1.b.

Public Health and  
Safety

I. Purpose

Man's environment can impact on him in several ways. This section provides a discussion of some of the more pertinent ways this can happen

II. Provide the Following Information

A. Discuss

1. Industrial health and safety and other accidents
  - a. The high-risk activities (III G)
  - b. Accidents reported in II.C.1 resulting from high-risk activities (III A, B and G)
2. Fire protection and emergency plans (III E and F)
  - a. The types and numbers of fire-fighting vehicles
  - b. The portion of the noninstallation community served by the fire department
  - c. The number of emergencies
  - d. The number of lost property calls
  - e. The cost of the lost property
  - f. The major causes of the lost property calls
  - g. The installation emergency contingency plans (III C and D)
    - (1) The emergencies involved
    - (2) An overview of the responses to each emergency
3. Medical facilities (III I)
  - a. Installation clinics, hospitals, etc. (include veterinary facilities)
  - b. Staff for above
  - c. Ambulances for above
  - d. Types of care available in the above (include number of available beds)
  - e. To whom above care is extended
  - f. Daily average number of patients receiving above care
  - g. The names and operating conditions (kilovolt peak-kvp) of X-ray machines
4. Public health and epidemiology (III H and I)

- a. The diseases for which pets are inoculated
  - b. Which of the above are communicable to man
  - c. The disposition, number and results of suspected rabies cases
  - d. Other threats to human health, such as wildlife vectors, poisonous snakes, etc. (III H through M)
5. Areas of earthquakes, landslides and other types of earth movements (III A, H, N and O)
- a. The type of problem
  - b. The periodicity of the problem
  - c. Protective measures
6. Climate-related hazards are discussed in Section A.2.a., page A.2-1

B. Illustrate

- 1. On an installation map (refer to page A.1-2)
  - a. Fire stations (III F)
  - b. Hospitals and Health Clinics (III I)
- 2. On an area map (refer to page A.1-2)
  - a. Earth movement hazard areas, such as faults and landslides (III N)
  - b. Epicenters of earthquakes in the surrounding area (III N and O)

C. Tabulate

1. A summary of the Installation Accident Experience Report in Table C.1.b-1. "Organization" refers to major organizations including major tenant activities. The safety offices in some smaller installations calculate only the total information for the installation, in which case there will be no need to fill out the "organization" columns. The method of calculating military disabling injuries and accidents per military man days is as follows:

$$\frac{\text{annual number of military disabling injuries/accidents} \times 1,000,000}{\text{No. of military assigned} \times \text{No. of days in the year}}$$

The method of calculating the civilian disabling injuries and accidents per civilian man days worked is as follows:

annual number of civilian disabling  
injuries and accidents x 1,000,000  
annual No. of civilian man days worked

The "target" is assigned by DARCOM, and occasionally a second, more rigorous, target is assigned by the major subordinate command.

2. A table providing the map numbers used to identify the epicenters of the earthquakes in II.B.3, their dates, times and magnitudes on the Richter scale (III N and O)

### III. Suggested Sources

- A. Safety office
- B. Installation annual accident experience report
- C. Installation chemical/accident incident control plan
- D. Installation disaster control plan
- E. Installation Regulation 420-1, Fire Protection and Prevention
- F. Installation fire chief
- G. Pay management branch, comptroller office, for jobs with environmental differential pay
- H. Installation agronomist or game warden
- I. Installation dispensary, doctor and veterinarian
- J. State and county health departments
- K. State wildlife or fish and game departments
- L. Local wildlife disease studies conducted by installation ecological groups or local universities
- M. Wildlife management plan



N. U.S. or state Geological Survey,  
geological maps and seismographic information

O. National oceanographic and atmospheric  
administration reports from the worldwide seismographic  
network

Table C.1.b-1. A Summary of the Installation Accident Experience Report

|                                                               | Organization |  |  |  |  |  |  |                  | Installation Average | Total |
|---------------------------------------------------------------|--------------|--|--|--|--|--|--|------------------|----------------------|-------|
|                                                               |              |  |  |  |  |  |  | Others (Specify) |                      |       |
| Military Disabling Injuries and Accidents Per Military Manday |              |  |  |  |  |  |  |                  |                      |       |
| Civilian Disabling Injuries and Accidents Per Civilian Manday |              |  |  |  |  |  |  |                  |                      |       |
| Costs                                                         |              |  |  |  |  |  |  |                  |                      |       |
| Target                                                        |              |  |  |  |  |  |  |                  |                      |       |

Section C.2.a.

INSTALLATION MISSION  
AND TENANT ACTIVITIES

Manufacturing and  
Industrial  
Operations

I. Purpose

At least three major programs or categories can be identified as industrial functions at DARCOM installations: depots, arsenals, and ammunition plants.

Depots are government-owned, government-operated facilities under the control of DARCOM. Depots serve two distinct functions - storage and repair. Each depot has a primary commodity storage assignment and at least one secondary storage assignment. The repair facilities can best be described as small-lot, assembly-line operations.

U.S. Army arsenals are generally government-owned, government-operated facilities under DARCOM. Since most weapons are now procured from the commercial sector by contract, the arsenals have been assigned a research and development role.

Ammunition plants are government-owned, contractor-operated facilities under the management of DARCOM. Eighty percent of the explosives used by the U.S. Armed Forces are produced in Army ammunition plants.

Depot activities which can be considered as manufacturing operations can include:

Cleaning (acids, alkalies, solvents, abrasives, etc)  
Storage and warehousing  
Drying (drying ovens, etc)  
Preservation (paint, corrosion inhibitors, etc)  
Packaging and issue  
Disposal of waste petroleum products  
Detreading and retreading tires  
Plating operations  
Machining operations  
Testing of repaired items

Arsenal activities include:

Foundry operations  
Machine shop operations  
Heat treating  
Metal finishing  
Weapons repair operations  
Demilitarization of weapons

Ammunition plant activities include:

Manufacture of detonating agents  
Manufacture of priming compositions  
Manufacture of noninitiating high explosives  
Manufacture of propellants  
Manufacture of projectiles  
Manufacture of casings  
Manufacture of chemical agents  
Manufacture of chemicals for use in explosives

Other indirect activities, such as pilot plant operations, may be included as industrial activities. Transportation, utilities usage, and storage operations are also important aspects of the manufacturing process. Because such activities can also occur as installation support activities, they are described in further detail in later sections.

II. Provide the Following Information

A. Discuss (III A through M)

1. Where necessary, the information in the table called for in Part II.C
2. Whether the facilities comply with the applicable air and water quality regulations and standards (Sections A.2.b and A.2.d, pages A.2-6 and A.2-12, respectively).
3. The applicable workroom environment standards and whether the facilities comply (III K)

B. Illustrate, on an installation map (refer to page A.1-2), the buildings and complexes identified in Part II.C

C. Tabulate (III A through M)

1. In Table C.2.a-1, the information on manufacturing operations and industrial activities with

water and air effluents. All pollutants covered by the Federal Hazardous Substances Act and state equivalents must be covered. As a minimum, any process emitting the following pollutants should be identified and included in the table:

|                                   |                |              |
|-----------------------------------|----------------|--------------|
| Particulates                      | Toluene        | Nitrates     |
| Sulfur dioxide                    | Xylene         | Nitrites     |
| Oxides of nitrogen                | Mercaptans     | "Red Water"  |
| Carbon monoxide                   | Chlorine       | Acids:       |
| Ketones                           | Fluorine       | Hydrochloric |
| Esters                            | Fluorides      | Sulfuric     |
| Ethers                            | Bromine        | Phosphoric   |
| Alcohols                          | Iodine         | Acetic       |
| Ammonia                           | Benzene        | Others       |
| Asbestos                          | Enamel         |              |
| Cyanides                          | Laquer         |              |
| Perchloroethylene                 | Stains         |              |
| Trichloroethylene                 | Varnishes      |              |
| Methylchloroform                  | Undercoatings  |              |
| Mineral spirits                   | Liquid styrene |              |
| Naphtha                           | Adhesives      |              |
| Halogenated hydrocarbons          |                |              |
| Nonmethane hydrocarbons           |                |              |
| Organic and inorganic sulfides    |                |              |
| Beryllium or its compounds        |                |              |
| Lead or its compounds             |                |              |
| Mercury or its compounds          |                |              |
| Pesticides or herbicides          |                |              |
| Benzo-A-Pyrene, other carcinogens |                |              |

The product or material produced at the plant is entered in Item B. The process used in manufacturing the product, or in some phase of the manufacturing procedure, should also be identified. For example, in the manufacture of TNT, a particular process such as the Sellite process would be identified. Note that the form has multiple columns so that all processes used in manufacturing the product can be identified and emissions from each process inventoried. The equipment name used in the process is identified in Item C (primary nitrator in the manufacture of TNT, for example).

One operation may be cleaning and preservation of repaired and stored items. Such activities normally involve the use of solvents or solvent-based material, which can have a significant environmental effect. The percent solvent of the material as it is applied is required for completion of Item E. For example, if

2 gallons of lacquer consisting of 50 percent solvent by volume is mixed with 1 gallon of lacquer which is 100 percent solvent by volume, the percent solvent as applied by spray coating is:

$$\frac{2 \text{ gal} \times 0.5 + 1 \text{ gal} \times 1.0}{3 \text{ gal}} = \frac{2}{3}$$

or 67 percent by volume.

Use the following code for Item F, a copy of the code should follow the table

Air

1. Uncontrolled or none
2. Settling chamber
3. Cyclone
4. Multicyclone
5. Other centrifugal type
6. Packed or spray tower without water
7. Venturi scrubber
8. Oil filter
9. Fabric filter
10. Afterburner
11. Catalytic burner
12. Electrostatic precipitator
13. Other (identify)

Water

14. Uncontrolled or none
15. Aerator
16. Carbon absorber
17. Chemical lead system
18. Chlorinator
19. Clarifier
20. Flocculator
21. Ion exchanger
22. Magnetic separator
23. Oil skimmer
24. Reverse osmosis
25. Sludge dewatering device
26. Vacuum filters
27. Trickling filter
28. Settling pond
29. Other (identify)

The average collection efficiency should account for downtime of the devices. For example, if the known collection efficiency of the device is 90 percent, but

the device operated only during 60 percent of the total time the process was emitting, the average annual collection efficiency is  $0.90 \times 0.60$ , or 54 percent.

Items G through M describe stacks or vents which handle the exhaust or emissions from the process. The height of the tallest structure or obstruction in the vicinity of the stack (within a horizontal distance equivalent to 10 stack heights) should be entered into Item L. The tallest structure may or may not be the building housing the process reported upon.

Item N refers to liquid effluents. Destinations include sanitary sewer, bodies of water and tracks of land (settling ponds, storm sewers, etc., are generally intermediate destinations). The inventory of waste disposal operations is discussed in Section C.3.b, page C.3-11.

## II. Suggested Sources

- A. Environmental quality coordinator
- B. Contents of environmental quality coordinator's file, file symbol 1512, AR 340-18-15
- C. Installation safety office
- D. Building directors or superintendents
- E. U.S. Army Environmental Hygiene Agency reports
- F. Air and water pollution control reports
- G. Ecological surveys conducted by the Ecological Research Team, Chemical Systems Laboratory/Dugway Proving Ground, local university teams or contractors
- H. EPA Form 7550-9 (-93). Application for Permit to Discharge and its state and local equivalents
- I. Report of the DARCOM Ad Hoc Committee on environmental instrumentation

J. Compilation of Air Pollution Emission  
Factors, AP-42

K. Threshold Limit Values for Chemical  
Substances and Physical Agents in the Workroom Environ-  
ment, American Conference of Governmental Industrial  
Hygienists

L. Computerized Environmental Legisla-  
tive Data System-CELDS (at CERL)

M. Pollution Estimation Factors (at  
CERL)



Table C.2.a-1. Manufacturing Operations and Industrial Activities Information

|                                                                                                                           | Plant Identification (Building No.) |              |              |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------|--------------|
| A. Responsible Agency                                                                                                     |                                     |              |              |
| B. Product or Materials                                                                                                   |                                     |              |              |
| C. Equipment Name                                                                                                         |                                     |              |              |
| D. Normal Operating Schedule (days/yr)                                                                                    |                                     |              |              |
| E. Total Quantity of Material Processed, Handled, Collected or Applied (units should be metric)                           | Amount _____                        | Amount _____ | Amount _____ |
|                                                                                                                           | Units _____                         | Units _____  | Units _____  |
| F. Emission Control Devices Serving the Equipment of Item C. The Annual Average Overall Collection Efficiency, (if known) | _____ %                             | _____ %      | _____ %      |
| G. Height of Stack                                                                                                        | _____ m                             | _____ m      | _____ m      |
| H. Inside Diameter at Top of Stack                                                                                        | _____ m                             | _____ m      | _____ m      |
| I. Exit Gas Temperature                                                                                                   | _____ °C                            | _____ °C     | _____ °C     |
| J. Volume Flow Rate at the Temperature Specified in Item I                                                                | _____ m/min                         | _____ m/min  | _____ m/min  |
| K. Number of Stacks with the Identical Specifications                                                                     |                                     |              |              |
| L. Height of Tallest Building (obstruction) in Meters and Distance from Stack                                             | _____ m                             | _____ m      | _____ m      |
|                                                                                                                           | _____ km                            | _____ km     | _____ km     |
| M. List Other Equipment That Exhausts any Part of its Effluent Gas Through This Stack(s).                                 |                                     |              |              |
| N. Ultimate Destination of Liquid Effluent                                                                                |                                     |              |              |

Section C.2.b.

Laboratory Testing  
and Development

I. Purpose

Emissions from laboratory venting systems and the chemical waste products from a laboratory can be so varied that it is virtually impossible to provide detailed guidelines or inventory forms considering all possible environmental insults from laboratory operations. Nevertheless, major laboratory activities and processes and the types of chemicals and biological materials which are routinely discharged or may possibly be discharged in laboratory operations must be inventoried because of their potential for environmental effects.

II. Provide the Following Information

A. Discuss

1. The general types of research involved  
a. Where necessary, the tabulated information

B. *Illustrate on an installation map*  
(refer to page A.1-2)

1. The building or complexes identified  
in II C.1

C. Tabulate

1. Laboratory testing and development information. Use the same format as in Table C.2.a-1

III. Suggested Sources

A through M identical to those in Section C.2.a, pages C.2-5 and C.2-6

Section C. 2.c.

Open-air Test Ranges and Sites

I. Purpose

Open-air testing can cause considerable, short and long-term damage to the environment. Noise will be discussed in Section C.4.d.(3) page C.4-9.

II. Provide the Following Information

A. Discuss

1. Overall objective of testing; e.g., generate firing tables, acceptance testing, etc
2. For air, land and water vehicular testing (III A through E)
  - a. The types of vehicles tested
  - b. The responsible testing agencies
  - c. The number of each type tested per year
  - d. The areas where tested
    - (1) Identification
    - (2) Size
  - e. The number of: annual take-off and landing cycles, miles traveled or hours utilized as appropriate
  - f. Whether testing is conducted on unimproved areas, and if so, the trafficability of the terrain (ability to withstand use) to include soil strength, obstacles, climatic conditions and slope
  - g. The constraints placed on testing to mitigate undesirable environmental impact (e.g., weather conditions that would prohibit testing)
  - h. The pertinent regulations, standing operating procedures (SOPs) and standards
3. For stationary equipment (III A, B, D and E)
  - a. The type of equipment tested
  - b. The responsible testing agencies
  - c. The number of each type tested per year
  - d. The areas where tested
    - (1) Identification
    - (2) Size
  - e. The annual hours used and amounts and types of fuel consumed, the area required for each unit, as appropriate

- f. The pertinent regulations, SOPs and standards
- g. The constraints placed upon testing to mitigate undesirable environmental impacts
  - (1) Whether the tests require physical destruction of habitat
- 4. For conventional weapons systems, agents and pyrotechnics (III A through E)
  - a. The responsible testing agencies
  - b. The types of weapons tested
  - c. The number of each type tested per year, and the maximum daily test rate, including, as appropriate, the number of rounds fired
  - d. The combustion products resulting (III G and H)
  - e. The areas where tested
    - (1) Identification
    - (2) Size
  - f. The extent of cratering upon impact of the round
  - g. What, if anything, is policed (recycled)?
  - h. The pertinent regulations, SOPs and standards
  - i. The constraints placed upon testing to mitigate undesirable environmental impacts
- 5. For electromagnetic forces (EMF) testing (III A, B, D, E and I):
  - a. The EMF frequency if the item is operating in the VHF, UHF or SHF ranges (1 to 30 gigahertz)
  - b. The distance from the EMF source at which the power density is  $10 \text{ mW/cm}^2$
  - c. The rate of rotation of the signal for a horizontal sweep
  - d. The duration of each pulse
  - e. The frequency of each pulse (pulses per second)
  - f. The responsible testing agency
  - g. The schedule of testing, including number of annual tests
  - h. The areas where tested
  - i. The constraints placed on testing to mitigate undesirable environmental impacts
  - j. The pertinent regulations, SOPs and standards
  - k. Limited occupancy zones (III C)
    - (1) Location

- (2) Nature of the limitation
- 6. For others (e.g., X-rays and lasers)
  - a. The basic information required as

above

- b. Information which would be specific for the types of testing conducted

- B. Illustrate (sources as above)

- 1. The locations of all test ranges and sites on an installation map (refer to page A.1-2)

- C. Tabulate

- 1. In Table C.2.c-1, as appropriate, the pollutants generated per year (sources as above plus III F, G and H) during the testing of vehicles, stationary equipment, conventional weapons systems and others. "Item" refers to specific parts of the weapons system such as motor propellant, rocket launcher, etc

### III. Suggested Sources

- A. Materiel test directorate (test plans, reports of tests, operations plans, etc)

- B. Range control office

- C. Safety and surety office

- D. Environmental quality coordinator

- E. Contents of environmental quality coordinator's file, file symbol 1512, AR-340-18-15

- F. Compilation of Air Pollution Emission Factors, AP-42

- G. TM 9-1300-214, Military Explosives, November 1967

- H. Minutes of the Fifteenth Explosives Safety Seminar, Vol II, DOD Explosives Safety Board 1973

- I. Electromagnetic Compatibility Analysis Center, Annapolis, MD

Table C.2.c.c.-1. Annual Amounts of Pollutants Generated During Open-Air Testing at the Installation

| System | Item | Particulates | Sulfur Oxides | Carbon Monoxide | Hydrocarbons | Nitrogen Oxides | Aldehydes | Others (Specify) |
|--------|------|--------------|---------------|-----------------|--------------|-----------------|-----------|------------------|
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |
|        |      |              |               |                 |              |                 |           |                  |

Section C.2.d.

Storage and Handling  
of Toxic and Hazardous  
Materiel

I. Purpose

There are many types of storage activities which have a potential for having an environmental impact. Spills and leaks of liquids or gasses have the most obvious potentials for damage. A less obvious problem is simply the vast size of the area set aside for storage on some installations. Such areas are unavailable for most other types of activities.

II. Provide the Following Information

A. Discuss

1. For chemical and biological agents, explosives and pyrotechnics (III A through F and L, M and N)

- a. Reason stored
- b. Whether there is a passive or other type of alarm system for the stored agents identified in Table C.2.d-1
- c. The responsible agency
- d. Whether spills or leaks have occurred in the past, and if so, when and under what circumstances
- e. A brief summary of the safety program, to include shipping and storage
- f. The references for the regulations regarding shipping and storage procedures (III O)
- g. A summary of hazard-analysis studies
- h. Estimate of container durability

2. For radioactive materiel (III A, C, D, F and G):

- a. Type of materiel stored
- b. Reason stored and responsible agency
- c. Brief summary of the safety program (III, F, H and I)
- d. Definitions of criteria or prevention of population and occupational exposure (III J and K)
- e. Estimate of container durability
- f. The references for the regulations regarding shipping and storage procedures (III O)

3. For petroleum storage tanks (both fixed and collapsible) with a capacity greater than 10,000 gallons (III A and C):

- a. Whether the tanks identified in Table C.2.d-3 are above or below ground
- b. If tank is above ground - whether it is diked to fully contain the petroleum in the event of a leak
- c. Reference fire control and other safety procedures
- d. The responsible agency
- e. The references for the regulations regarding shipping and storage procedures (III 0)

4. For sewage or industrial waste sites (III A, C, F and G):

- a. Whether the waste is solid, semi-solid or liquid
- b. How the waste is stored or disposed of (in tanks, drums or lagoons, etc.)
- c. Whether the site is diked to contain leaks
- d. The construction material of the lagoon, whether it is lined to prevent seepage, and if so, with what and is it effective?
- e. The responsible agency
- f. The references for the regulations regarding shipping and storage procedures (III 0)

5. For other material (pesticides, boiler blowdown chemicals, chlorine, paints, other chemicals):

- a. Intended use
- b. The type of material and its quantity
- c. Whether it is water soluble
- d. The precautions taken to prevent leaching into ground water or run-off into streams
- e. The responsible agency
- f. The references for the regulations regarding shipping and storage procedures (III 0)

6. The sizes of the above storage areas (III A)

B. Illustrate

1. On an installation map (refer to page A.1-2), sites of storage operations discussed above and all associated loading areas and maintenance and re-work areas. Also transportation routes normally followed.



### C. Tabulate

1. Storage information in Tables C.2.d-1, -2 and -3 should be referenced and summarized in the text. Generally, facility will have several storage types; therefore "Igloo," "Magazine" and "Open" in Table C.2.d-1 refer to the types of storage in the storage facility.

2. Table C.2.d-2, "Radiations Emitted" refers to alpha, beta and gamma particles. Also their energy levels should be included, using the following scale: less than 0.2 million electron volts (Mev), very low energy; 0.2-1 Mev. low energy; 1 through 3 Mev, high energy; over 3 Mev, very high energy.

3. In Table C.2.d-3, "Tank/Bldg/Map Number" refers to the method of identification (Tank/Bldg is preferable) used in the figure called for above; the column "Vapor Loss Recovery" refers to procedures used to control or recover vapor losses.

The control method generally used with fixed roof or underground tanks is to collect the vapor from the tanks and send it to a vapor recovery plant, which in turn uses absorption or compression methods to reduce vapor losses. Some tank trucks used in filling underground tanks at service stations and airfields have arrangements for recycling vapors into the truck tank as the underground tank is filled.

### III. Suggested Sources

- A. Facilities engineering directorate
- B. Provost Marshal's office
- C. Technical support directorate
- D. Ammunition storage branch, logistics  
directorate
- E. Explosive ordnance detachment
- F. Safety office
- G. Depot operations
- H. Title 10, Code of Federal Regulations, parts 20, 40, 50 and 70

- I. Fuels and Material Licensing
- J. Radiological Health Handbook, Public Health Service
- K. Publications 6 and 7, International Committee on Radiological Protection
- L. DARCOM Installation Summary-102 for the installation
- M. Department of the Army, TM 3-215, Military Chemistry and Chemical Agents, December 1963
- N. National Institute of Health, Bio-hazards Safety Guide, 1974
- O. Computerized Environmental Legislative Data System · CELDS (at CERL)

Table C.2.d.-1. Weapons/Agent Storage Inventory

| Type/Item                          | Storage Unit        | Agent Type (if any) | Armed or Unarmed | Average and Maximum Number of Units Stored |          |                       |
|------------------------------------|---------------------|---------------------|------------------|--------------------------------------------|----------|-----------------------|
|                                    |                     |                     |                  | Igloo                                      | Magazine | Open Storage Facility |
| 40 mm Cartridge                    | Boxes               |                     |                  |                                            |          |                       |
| 60 mm Cartridge                    | Boxes               |                     |                  |                                            |          |                       |
| Grenades Type                      | Boxes               |                     |                  |                                            |          |                       |
| Fuses/Bursters                     | Boxes               |                     |                  |                                            |          |                       |
| 105 mm Artillery Shell             | Pallets             |                     |                  |                                            |          |                       |
| 155 mm Artillery Shell             | Pallets             |                     |                  |                                            |          |                       |
| 8-in Artillery Shell               | Pallets             |                     |                  |                                            |          |                       |
| MC-1 Bombs                         | Pallets             |                     |                  |                                            |          |                       |
| Rockets 155 M-55 Other             | Pallets             |                     |                  |                                            |          |                       |
| Warheads Sargeant Littlejohn Other | Shipping Containers |                     |                  |                                            |          |                       |
| Spray Tanks TMU-288 Other          | Tanks               |                     |                  |                                            |          |                       |
| 1- Ton Container                   | Containers          |                     |                  |                                            |          |                       |

Table C.2.d-2. Radioisotopes Stored in the Installation

| Storage Location | Isotope | Amount | Storage Unit | Half Life (III J) | Period Stored | Radiation Emitted (III J) | Energy Levels (III J) |
|------------------|---------|--------|--------------|-------------------|---------------|---------------------------|-----------------------|
|                  |         |        |              |                   |               |                           |                       |

Table C.2.d-3. Petroleum Product Storage Inventory for the Activity

| Tank/<br>Bldg/<br>Map No. | Tank<br>Type <sup>a</sup> | Tank<br>Capacity<br>(Liters) | Liquid<br>Stored | Vapor Loss<br>Recovery<br>(if any) |
|---------------------------|---------------------------|------------------------------|------------------|------------------------------------|
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |
|                           |                           |                              |                  |                                    |

<sup>a</sup>Fixed roof, floating roof (single deck, double deck), covered floating roof, internal floating cover, variable vapor space, pressure (high, low), underground, other (specify)

Section C.2.e.

Troop Training Exercises

I. Purpose

Large-scale training exercises conducted on unimproved land can cause considerable physical damage from vehicle traffic and campsite activities. Permanent quartering and routine feeding of troops involved in training activities and the heating, water supply and waste disposal associated with such permanent structures are considered normal support activities and are covered in Section C.3.b., page C.3-13. Noise evaluation is discussed in Section C.4.d., page C.4-9.

II. Provide the Following Information

A. Discuss (III A, B and E)

1. The types of exercises
2. The troops involved in each exercise and their numbers
3. The types and extent of troop activities with a potential for environmental effects (III C)
  - a. Physical destruction
  - b. Attendant safety hazards (III D)
    - (1) Emplacement construction
    - (2) Shelling and explosives
    - (3) Amounts and types of chemical agent released as in riot control training
    - (4) Is live fire used?
    - (5) Others
4. The number and types of vehicles involved
5. The types and extent of vehicle activities with a potential for environmental effects (III C)
  - a. Physical destruction
    - (1) Fouling of waterways by crossings
    - (2) Temporary construction such as bridges
    - (3) Habitat destruction as in deserts
    - (4) Others
  - b. Exhaust emissions (covered in Section C.3.c., page C.3-25, which provides further details)
6. The number and size of campsites and other sites

7. The type and extent of campsite activities with a potential for environmental effects (III C)

- a. Physical destruction
- b. Waste disposal
- c. Cooking

8. Reclamation and mitigating efforts practiced (III B)

- a. Habitat reclamation
  - (1) Procedures
  - (2) Governing regulations
- b. Recovery of expended rounds and other discarded equipment
  - (1) Procedures
  - (2) Governing regulations
- c. Special conditions limiting exercises to avoid adverse environmental impact

B. Illustrate (III A and B)

On an installation or area map (refer to page A.1-2), as appropriate, the location or routine troop exercises, off road vehicular routes, cantonments and emplacements

### III. Suggested Sources

- A. Environmental quality coordinator
- B. Planning office
- C. Ecological surveys conducted by ecological research teams or local contractors
- D. Safety office
- E. National Guard, ROTC, Army reserve components and active duty components

Section C.3

SUPPORT ACTIVITIES

a. Utilities

I. Purpose

The installation use of utilities is an important and often ignored aspect of the demands that the installation places on the environment. Whether the utilities are provided by government facilities or by contract, resources are consumed and pollutants are released. The extent of the current and future demand also influences decisions regarding expansion of power plants, reservoirs, gas mains and sewage systems. If large increases in demand result from expansion of current facilities, the overload may result in service interruptions.

II. Provide the Following Information

A. Discuss

1. Fossil fuels

a. The major types of fossil fuels consumed for other than transportation and their use (III A, B, C, D, G, H, I and K)

b. The total number of boilers, the number of boilers with a capacity in excess of  $1.0 \times 10^6$  Btuh (gram-calories/hour), and the number of boilers with a capacity in excess of  $10.0 \times 10^6$  Btuh (III A, B, C, D, H, I and K)

c. The identity of the fossil fuel supply companies (III A, E and F)

2. Boiler blowdown

The number of boilers where blowdown is released to other than the sanitary sewer (III A, D, H, I and K)

3. Air conditioning

a. The number of cooling towers (III A, B, C, D, H, I and K)

b. The quantities of algicide added which could enter other than the sanitary sewer by flushing the lines (III A, B, C, D and K)

4. Electric power

a. The installation annual consumption in kilowatt-hours (III A, D, H, I and K)

b. The name of the utility company supplying the power (III A, E and F)



- c. The amount in II.A.4.a as a percentage of the total output of the utility company identified in II.A.4.b (III A, E, F and G)
- 5. Water supply
  - a. The average daily water demand in million gallons per day (MGD) (III A, B and C)
  - b. The percentage of water supply from installation sources (III A, B and C)
  - c. The name of the utility company supplying remainder of installation water requirements (III A, E and F)
  - d. The percentage of the total amount available from the installation sources of the total output of the utility identified in II.A.5.b consumed by the installation (III A, E, F and G)
  - e. The installation sources of water (wells, reservoirs, rivers, etc.) (III A, B, C, and K)
  - f. The identity of the sources which supply more than 5 MGD (III A, B, C and K)
- 6. Communications (III M and N)
  - a. The number of commercial lines connected to the installation
  - b. The numbers of A'ITOVON, AUTODIN and TWX lines the installation uses
  - c. The size of the installation internal telephone system
  - d. The identification of any microwave (VHF, UHF and SHF) equipment. Provide the information required in Section A.2.c, page A.2-10, Part II.A.2.c

B. Illustrate

- 1. On an installation or area map (refer to page A.1-2), as appropriate, the location of
  - a. The wells, rivers, reservoirs, etc., serving as sources of water
  - b. The water treatment plants
  - c. The boiler plants with a capacity greater than  $10 \times 10^6$  Btuh and boiler plants with boiler blowdown entering other than the sanitary sewers
  - d. The sewage treatment plants

C. Tabulate

- 1. Information on fossil fuels used in heating, cooling and power, in Table C.3.a-1 (III A through K)

2. Information on each boiler blowdown not entering the sanitary sewer, in Table C.3.a-2 (III A, D, H, I and K)

3. Information on each water treatment plant, in Table C.3.a-3 (III A, B, C, E, F, G and K)

Table C.3.a-3 is an example for describing waste water treatment facilities, treatment capacity, sludge generation, and wastewater discharge information. The disposal of sludge is considered under Section C.2.d, page C.2-14. Item B, "Status", refers to standby or active. Items J through N refer to the treatment categories. Primary treatment includes: (Item K) grit chambers, screens, settling tanks and basin/lagoon. Secondary treatment includes activated sludge, digester, trickling filter and settling tank. Tertiary or advanced treatment includes chemical clarification, microscreening, carbon absorption, air stripping, reverse osmosis and electrodialysis. Item P refers to the liquid waste such as filter backwash. Receiving bodies include sanitary sewer, deep well, septic tank, lagoon/pond and surface waters. Identify the receiving body.

4. The effectiveness of the facility. The effectiveness of water treatment facilities is judged by the water quality before and after treatment. An example for defining water quality is shown in Table C.3.a-4.

### III. Suggested Sources

- A. Facilities engineering directorate
- B. DA Form 2869, Command Analysis of Utilities Operations
- C. DA Form 2788. Facilities Engineering Technical Data
- D. EPA Form 7550-9 (-93), application for Permit to Discharge and its state and local equivalents
- E. Contract suppliers
- F. Utility companies
- G. Accounting office
- H. Air and water pollution control reports

- reports
- I. Army Environmental Hygiene Agency
  - J. Compilation of Air Pollution Emission Factors, AP-42 EPA
  - K. Contents of environmental quality coordinator's pollution control file, file symbol 1512, AR 340-18-15
  - L. District Engineer, regional office results on flow rates
- directorate
- M. Communications division, logistics
  - N. Communications detachment
  - O. Pollution Estimation Factors (at CERL)

Table C.3.a-1. Fossil Fuels Consumed on the Installation for Heating and Power

| Fuel Type             | Fuel Grade | Annual Amount Consumed | Major Uses | Annual Amount of Pollutants Released |               |                 |              |                 |
|-----------------------|------------|------------------------|------------|--------------------------------------|---------------|-----------------|--------------|-----------------|
|                       |            |                        |            | Particulates                         | Sulfur Oxides | Carbon Monoxide | Hydrocarbons | Nitrogen Oxides |
| Fuel Oil              |            |                        |            |                                      |               |                 |              |                 |
| Propane               |            |                        |            |                                      |               |                 |              |                 |
| Natural Gas           |            |                        |            |                                      |               |                 |              |                 |
| Coal                  |            |                        |            |                                      |               |                 |              |                 |
| Wood waste            |            |                        |            |                                      |               |                 |              |                 |
| Residual or waste oil |            |                        |            |                                      |               |                 |              |                 |
| Other solid waste     |            |                        |            |                                      |               |                 |              |                 |
| Others                |            |                        |            |                                      |               |                 |              |                 |

Table C.3.a-2. Boiler Blowdown Not Entering the Sanitary Sewer

| Boiler Building Number/Name | Daily Blowdown Released (gal/day) | Annual Amount of Pollutants |                          |                                     | Receiving Body/ Drainage System |
|-----------------------------|-----------------------------------|-----------------------------|--------------------------|-------------------------------------|---------------------------------|
|                             |                                   | Caustic Soda (lb/yr)        | Sodium Phosphate (lb/yr) | Extract Quebracho (lb/yr)<br>Others |                                 |
|                             |                                   |                             |                          |                                     |                                 |

Table C.3.a-3. Water Treatment Facilities on the Installation

|                                                |                                           |                                           |                                           |
|------------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| A. Building Location/<br>Identification Number |                                           |                                           |                                           |
| B. Status                                      |                                           |                                           |                                           |
| C. Use(s)                                      |                                           |                                           |                                           |
| D. Total Design Capacity<br>(MGD)              |                                           |                                           |                                           |
| E. Average Flow Into Facility<br>(MGD)         |                                           |                                           |                                           |
| F. Facility Annual Average<br>Discharge (MGD)  |                                           |                                           |                                           |
| G. Facility Maximum Discharge<br>(MGD)         |                                           |                                           |                                           |
| H. Average Treated (percent)                   |                                           |                                           |                                           |
| I. BOD <sup>a</sup> Removal (percent)          |                                           |                                           |                                           |
| J. Highest Level of Treatment                  |                                           |                                           |                                           |
| K. Equipment Type                              |                                           |                                           |                                           |
| L. Average Discharge                           | Amount _____<br>Units/Time<br>_____/_____ | Amount _____<br>Units/Time<br>_____/_____ | Amount _____<br>Units/Time<br>_____/_____ |
| M. Maximum Discharge                           | Amount _____<br>Units/Time<br>_____/_____ | Amount _____<br>Units/Time<br>_____/_____ | Amount _____<br>Units/Time<br>_____/_____ |

<sup>a</sup>biochemical oxygen demand

(continued)

Table C.3.a-3. Water Treatment Facilities on the Installation

| N. Sludge Generated                            | Amount     | Amount     | Amount     |
|------------------------------------------------|------------|------------|------------|
|                                                | Units/Time | Units/Time | Units/Time |
|                                                | ____/____  | ____/____  | ____/____  |
| O. Annual Amounts of Filter Backwash Additives |            |            |            |
| Sodium silica fluoride (units/year)            |            |            |            |
| Hydrated lime (units/year)                     |            |            |            |
| Alum sulfate (units/year)                      |            |            |            |
| Chlorine (units/year)                          |            |            |            |
| P. Number of Discharge Points                  |            |            |            |
| Q. Waste Receiving Body                        |            |            |            |

(concluded)

Table C.3.a-4. Example Water Quality Form

|                                                                                                                                                                                                                                                                                                                                                                                                                    | Before Treatment | After Treatment |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|
| Facility Name/Number<br><br>General Frequency of Sampling<br><div style="text-align: center;"> <math>\frac{\text{Units/}}{\text{Time}}</math> </div><br>Color (units)<br>pH (units)<br>Turbidity (Jackson units)<br>Temperature (°C)<br>Alkalinity (mg/l)<br>Total Dissolved Solids, TDS (mg/l)<br>Biochemical Oxygen Demand, BOD (mg/l)<br>Chemical Oxygen Demand, COD (mg/l)<br>Total Organic Carbon, TOC (mg/l) |                  |                 |
| Chemical Constituents (mg/l)<br><br>Ammonia<br>Antimony<br>Arsenic<br>Barium<br>Beryllium<br>Boron<br>Cadmium<br>Chlorine<br>Chromium<br>Copper<br>Iron<br>Lead<br>Manganese<br>Mercury<br>Molybdenum<br>Phosphorus<br>Selenium<br>Uranyl Iron<br>Vanadium<br>Zinc<br>Nitrates and Nitrites<br>Sulfate and Sulfide                                                                                                 |                  |                 |

(continued)



Table C.3.a-4. Example Water Quality Form

|                                        | Before Treatment | After Treatment |
|----------------------------------------|------------------|-----------------|
| Organic Chemicals (mg/l)               |                  |                 |
| Carbon Chloroform Extract (CCE)        |                  |                 |
| Methylene Blue Active Substances       |                  |                 |
| Cyanide                                |                  |                 |
| Oil and Grease                         |                  |                 |
| Pesticides and Herbicides<br>(specify) |                  |                 |
| Nitritotriacetic Acid (NTA)            |                  |                 |
| Orthonitrochlorobenzene (ONCB)         |                  |                 |
| Polychlorinated Biphenyls (PCB)        |                  |                 |

(concluded)

Section C.3.b.

Waste Disposal

I. Purpose

Burning (in open air) or incineration (in an enclosed high-temperature burner) of solid wastes can release large amounts of ash and fumes into the air. Landfill operations (where solid waste is dumped and buried) can breed pests, produce offensive odors, and pollute streams and wells, if landfills are not properly managed. Sewage treatment operations have the potential for pollution of surface or ground waters.

II. Provide the Following Information

The suggested sources for the following sections [C.3.b.(1) through C.3.b.(5)] are identical and therefore are listed below only and not in each section.

III. Suggested Sources

- A. Facilities engineering directorate
- B. Post engineer
- C. Civilian waste disposal contractors
- D. Explosive Ordnance Detachment
- E. Army Environmental Hygiene Agency reports
- F. Compilation of Air Pollutant Emission Factors, AP-42
- G. Installation depot operations, property disposal office
- H. Contents of environmental quality coordinator's pollution control file, file symbol 1512, AR 340-18-15
- I. Incinerator data information only for state department of health division of air quality control
- J. EPA Form 7550-9 (-93), Application for Permit to Discharge, and its state and local equivalents

- K. Range control office
- L. Installation fire department
- M. Game warden or agronomist
- N. Officers wives' club
- O. Boy or Girl Scouts
- P. DA Form 5126, Refuse and Salvage

Collection

Q. EPA Administrator's Decision Statement  
Number 5, Feb 6, 1973

R. CFR, 1975 Title 40: Protection of the  
Environment, Subchapter H: Ocean Dumping, Parts 220-227

S. Computerized Environmental Legislative  
Data System-CELDS (at CERL)

T. Pollution Estimation Factors (at CERL)

Section C.3.b.(1)

Landfill Operations, Deep-  
well Disposal and Ocean  
Dumping

I. Provide the Following Information

A. Discuss

1. For each active and inactive site (III A, B, C, E, G and H)
  - a. Any information in Table C.3.b-1 requiring further elaboration
  - b. Means of controlling vermin and odors
  - c. Efficacy of above
2. The disposal location and amounts (if the location is not the sanitary landfill) of solid waste from the installation's sewage treatment plant, fly ash from incinerators and cinders from coal burning power plants, incinerators, etc. (III A, B, C and E). If this falls more properly in one of the other subsections of Section C.3.b, include it there rather than here.
3. Appropriate regulations and SOP's [III A, B, H, Q, (deep wells) R and S]
4. The contractor's identity and disposal location for any contracted waste removal
5. Equivalent information on ocean dumping (III R)

B. Illustrate (sources as above)

The locations of all active and inactive landfill operations and dumps on an installation map

C. Tabulate information on the landfill operations, Table C.3.b-1 (III P and T)

Item A includes sanitary landfill, deep well, open dump. Items N to P describe sanitary landfill operations

Table C.3.b-1. Installation-Operated Dumping Operations

| Identification and Operation Data                       |                                             |                                             |
|---------------------------------------------------------|---------------------------------------------|---------------------------------------------|
| A. Type                                                 |                                             |                                             |
| B. Responsible Agency                                   |                                             |                                             |
| C. Status                                               |                                             |                                             |
| D. Size                                                 | Area ____ hectares<br>Depth ____ m          | Area ____ hectares<br>Depth ____ m          |
| E. Date Opened                                          | ____ Year                                   | ____ Year                                   |
| F. Actual or Proposed Closing Date                      | ____ Year                                   | ____ Year                                   |
| G. General Waste<br>Paper<br>Cardboard<br>Garbage, etc. | Amount _____<br>Units/Time _____<br>/ _____ | Amount _____<br>Units/Time _____<br>/ _____ |
| H. Woodwaste                                            | Amount _____<br>Units/Time _____<br>/ _____ | Amount _____<br>Units/Time _____<br>/ _____ |
| I. Metals                                               | Amount _____<br>Units/Time _____<br>/ _____ | Amount _____<br>Units/Time _____<br>/ _____ |
| J. Organic Chemicals                                    | Amount _____<br>Units/Time _____<br>/ _____ | Amount _____<br>Units/Time _____<br>/ _____ |
| K. Pathogenic Materials                                 | Amount _____<br>Units/Time _____<br>/ _____ | Amount _____<br>Units/Time _____<br>/ _____ |

(continued)

Table C.3.b-1. Installation-Operated Dumping Operations

| Identification and Location Site                      |                                    |                                    |
|-------------------------------------------------------|------------------------------------|------------------------------------|
| L. Sewage Sludge                                      | Amount<br>Units/Time<br>_____/____ | Amount<br>Units/Time<br>_____/____ |
| M. Other Waste                                        | Amount<br>Units/Time<br>_____/____ | Amount<br>Units/Time<br>_____/____ |
| N. Average Depth<br>of Sequential<br>Compacted Refuse | _____m                             | _____m                             |
| O. Average Depth<br>of Sequential<br>Earth Overcover  | _____m                             | _____m                             |
| P. Frequency of<br>Compacting<br>Operations           | _____Times/Unit<br>Time            | _____Times/Unit<br>Time            |

(concluded)

Section C.3.b.(2)

Incineration and  
Open Burning

I. Provide the Following Information

A. Discuss

1. The name of the responsible organization
2. The make, model, and year of equipment (III A, B, E, H, I and J)
3. Special precautions taken with biological or chemical wastes (III A, B and D)
4. Proposed changes or modifications to be operational within the next 12 to 18 months (III A, B and H)
5. The amount (weight or acreage), type and sources of material burned and reasons open burning was the method of disposal chosen (III A, B, D, E, G, H, K, L and M)
6. The frequency of burning
7. The material used for igniting the fire
8. The restrictions on burning (III S)
9. The appropriate regulations and SOP's
10. Future plans (III A, B, E and H)

B. Illustrate (sources as above)

The location of all installation incineration and open burning sites on an installation map (refer to page A.1-2)

C. Tabulate

Information pertaining to incineration and open burning on the installation, in Table C.3.b-2 (III A, B, E, F, H, I and J)

If no other data are available for item D, in Table C.3.b-2, use a factor of 2.23<sup>1</sup> tons of grass, etc., per acre for open burning. Item E includes single chamber, multiple chamber, flue fed, controlled air, multiple hearth, conical (teepee), and liquid waste. Item I includes wetted baffles, scrubber, cyclone or multicyclone, electrostatic precipitation and fabric filter.

<sup>1</sup>Odom, E.P. Fundamentals of Ecology, W.B. Saunders Co. 1971. (Table 2-2).

Table C.3.b-2. Incineration and Open Burning on the Installation

| Identification and Location                         |                                                                               |                                                                               |  |
|-----------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--|
| A. Site Identification                              |                                                                               |                                                                               |  |
| B. Method of Burning<br>(Check One)                 | <input type="checkbox"/> Open Burning<br><input type="checkbox"/> Incinerator | <input type="checkbox"/> Open Burning<br><input type="checkbox"/> Incinerator |  |
| C. Waste Burned                                     |                                                                               |                                                                               |  |
| General Waste<br>Paper<br>Cardboard<br>Garbage, etc | Amount _____<br>Units/Year<br>_____/_____                                     | Amount _____<br>Units/Year<br>_____/_____                                     |  |
| Woodwaste                                           | Amount _____<br>Units/Year<br>_____/_____                                     | Amount _____<br>Units/Year<br>_____/_____                                     |  |
| Pathological<br>Waste                               | Amount _____<br>Units/Year<br>_____/_____                                     | Amount _____<br>Units/Year<br>_____/_____                                     |  |
| Sewage<br>Sludge                                    | Amount _____<br>Units/Year<br>_____/_____                                     | Amount _____<br>Units/Year<br>_____/_____                                     |  |
| Organic<br>Chemical<br>Waste                        | Amount _____<br>Units/Year<br>_____/_____                                     | Amount _____<br>Units/Year<br>_____/_____                                     |  |
| Other Waste<br>(Specify)                            | Amount _____<br>Units/Year<br>_____/_____                                     | Amount _____<br>Units/Year<br>_____/_____                                     |  |

(continued)



Table C.3.b-2. Incineration and Open Burning on the Installation

|                                                                                                                                |                                                                                                          |                                                                                                          |  |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|
| <p>D. Pollutants</p> <p>Particulates<br/>Sulfur Oxides<br/>Carbon Monoxide<br/>Hydrocarbons<br/>Nitrogen Oxides<br/>Others</p> | <p>Generated<br/>Units/Year</p> <p>_____<br/>/_____<br/>_____</p>                                        | <p>Generated<br/>Units/Year</p> <p>_____<br/>/_____<br/>_____</p>                                        |  |
| <p>E. Incinerator Type</p>                                                                                                     |                                                                                                          |                                                                                                          |  |
| <p>F. Incinerator Capacity</p>                                                                                                 | <p>Amount _____</p>                                                                                      | <p>Amount _____</p>                                                                                      |  |
| <p>G. Enter the Average Number of Hours the Incinerator is Operated Annually</p>                                               | <p>Hours/Year</p>                                                                                        | <p>Hours/Year</p>                                                                                        |  |
| <p>H. Check if Incinerator has a Primary and/or Secondary Burner Which is Used</p>                                             | <p>Pri-      Sec-<br/>mary      ondary</p> <p><input type="checkbox"/>      <input type="checkbox"/></p> | <p>Pri-      Sec-<br/>mary      ondary</p> <p><input type="checkbox"/>      <input type="checkbox"/></p> |  |
| <p>I. Incinerator Fly Ash Control Equipment</p>                                                                                |                                                                                                          |                                                                                                          |  |

(concluded)

Section C.3.b.(3)

Demilitarization  
Operations

I. Provide the Following Information

A. Discuss (III A through E and H)

1. The types of munitions demilitarized
2. The methods of neutralization used
3. The methods of handling by-products
4. The amounts, composition, pH, etc., of  
by-products
5. The site and method of ultimate dis-  
posal of by-products
6. The safety and antispill precautions
7. The appropriate regulations and SOP's  
and the responsible organization (III S)
8. Noise will be discussed in Section  
C.4.d, page C.4-9

B. Illustrate

The agent and demilitarization sites  
on an installation map (refer to page A.1-2)

C. Tabulate

Information pertaining to the demili-  
tarization operations in Table C.3.b-3

Table C.3.b-3. Demilitarization Operations on the Installation

| Operation Name/ Identification | Materiel Demilled | Annual Amounts Demilled | Annual Amounts of By-Products and Combustion Products Generated |                  |                 |          |             |                  |  |
|--------------------------------|-------------------|-------------------------|-----------------------------------------------------------------|------------------|-----------------|----------|-------------|------------------|--|
|                                |                   |                         | Salts (specify)                                                 | Sodium Hydroxide | Carbon Monoxide | Nitrates | Hydrocarbon | Others (specify) |  |
|                                |                   |                         |                                                                 |                  |                 |          |             |                  |  |

Section C.3.b.(4)

Sewage and  
Sanitation

I. Provide the Following Information

A. Discuss

1. Processes used (trickling filter, settling basin, etc.) and any special design or operation features (III A, B, C, H, J and T)

2. Unusual influents requiring specialized pretreatment or treatment procedures (Section C.2.a., page C.1-2) (III S)

3. The method of sludge disposal (provide details in Section C.2.d, page C.2-13) (III A, B, C and H)

B. Illustrate

On an installation map (refer to page A.1-2), the location of sewage treatment facilities

C. Tabulate

Information on each sewage treatment plant, Table C.3.b-4. The highest level of treatment refers to primary, secondary or tertiary. See Table C.3.a-3 for treatment categories and equipment types.

Table C.3.b-4. Sewage Treatment Facilities on the Installation

| Building Number/Name | Design Capacity (MGD) <sup>a</sup> | Average Daily Volume Treated (MGD) | Highest Level of Treatment | Equipment Type | % BOD Removed |
|----------------------|------------------------------------|------------------------------------|----------------------------|----------------|---------------|
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |
|                      |                                    |                                    |                            |                |               |

<sup>a</sup>Millions of gallons per day

Section C.3.b.(5)

Recycling  
Operations

I. Provide the Following Information

A. Discuss

1. Official recycling efforts - scrap property sale, composting, pyrolysis, waste oil recovery and use, etc (III A, B, E, G and H)
2. Officially sanctioned household and office waste recycling efforts (III N and O)
3. Unofficial on-post efforts (III N and O)
4. For each of the above, identify (III A, B, C, E, G and H):
  - a. Central responsibility
  - b. What is recycled
  - c. Source of recycled material
5. The money proportion of property disposal office operations which is attributable to recycling (III G)
6. Applicable regulations (III S)

B. Illustrate (sources as above)

The locations of recycling centers on our installation map (refer to page A.1-2)

C. Tabulate (sources as above)

Information pertaining to the recycling programs on the installation, in Table C.3.b-5, to include the types of material [paper, scrap metal, glass, wood, silver nitrate (photo finishing) and excess property] and the methods of recycling (sale, pyrolysis, repair and reuse, recovery and alternate uses)

Table C.3.b-5. Recycling Programs on the Installation

| Recycling Center/<br>Program | Type of Material<br>Recycled | Annual<br>Amounts<br>Recycled | Cost<br>Recovery | Method<br>of<br>Recycling |
|------------------------------|------------------------------|-------------------------------|------------------|---------------------------|
|                              |                              |                               |                  |                           |

Section C.3.c.

Transportation

I. Purpose

Transportation is often a major source of air pollutants and consumes energy.

II. Provide the Following Information

A. Discuss

1. The transportation-related air factors
  - a. For airports (III C, G, H, I and K)
    - (1) The locations of airports
    - (2) The monthly average of take-off and landing cycles for fixed and rotary wing aircraft
    - (3) The types of aircraft the field is capable of accommodating
    - (4) For cleaning, fueling, painting, etc., operations, refer to Sections C.2.a and C.2.d
  - b. For rail use (III A, C, G, H, J, K and L)
    - (1) The number and type of locomotives and cranes
    - (2) The average annual operation in days
    - (3) The available horsepower of each of above
    - (4) In lieu of (2) and (3), the gallons of fuel consumed by each annually (this information is required to fill out Table C.3.c-1)
  - c. For boats (III A, B, G and H)
    - (1) The number and types of inboard and outboard powered boats
    - (2) The average number of miles traveled by each in and around the installation
    - (3) The number of boats equipped with heads and whether the effluents are treated or pumped into tanks at dockside. The number of boats required to have this equipment by paragraph 10.d.(1), DARCOMR 200-1 (III M)
  - d. For vehicles (III A, B, D, F, G and H)
    - (1) The number of highway vehicles operated on the installation
    - (2) The total annual miles driven for the above while on the installation or commuting to and from the installation



(3) The number of light-duty, gasoline-powered; heavy-duty, diesel-powered; and heavy-duty, gasoline-powered vehicles and materials handling equipment operated on or off-highway on the installation

(4) The total annual miles driven for the above while on the installation

e. For off-highway stationary sources such as generators and compressors (III A, C, F, G, H, J and K)

(1) The number of gas turbines using distillate, fuel oil or natural gas and the number of gas fueled engines

(2) The total annual volume of fuel consumed for each type

#### B. Illustrate

The operations discussed above, on an installation map (refer to page A.1-2), along with the major road network, identifying types (paved, oiled, improved, etc)

#### C. Tabulate (sources as in II.A.1)

1. The transportation-related air factors (III E) in Table C.3.c-1

2. The total annual consumption of diesel fuel, mo-gas (premium, regular, lead-free), JP-4 fuel, AV-gas and others, if appropriate, used for transportation

### III. Suggested Sources

A. Safety office

B. Provost Marshal

C. Air and water pollution control reports

D. Traffic engineering planning study

E. Compilation of Air Pollution Emission Factors, AP-42

F. Chief, motor pool operations

G. Environmental quality coordinator

H. Contents of environmental quality coordinator's file, file symbol 1512, AR 340-18-15

I. Chief, airport operations

J. Logistics directorate

K. Facilities engineering directorate

L. Chief, switching yard

M. DARCOMR 200-1, Environmental Enhancement and Pollution Abatement

Table C.3.c-1. Transportation Related Annual Air Emission on the Installation

|                                                                                               | Particulates | Sulfur Oxides | Carbon Monoxide | Hydrocarbons | Nitrogen Oxides | Aldehydes |
|-----------------------------------------------------------------------------------------------|--------------|---------------|-----------------|--------------|-----------------|-----------|
| Aircraft                                                                                      |              |               |                 |              |                 |           |
| Fixed-wing<br>Turbofan<br>Turbojet<br>Turboprop<br>Turboshaft<br>Piston<br>Transport<br>Light |              |               |                 |              |                 |           |
| Rotary-wing<br>Conventional<br>Turbojet                                                       |              |               |                 |              |                 |           |
| Motor vehicles and<br>materials handling<br>equipment                                         |              |               |                 |              |                 |           |
| Gasoline-powered<br>light-duty (cars)<br>light-duty trucks<br>heavy-duty trucks               |              |               |                 |              |                 |           |
| Diesel-powered<br>light-duty<br>heavy-duty                                                    |              |               |                 |              |                 |           |
| Trains                                                                                        |              |               |                 |              |                 |           |
| Locomotives                                                                                   |              |               |                 |              |                 |           |
| Cranes                                                                                        |              |               |                 |              |                 |           |

(cont inued)

Table C.3.c-1. Transportation Related Annual Air Emission on the Installation

|                            | Particulates | Sulfur Oxides | Carbon Monoxide | Hydrocarbons | Nitrogen Oxides | Aldehydes |
|----------------------------|--------------|---------------|-----------------|--------------|-----------------|-----------|
| Boats                      |              |               |                 |              |                 |           |
| Gasoline-powered           |              |               |                 |              |                 |           |
| Diesel-powered             |              |               |                 |              |                 |           |
| Generators and Compressors |              |               |                 |              |                 |           |
| Gas turbines               |              |               |                 |              |                 |           |
| Distillate, fuel oil       |              |               |                 |              |                 |           |
| Natural gas                |              |               |                 |              |                 |           |
| Gas-fueled engines         |              |               |                 |              |                 |           |

(concluded)

Section C.4

LAND-USE FACTORS

I. Purpose

Proper land use is essential to the environmentally sound operation of the installation. Without it, land can become subject to extensive erosion, contamination, runoff and other undesirable consequences.

a. Pesticide and Fertilizer Use

I. Provide the Following Information

A. Discuss

1. Use of herbicides, insecticides, rodenticides, fungicides, etc) (II A through E and H)
  - a. Whether persistent pesticides (chlorinated hydrocarbons, etc) are used
  - b. Whether alternatives such as biological controls are being considered
  - c. The disposal procedure for unserviceable pesticides (Summarized; complete detail belongs in Section C.3.b, page C.3-11)
  - d. Unusually heavy pesticide applications in the past
    - (1) The amounts applied
    - (2) The dates applied
    - (3) The target species
  - e. The appropriate regulations, SOP's and standards (II F, G and K)
  - f. The names of personnel certified in pesticide use and the training received
2. For fertilizers and other chemical applications
  - a. The disposal procedure for unserviceable fertilizers (Summarized; complete detail belongs in Section C.3.b, page C.3-11)
  - b. Unusually heavy fertilizer applications in the past
  - c. The appropriate regulations, SOP's and standards

B. Illustrate (sources as above)

1. The major outdoor locations of pesticide, fertilizer and other chemical applications, including those identified in I.A.1.d and I.A.2.b

- 2. The areas of major indoor applications
- C. Tabulate (above sources plus I)

Information pertaining to the pesticides, fertilizers and other chemicals applied on the installation in Table C.4.a-1. It may be necessary to break out each major application of the same chemical rather than lump major applications together. Under "Use" heading, also identify the specific target species for each herbicide and fertilizer. "Frequency of Application": once/month, twice/year, etc. "Rate of Application": tons/acre, gallons/square feet, etc. "Time of Application": spring, April, etc.

II. Suggested Sources

- A. Management plans
- B. Agriculture lessee's records
- C. Pest Control Summary Report, DD Form 1532
- D. Facilities engineering directorate, pest control division
- E. Engineer entomologist, medical entomologist
- F. AR 420-76, Pesticide Use Policy
- G. AR 240-77, Restrictions on the Use of 2, 4, 5-T
- H. Vegetation control plan
- I. Pesticide application schedule and location guide
- J. Environmental quality coordinator
- K. Computerized Environmental Legislative Data System-CELDS (at CERL)

Table C.4.a-1. Application of Pesticides, Fertilizers and Other Chemicals Applied on the Installation

| Type        | Use/Target Species           | Specific Name | Annual Quantity Applied | Frequency of Application | Rate of Application | Time of Application |
|-------------|------------------------------|---------------|-------------------------|--------------------------|---------------------|---------------------|
| Pesticides  | Rodent Control               |               |                         |                          |                     |                     |
|             | Insect Control               |               |                         |                          |                     |                     |
|             | Fumigants                    |               |                         |                          |                     |                     |
|             | Agricultural Spray/Dust      |               |                         |                          |                     |                     |
|             | Plant Control                |               |                         |                          |                     |                     |
| Fertilizers | Grounds Maintenance          |               |                         |                          |                     |                     |
|             | Agricultural                 |               |                         |                          |                     |                     |
|             | Recreational (wildlife mgmt) |               |                         |                          |                     |                     |
| Chemicals   | Snow and Ice Removal         |               |                         |                          |                     |                     |
|             | Others                       |               |                         |                          |                     |                     |

Section C.4.b.

Construction

I. Provide the Following Information

A. Discuss

1. Selecting a site

All the appropriate environmental considerations involved in the site selection process (Are all the factors described in this handbook considered?) (II A, C, D, E and J)

2. Preparing the site (II A through E and J)

a. The extent of clearing, the guidelines used to avoid unnecessary clearing

b. Precautions for protecting human safety and health during blasting (noise)

c. The manner of disposing of the fill from excavations and waste from demolition (Details should be provided in Section C.3.b, page C.3-11)

3. During construction (II A through E and J)

a. Erosion control measures practiced

b. Noise control practices

c. Measures taken to minimize unintentional physical destruction from heavy-duty vehicles

d. The manner of construction waste disposal (Details should be provided in Section C.3.b, page C.3-11)

4. Projected improvements for the next 10 years with a proposed cost of \$3 million or more

a. Identity of each (II A, F and G)

b. Cost, scheduled dates of initiation and completion (II A, B, H and I)

B. Illustrate

The location of any projected major improvements identified in II.A.4.a

II. Suggested Sources

A. Facilities engineering directorate

B. Procurement directorate, service contracts office

C. Installation agronomist



- D. Environmental quality coordinator
- E. Personal observation
- F. Plans and analysis office
- G. Short and intermediate range Military Construction Army (MCA) program for the installation (facilities engineering directorate)
- H. Chief, operations review division
- I. Chief, contractor operations
- J. User Manual for Construction Activities - Environmental Impact Computer System (at CERL)

Section C.4.c.

Contamination

I. Provide the Following Information

A. Discuss [III A through K (B and K best sources)]

1. Those sites contaminated with
  - a. Agents
  - b. Manufacturing wastes
  - c. Pyrotechnics
  - d. Petroleum spills
  - e. Others
2. The cause of the contamination
3. The decontamination or clean-up method used
4. Present status of area (no vegetative growth, completely recovered, still actively dangerous, pollutants escaping via leaching, evaporation, etc)
5. The continuing operations that have or may result in spills, dumping, or testing of materials on sites not detailed above (II A and C through G)

B. Illustrate (sources as above)

All the contaminated areas on an installation map (refer to page A.1-2)

C. Tabulate (II A through H)

In Table C.4.c-1, information pertaining to the contaminated areas on the installation. The "Map Location Number" refers to the map identified in Part I.B. "Status" refers to active or inactive - currently being used and therefore contaminated or closed to further use, respectively. For "Period of Active Contamination," provide the inclusive years of active use.

II. Suggested Sources

- A. Facilities engineering directorate
- B. Facilities Contamination Report, RCS
- C. Range control office
- D. Fire direction center

DARCOM-OT-553

- E. Explosive Ordnance detachment
- F. Safety office
- G. Environmental quality coordinator
- H. Contents of the environmental quality coordinator's pollution control file, file symbol: 1512, AR 340-18-15
- I. Personal observation
- J. Ecological surveys conducted by the Chemical Systems Laboratory (CSL)/Dugway Proving Ground Ecological Research Teams and other contractors
- K. Installation Restoration Teams, CSL

Table C.4.c-1. Contaminated Areas on the Installation

| Map Location Number | Contaminant or Hazard | Quantity of Contaminant or Hazardous Material | Type of Container | Size of Contaminated Area | Period of Contamination | Activity Causing Contamination Hazard | Current Status (Active-Inactive) |
|---------------------|-----------------------|-----------------------------------------------|-------------------|---------------------------|-------------------------|---------------------------------------|----------------------------------|
|                     |                       |                                               |                   |                           |                         |                                       |                                  |
|                     |                       |                                               |                   |                           |                         |                                       |                                  |
|                     |                       |                                               |                   |                           |                         |                                       |                                  |
|                     |                       |                                               |                   |                           |                         |                                       |                                  |
|                     |                       |                                               |                   |                           |                         |                                       |                                  |
|                     |                       |                                               |                   |                           |                         |                                       |                                  |
|                     |                       |                                               |                   |                           |                         |                                       |                                  |
|                     |                       |                                               |                   |                           |                         |                                       |                                  |

Section C.4.d.

Miscellaneous Factors

I. Provide the Following Information

A. Discuss (II N and O)

1. The miscellaneous water factors

a. Swimming pools (II B, I and L)

- (1) The number of swimming pools on the installation
- (2) The number of times the pools are emptied per year
- (3) The average daily overflow and filter backwash per pool

(4) Whether the water from (2) or (3) above enters the storm or sanitary sewer

b. Washing operations not entering the sanitary sewer (II C, E, G through M, P and T)

- (1) The number of washing operations on the installation
- (2) Whether each is equipped with sediment traps or oil separation chambers

2. The noxious odor problem on the installation (II A, B, F and I)

a. The nature of the problem

- (1) Type
- (2) Duration

b. The distance downwind the odor is detectable

c. The complaints lodged because of the odor (II B, C, D and J)

3. The noise problems on the installation including air conditioning towers, airports, railroad tracks, testing operations, demilitarization by explosives, etc (II A, B, H through M and P)

a. Where continuous exposure is likely to exceed the following noise level standards on the A scale "slow response setting": 85 dB over 8 hours, 92 dB over 6 hours, 95 dB over 4 hours, 97 dB over 3 hours, 100 dB over 2 hours, 102 dB over 1 1/2 hours, 105 dB over 1 hour or 110 dB over 1/2 hour or less (II Q and R)

b. Where peak impulse noise is likely to exceed the standard of 140 dB

- (1) The nature of the source
- (2) The noise levels at the operator's position, including peak impulse noise levels if the noise is of short duration

(3) The duration of the above noise level

(4) The dominant frequencies of the above noise levels (useful in predictions)

(5) How far away the noise is troublesome, providing contours to the standards identified above

(6) The complaints lodged because of the noises (II B, C, D and J)

(7) Hearing protective measures taken

4. Other problems known to exist but not treated elsewhere in the handbook (II A, B, D and J)

a. The nature of the problem

B. Illustrate (sources as in I.A)

1. The map numbers and building numbers of all the miscellaneous operations discussed above, illustrated on an installation map (refer to page A.1-2)

2. The contours discussed in I.A.3.b

C. Tabulate (sources as in I.A)

1. The miscellaneous water factors

a. For swimming pools in Table C.4.d-1

b. For washing operations (vehicle, aircraft, garbage can, etc.) in Table C.4.d-1. The "Map Identification Number" refers to the figure called for in I.B. "Receiving Body" includes sanitary sewer, creeks and rivers. Types of washing operations include vehicles, aircraft, garbage cans and other (identify).

## II. Suggested Sources

A. Safety office

B. Public affairs office

C. Provost Marshal

D. Installation commander

E. Air and water pollution control reports

F. Traffic engineering planning studies

G. Compilation of Air Pollution Emission Factors, AP-42

- H. Chief, motor pool operations
- I. Ecological surveys conducted by the Chemical System Laboratory/Dugway Proving Ground Ecological Research Teams, and other contractors
- J. Environmental quality coordinator
- K. EPA Form 7550-9 (-93). Application for Permit to Discharge and its state and local equivalents
- L. Environmental quality coordinator's file, file symbol 1512, AR 340-18-15
- M. Chief, airport operations
- N. Logistics directorate
- O. Facilities engineering directorate
- P. Chief, test operations
- Q. DARCOMR 200-1
- R. Occupational Safety and Health Act
- S. Noise contours [Construction Engineering Research Laboratory (CERL)]
- T. Pollution Estimation Factors (at CERL)

Table C.4.d-1. Miscellaneous Water Factors on the Installation

|                           | Map Identification Number | Annual Amount of Water Used | Annual Amount of Materials Added |            |                                 | Receiving Body |
|---------------------------|---------------------------|-----------------------------|----------------------------------|------------|---------------------------------|----------------|
|                           |                           |                             | Diatomaceous Earth               | Soda Ash   | Sodium Hypochloride or Chlorine |                |
| Swimming Pools            |                           |                             |                                  |            |                                 |                |
| Washing Operations/(type) |                           |                             | Solvents                         | Detergents | Disinfectants                   |                |
| Others (specify)          |                           |                             |                                  |            |                                 |                |



SECTIONS D THROUGH I

These sections recast the data obtained in the prior three sections. Sections D through I are adequately covered in Chapter 2, AR 200-1, 15 Mar 78. Thus they are not covered here.

### LITERATURE CITED

This section is a bibliography of every document, paper or article used in the gathering of material for the IEIA. This includes all regulations, newspaper articles, pamphlets, directives, circulars, etc. The list should give full information, including title, author or originating authority, date of publication and publisher, so that the document can be located. Number references consecutively, according to their order of appearance in the text. Note: it is important to use these reference numbers in the body of the text to document sources of information.

Should the IEIA require periodic updating, it is better to reference each source on the page where it is used. Thus, changes can be made on individual pages without having to change all subsequent pages.

PERSONNEL CONTACTED

In this section identify (in alphabetical order) each person who provided information. Give their full name, job title, organization and phone number. All are important so that the office may be contacted in the future even if the individual is no longer there.

Should the IEIA require periodic updating, it is better to reference each source on the page where it is used.

## APPENDIXES

In this section, append all supporting documents, regulations and articles which would make parts of the main text more understandable but are too detailed for inclusion in the text. All material placed here as an appendix must be cited in the body of the text.

A general rule for placing material in an appendix:

Material of interest or value to the understanding of the text, but which would not significantly change the meaning of the text if omitted. The key is to keep the main text as short and easy to read as possible.

APPENDIX A. CORRESPONDENCE PRECEDING FIRST DATA-GATHERING EFFORT  
(SAMPLE LETTER)

Subject: Pollution Ecology Survey (PES)

TO: Commander

1. The Ecological Research Team, Chemical Systems Laboratory/Dugway Proving Ground, has been designated by (authority) to perform a PES on (installation).

2. To assist the team in timely completion of this task, please forward a copy of the installation environmental impact assessment to this office.

cf Environmental Quality Coordinator

APPENDIX B. MATERIAL TO BE OBTAINED AND CONTACTS TO BE MADE EXTERNAL TO THE INSTALLATION AS PART OF THE SECOND DATA-GATHERING EFFORT

- I. From U.S. Government Sources
  - A. U.S. Department of the Interior
    - 1. U.S. Geological Survey (USGS)
      - a. Aerial photography division (Refer to Chapter 2, Volume 4)
        - Aerial photographs at approximately 10-year intervals
      - b. Topographical map center (Refer to Appendix D, Volume 6)
        - Topographical maps, 1:24,000 and 1:250,000
      - c. Regional Water Resources Division (Figure B-1 and Table B-1)
        - Flow rates in streams and other hydrologic data
      - d. State office
        - Geological studies for the area
    - 2. Bureau of Land Management regional office
      - a. Land ownership, recreation and land-use maps
      - b. Protected habitats
    - 3. U.S. Fish and Wildlife Service
      - a. National Wetlands Inventory, U.S. Fish and Wildlife Service, Suite 217, Dade Bldg., 9620 Koger Executive Center Drive, St. Petersburg, FL 33702
        - Identification of the wetlands in the area
      - b. Office of Endangered Species, U.S. Fish and Wildlife Service, Department of Interior, 1612th K St., Washington, DC 20240
        - Information on endangered species
  - B. U.S. Department of Agriculture
    - 1. U.S. Forest Service (Refer to Figure 2-2 and Table 2-2, Volume 6)
      - Forest atlases of the area
    - 2. Soil Conservation Service, State office
      - Soil maps
    - C. Environmental Protection Agency regional office (Refer to Figure 2-5 and Table 2-5, Volume 6)
      - 1. STORET data on local drainage systems

2. Pertinent information for the area, such as computer printout of "National Pollutant Discharge Elimination System," "National Aerometric Data System (SAROAD)" and "National Emissions Data System, Point Source Listing"

D. U.S. Department of Commerce, National Oceanographic and Atmospheric Administration.

1. National Climatic Center, Environmental Data Service, Federal Bldg., Ashville, NC 28001

The Monthly Weather Review and other data on climate

2. Environmental Data Service, D-62, Boulder, CO 80302  
Seismographic data<sup>1</sup> and data on various geological and geophysical features found in the Earthquake Data File, Earthquake Intensity File and the Solid Earth Data Services Division of the National Geophysical, Solar-Terrestrial Data Center

E. Electromagnetic Compatibility Analysis Center, North Severn, Annapolis, MD 21402

Data base of EMF sources across the U.S. This is a DOD facility. Small studies are conducted at no cost to the user.

F. U.S. Army Corps of Engineers (Figure B-2 and Table B-2)

1. District Headquarters available through Division Headquarters

Pertinent information on their activities in the area and data they have collected, such as stream flow rates.

2. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 31980

a. A User Accessed Computer Information System for Environmentally Sensitive Wildlife

b. Selected Legally Protected Animals

c. Retrieval Program for Information Sources (RPIS)

<sup>1</sup>Up-to-date seismographic data from the world-wide seismograph network operated by the U.S. Geological Survey are obtained through the National Earthquake Information Center (NEIC), Golden, Colorado. The NEIC, in turn, relays its information (1 to 2 years later) to the Solid Earth Data Service, where records are kept for as far back as the 1600's.

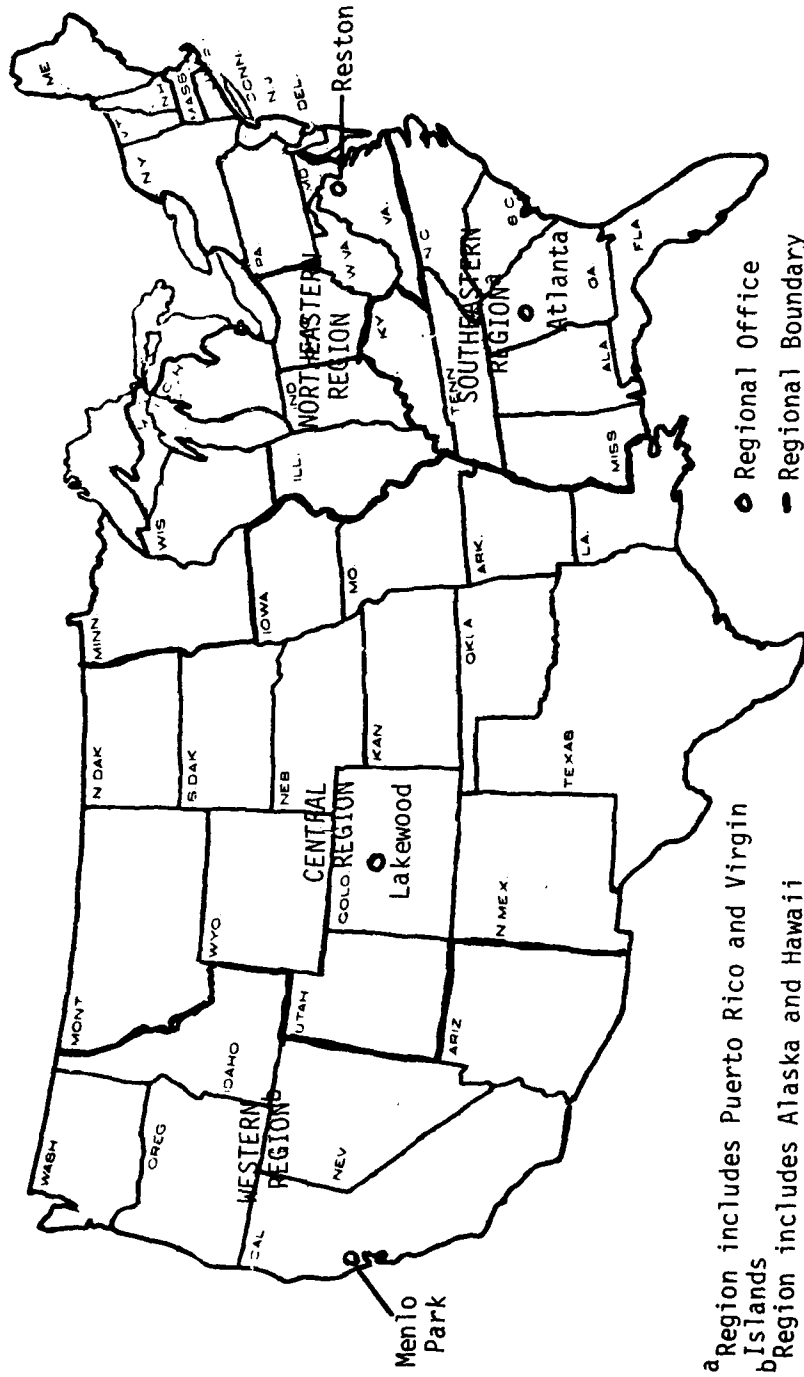
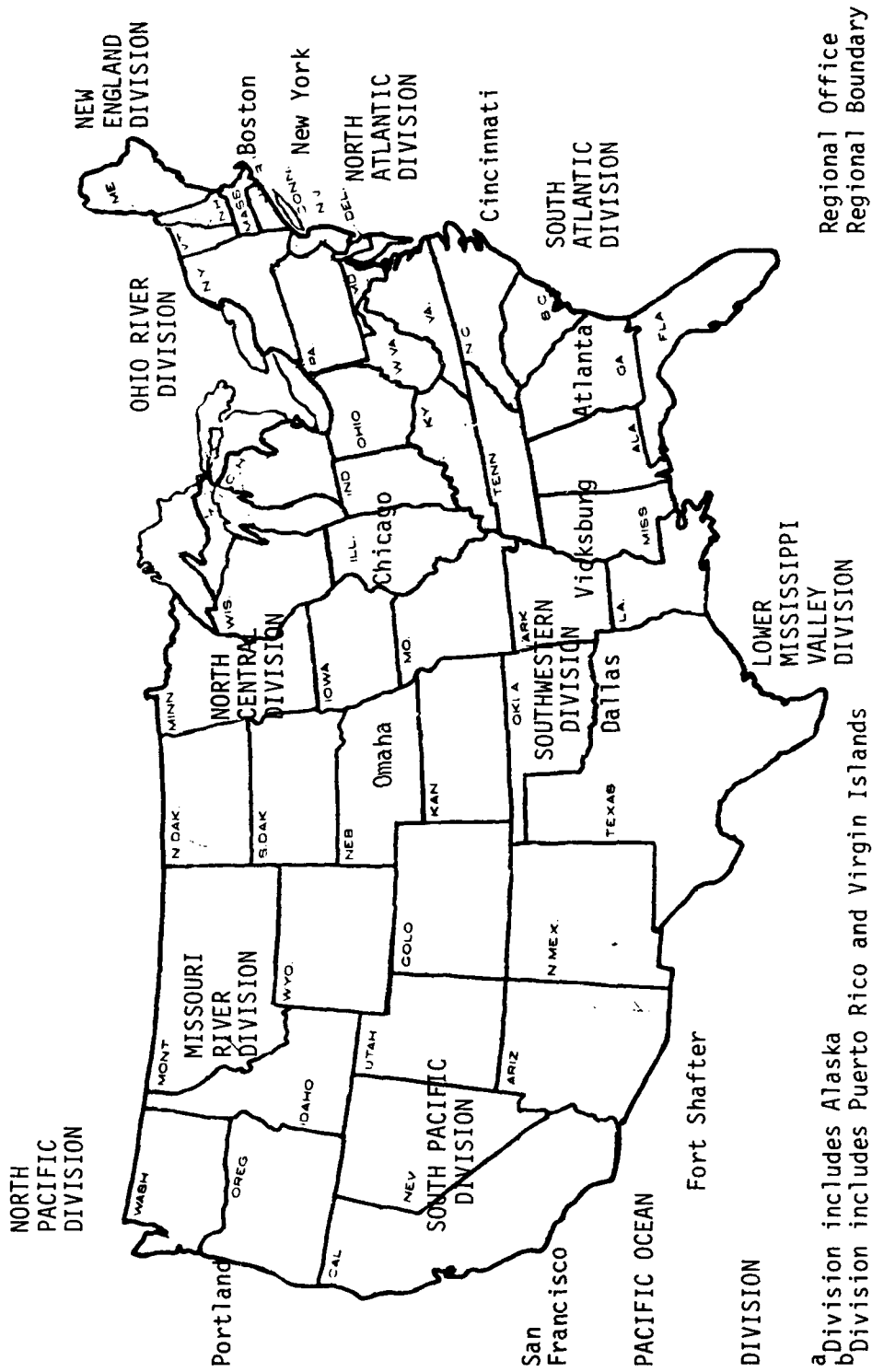


Figure B-1. Regional Offices of the Water Resources Division, U.S. Geological Survey.



Table B-1. Regional Offices of the Water Resources Division (WRD),  
U.S. Geological Survey

| Region              | Area                                                                                             | Address                                                                                                                            | Telephone    |
|---------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <u>Northeastern</u> | CT, DE, DC,<br>IL, IN, ME,<br>MD, MA, MI,<br>MN, NH, NJ,<br>NY, OH, PA,<br>RI, VT, VA,<br>WV, WI | Regional Hydrologist<br>U.S. Geological Survey<br>National Center<br>Mail Stop 433<br>12201 Sunrise Valley Dr.<br>Reston, VA 22092 | 703 860-6985 |
| <u>Southeastern</u> | AL, FL, GA,<br>KY, MS, NC,<br>PR, SC, TN,<br>VI                                                  | Regional Hydrologist<br>U.S. Geological Survey<br>1459 Peachtree St., N.E.<br>Suite 200<br>Atlanta, GA 30309                       | 404 881-4395 |
| <u>Central</u>      | AK, CO, IA,<br>KS, LA, MO,<br>MT, NE, NM,<br>ND, OK, SD,<br>TX, UT, WY                           | Regional Hydrologist<br>U.S. Geological Survey<br>Mail Stop 406, Box 25046<br>Denver Federal Center<br>Lakewood, CO 80225          | 303 234-3661 |
| <u>Western</u>      | AK, AZ, CA,<br>GU, HI, ID,<br>NV, OR, WA                                                         | Regional Hydrologist<br>U.S. Geological Survey<br>345 Middlefield Road<br>Menlo Park, CA 94025                                     | 415 323-8111 |



<sup>a</sup> Division includes Alaska  
<sup>b</sup> Division includes Puerto Rico and Virgin Islands

Figure B-2. U.S. Army Corps of Engineers Division Headquarters

Table B-2. U.S. Army Corps of Engineers Division Headquarters

| Division                        | Address                                                                                                                        | Telephone    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------|
| <u>New England</u>              | Division Headquarters<br>U.S. Army Corps of Engineers<br>424 Trapelo Rd.<br>Waltham, MA 02154                                  | 617 894-2400 |
| <u>North Atlantic</u>           | Division Headquarters<br>U.S. Army Corps of Engineers<br>90 Church St.<br>New York, NY 10007                                   | 212 264-7101 |
| <u>South Atlantic</u>           | Division Headquarters<br>U.S. Army Corps of Engineers<br>510 Title Bldg.<br>30 Pryor St. S.W.<br>Atlanta, GA 30303             | 404 221-6711 |
| <u>North Central</u>            | Division Headquarters<br>U.S. Army Corps of Engineers<br>536 S Clark St.<br>Chicago, IL 60605                                  | 312 353-6310 |
| <u>Ohio River</u>               | Division Headquarters<br>U.S. Army Corps of Engineers<br>P.O. Box 1159<br>550 Main St.<br>Cincinnati, OH 45201                 | 513 684-4166 |
| <u>Lower Mississippi Valley</u> | Division Headquarters<br>U.S. Army Corps of Engineers<br>P.O. Box 80<br>Corner Crawford and Walnut Sts.<br>Vicksburg, MS 39180 | 601 636-1311 |
| <u>Missouri River</u>           | Division Headquarters<br>U.S. Army Corps of Engineers<br>P.O. Box 103 Downtown Station<br>Omaha, NE 68101                      |              |

(continued)

Table B-2. U.S. Army Corps of Engineers Division Headquarters

| Division             | Address                                                                                                         | Telephone    |
|----------------------|-----------------------------------------------------------------------------------------------------------------|--------------|
| <u>Southwestern</u>  | Division Headquarters<br>U.S. Army Corps of Engineers<br>Main Tower Bldg.<br>1200 Main St.<br>Dallas, TX 75202  | 214 767-2500 |
| <u>North Pacific</u> | Division Headquarters<br>U.S. Army Corps of Engineers<br>P.O. Box 2870<br>Portland, OR 97208                    | 503 221-3700 |
| <u>South Pacific</u> | Division Headquarters<br>U.S. Army Corps of Engineers<br>630 Sansome St.<br>Rm. 1216<br>San Francisco, CA 94111 | 415 556-0914 |
| <u>Pacific Ocean</u> | Division Headquarters<br>U.S. Army Corps of Engineers<br>Bldg. 230<br>Ft. Shafter, HI 96858                     | 508 438-1500 |

(concluded)

3. Construction Engineering Research Laboratory (CERL),  
P.O. BOX 4005, Champaign, IL 61820
- a. Economic Impact Forecast System (EIFS)
  - b. Environmental Impact Computer System (EICS)
  - c. Environmental baseline data on major military installations (to include noise contour maps and State Critical Habitat Inventory)
  - d. Computer-Aided Environmental Legislative Data System (CELDS)
  - e. List of points of contact (POC's) for environmental information in the surrounding area
  - f. Publications on predicting impact from selected army activities (the list of activities covered is expanding, recommend contact for latest coverage)
  - g. Pollution Estimation Factors, characterizations of air, solid and water waste emission factors.

G. U.S. Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD 21010

Pertinent information on their activities at the installation

H. U.S. Army Atmospheric Sciences Laboratory, U.S. Army Electronics Research and Development Command, White Sands Missile Range, NM 88002

Meteorological data on the installation

I. U.S. Air Force Environmental Technical Applications Center, CBL STOP 825, Scott Air Force Base, IL 62223

Meteorological data on the installation

J. U.S. Naval Oceanographic Office, Suitland MD 20523

Meteorological data on the installation and oceanographic data, if appropriate

II. From the appropriate state agencies of the state containing the installation or other nonfederal sources

A. Governor's office

An organization chart with phone numbers of the state government

B. State wildlife or fish and game department or state division of natural resources

A list of state protected species

C. State Agricultural department or local extension agents

Soil surveys from the area, including seismograph studies and information on agriculture

D. State geological and mineral survey

Geological surveys for the area, including seismograph studies

E. State department of health: air and water quality divisions

Information on state, air and water quality programs and regulations and other health-related data pertaining to the area

F. State historical society

Pertinent historical information on the area

G. State archaeologist

Pertinent archaeological information on the area, (especially sites reported from the installation) or state or local archaeological sources

H. The Colonial Bird Register, Laboratory of Ornithology, Cornell University, Ithaca, NY 14853

Information on colonial birds in the area

I. State highway department

Information on roads and traffic flow rates

J. Nature Conservancy, ATTN: Stewardship Office, 1800 N Kent St., Arlington, VA 22209 and Natural Audubon Society, Sanctuary Department, West Cornwall Rd., Sharon, CT 06069

Identification of sanctuaries in the area

III. From Local Activities in the State

A. Local, state and national parks and wildlife refuges, conservation societies and museums

Species lists and identification of other natural resources

B. National Weather Service Office and local airports utilization records

Climate information

C. Local utility companies

Information on utilities supplied to the installation

D. Railroad company offices

Information on railroads

E. Harbormaster

Information on harbor activities

F. Pertinent information from the following departments of local universities:

1. Life sciences
2. Biology
3. Botany
4. Zoology
5. Geology
6. Geography
7. Soils
8. Agriculture
9. Agronomy
10. Meteorology
11. Archaeology
12. History
13. Natural history and museum
14. Data bases

a. ASI, American Statistical Index. A master guide and index to all statistical publications of the U.S. Government dealing with social, demographic and economic information

b. METEOR/GEO ABS, Meteorological and Geostrophysical Abstracts. A list of citations for the most important meteorological and geostrophysical research

c. GEOREF. A data base providing primary coverage of the geological journals and other publications

d. COMP DISS ABS, Comprehensive Dissertation Abstracts. A data base covering every American dissertation accepted at an accredited institution since 1861.

G. Private industry

Studies on climate and resources

IV. From County Government:

A. Board of health

Information on air and water monitoring stations in the area and their health aspects

B. County water use planning board

Local water use, etc

C. Flood control office

Flood control measures

D. County land office

Local land use and zoning regulations

E. Chamber of commerce

Statistical information on the county

V. Standard References and Equipment

A. Two copies of installation environmental impact assessments completed by the CSL/DPG Ecology Team

B. Environment Regulation Handbook, Environment Information Center, INC., 124 E. 39th St., New York, NY 10016

C. State air laws and state water laws from the appropriate state, Environmental Reporter. Bureau of National Affairs, Inc., 1231 25th St. NW, Washington, DC 20037



D. U.S. House of Representatives, Committee on National Marine and Fisheries. A Compilation of Federal Laws Relating to Conservation and Development of Our Nation's Fish and Wildlife Resources, Environmental Quality and Oceanography. January, 1977 (or latest revision)

E. Federal Register 40, No. 127, Vascular Plants, pp 27824 - 27924, 1 Jul 75

F. Guides to the Fauna and Flora

1. Mammals:

Hall, E.R. and K.R. Kelson. The Mammals of North America, Vol 1, 546 pp; Vol 2, pp 547 - 1083, Ronald Press Co., NY, 1959

2. Birds:

Robbins, C.S., B. Brunn and H.S. Zim. A Field Guide to the Identification of Birds of North America, Golden Press, NY, 1966

3. Reptiles and Amphibians:

Conant, R. A Field Guide to Reptiles and Amphibians of the United States and Canada East of the 100th Meridian, Peterson Field Guide Series, Houghton Mifflin Company, Boston, MA 1964.  
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Pennak, R.W. Fresh-water Invertebrates of the United States, Ronald Press Co., 1953

Abbot, R. Tucker. American Seashells, D. Van Nostrand Co., Inc, NY, 1954

6. Algae:

No thorough nationwide reference source<sup>1</sup>

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No thorough nationwide reference source<sup>1</sup>

8. Lichens:

No thorough nationwide reference source<sup>1</sup>

9. Mosses:

No thorough nationwide reference source<sup>1</sup>

10. Ferns:

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11. Flowering Plants:

No thorough nationwide reference source<sup>1</sup> other than:  
Brockman, C.F. Trees of North America, a guide to Field Identification,  
Golden Press, NY 1968

H. Council of Environmental Quality, Environmental  
Quality, Annual Reports

I. Kuckler, A.W. Manual to Accompany the Map, Potential  
Natural Vegetation of the Conterminous United States, American Geo-  
graphical Society, Special Publication 36, 1964

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K. Environmental Protection Agency, Compilation of Air  
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Control Regions, AP-102, 1972

M. Environmental Protection Agency, The National Air  
Monitoring Program: Air Quality and Emission Trends, Annual Reports,  
EPA 450/1-73-001a, 1973 et seq

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N. U.S. Department of Health, Education and Welfare  
Public Health Service, Radiological Health Handbook, Committee on  
Radiological Protection Revised Edition, January 1970

O. U.S. Department of Health, Education and Welfare  
Public Health Service, National Institute of Health Biohazards Safety  
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P. American Conference of Government Industrial  
Hygienists, Values for Chemical Substances and Physical Agents in the  
Workroom Environment, Cincinnati, OH, 1977

Q. Regional Economic Activity in the United States, S/N  
5245-0012, Catalogue No. Y3 W29: 2-OB 2/V 1-5

R. Map, "Wild and Scenic Rivers of the United States",  
National Geographic, 152(1), 2A, July 1977

S. Department of the Army, Military Chemistry and  
Chemical Agents, TM 3-215, December 1963

T. Department of the Army, Military Explosives, TM 9-  
1300-214, November 1967

U. Department of the Army, Minutes of the Fifteenth  
Explosives Safety Seminar, Vol II DOD Explosives Safety Board, 1973

V. Department of the Army, Environmental Quality,  
Environmental Protection and Enhancement, AR 200-1, Change 2, Nov 1975

W. Department of the Army, Report of the AMC AdHoc  
Committee on Environmental Instrumentation, June 1973

X. Information on the state containing the installation  
from an encyclopedia

Y. AAA Guide book for the area

Z. World Almanac

AA. State highway maps

AB. Calculators

AC. Planimeters

AD. Department of the Army, Control of Hazards for Health  
from Microwave Radiation, TB Med 270, 60 EC, 1965

AE. Department of Interior, National Park Service,  
Natural History Theme Studies, No. 1, Eastern Dicotyledonous Forest, Vol 1:  
Southeastern Evergreen and Oak-Pine Region (Potential Natural Landmarks);  
No. 2, Inland Wetlands of the United States (Potential Natural Land-  
marks), 1975.

AF. Hunt, C.B., Natural Regions of the United States and  
Canada, W.H. Freeman and Company, 1974.

APPENDIX C. MATERIAL TO BE OBTAINED FROM THE INSTALLATION AS PART OF  
THE SECOND DATA-GATHERING EFFORT (SAMPLE LETTER)

Subject: Pollution Ecology Survey (PES)

TO: Environmental Quality Coordinator

1. The Ecological Research Team, Chemical Systems Laboratory/Dugway Proving Ground, has been designated by (authority) to perform a PES on (installation).
2. To assist the team in the timely completion of this task, please gather the items in enclosure 1 for our arrival on (date).
3. Also, please obtain a list of (number) personnel who, by virtue of their interest in the out-of-doors or specific training in biology, might be able to assist us by acting as "paraecologists". The first day of our visit, we will interview these personnel and select (number) who will join us in the PES team. Only one or two of these personnel will have to devote full time to the PES.
4. Also, during the first day of our initial visit, we will require a meeting with the environmental representatives of each office, directorate, and tenant activity. This meeting will be used to explain our procedures and to request further information from each of the representatives, if necessary.
5. Please obtain a copy of a DF signed by the Commander, stating his support for the PES and requesting cooperation of all people involved. Provide us with enough copies to distribute to each person in attendance at the environmental representative meeting described in paragraph 4.
6. Team members have a (security level) clearance. Proper information is being forwarded to your Security Office.

1 Incl  
as

Information, Materials and Service Requested by the Ecological  
Research Team, Chemical Systems Laboratory/Dugway Proving Ground

I. One escort and one four-wheel-drive vehicle should be available intermittently during the initial visit. (Following optional) Please arrange an overflight for (number of) individuals.

II. Limited office space should be available during the initial visit. Office space suitable for approximately (number) personnel should be available, along with (number) of phones with (number) Autovon and (number) long distance lines.

III. The location of the nearest, most complete set of DOD, DA, DARCOM and Installation regulations. This should be as close as possible to the above office space.

IV. The following reports, maps, records and data must be available as per letter.

A. Contents of the Pollution Control File, File Number Series 1512 AR 340-18-15

B. In lieu of the above file,

1. Approved original environmental impact assessments or statements

2. Inventory of activities on post that could contribute to environmental pollution; e.g., washracks, plating plants, painting operations, chemical plants, heating plants, open burning, etc

3. Existing devices, facilities, and programs for control of environmental pollution, including their effectiveness

4. Projects and programs proposed to prevent and control environmental pollution for the year when project is programmed

5. A record of all complaints, corrective action required, and date completed

6. A complete file on all environmental pollution standards applicable to the installation

7. Names, addresses, and telephone numbers of the state and local pollution control authorities

8. A complete copy of each report on installation pollution; e.g., Army Environmental Hygiene Agency (AEHA), the Environmental Protection Agency and Technical Assistance Visits (TAV)

- C. Aerial photographs of the installation
- D. DARCOM - 102, for the installation (activity summary)
- E. Installation strength card
- F. A complete set of Basic Information Maps for the installation
- G. RCS DD-HEE (A) 1269, Annual Status Report on Environmental Programs and Activities
- H. Installation management plans
- I. Air and water pollution control reports
- J. RCS DARCOM-OT-553, Facilities Contamination Report
- K. Reports on the installation air and water quality monitoring programs
- L. U.S. Army Meteorological Team data
- M. Reports of the post conservation and beautification committee
- N. Reports from ecological surveys conducted on the installation
- O. Short and intermediate range MCA program
- P. DA Form 2869, Repairs and Utilities, Command Analysis of Utilities Operations
- Q. DA Form 2788, Facilities Engineering Technical Data
- R. EPA Form 7550-9-(-93), Applications for Permit to Discharge and its state and local equivalents (both air and water)
- S. DA Form 5-126, Refuge and Salvage Collection
- T. Traffic Engineering planning studies
- U. Agricultural lessee's records
- V. DD Form 1532, Pest Control Summary Report
- W. Vegetation control plan

- X. Pesticide application schedule and location guide
- Y. Installation phone book
- Z. Area phone book
- AA. Phone book for the capital of the state
- AB. Natural resources report
- AC. All SOP's pertaining to hazardous operations or operations with environmental implications
- AD. Installation annual accident experience report
- AE. Installation chemical accident/incident control plan
- AF. Installation disaster control plan
- AG. Installation regulation 420-1, Fire Protection and Prevention
- AH. Nuclear and radionuclide, Fuels and Material Licenses
- AI. Incinerator data, information only, for state department of health, Division of Air Quality Control



Appendix D. Sample Information and Source Summary Sheet for Recording each Source of Information

DATE \_\_\_\_\_ INTERVIEWER \_\_\_\_\_

| Section<br>In<br>IEIA | Title, Name, Position, Agency or Author<br>or Regulation, Title, Journal or Publisher,<br>Volume, Pages, Date | Phone No. or<br>Pertinent Pages | Information |
|-----------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------|-------------|
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