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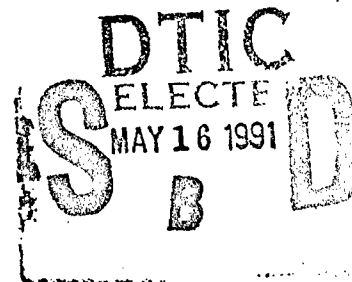


CONTAMINATION CONTROL SYSTEMS ANALYSIS
Phase IV: Air Base Information Requirements
During Chemical Warfare Operations

March 1991

Jerry G. Jensen
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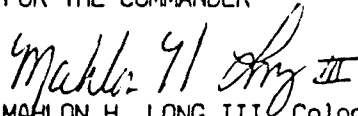
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This technical report has been reviewed and is approved for publication.



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FOR THE COMMANDER



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Program Director
Human Systems

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Phase IV of the Contamination Control Systems Analysis (CCSA) was undertaken to identify and prioritize the chemical warfare information needed by air base personnel, so that requirements for the Fixed Site Detection and Warning System (FSDWS) could be better defined.

Due to funding limitations and threat changes, Phase IV was stopped before completion. This document presents the results of the incomplete phase IV; namely, two versions of a questionnaire developed to gather information about the decision processes and information flow particular to an air base during chemical warfare operations.

Contamination Control	Air Base Operations
Information Requirements	Command and Control
Chemical Warfare Defense	Detection and Warning

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PREFACE

The work detailed in this report was performed by the JAYCOR Dayton Operations Office under Contract F33615-86-C-0652. The effort was sponsored by the Human Systems Division (HSD/YAZ), Brooks Air Force Base, Texas. Comments concerning this document should be directed to that office. The contract monitor was Capt Thomas J. Sterle, HSD/YAZ.

The JAYCOR principal investigator for this project was Jerry G. Jensen; the primary collaborator and coauthor was Douglas E. Vanderveer of JAYCOR. Richard E. Crabtree and Stanley P. Waskiewicz III, also of JAYCOR, contributed to this report.

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CONTAMINATION CONTROL SYSTEMS ANALYSIS (CCSA) PHASE IV: AIR BASE INFORMATION REQUIREMENTS DURING CHEMICAL WARFARE OPERATIONS

INTRODUCTION

This report is on Phase IV of the four-phase Contamination Control Systems Analysis (CCSA) study performed by JAYCOR for the Human Systems Division (HSD/YAZ). The overall objectives of this project were (1) to determine the extent of contamination that can be expected on an air base during chemical warfare operations, (2) to analyze operational procedures for contamination avoidance and decontamination, and (3) to develop a decision aid to assist survival/recovery personnel in determining how to most efficiently avoid contamination and how to most effectively use their available resources for decontamination.

The results of Phases I to III are summarized below.

PHASE I

- Developed a list of critical sortie generation equipment which would be exposed to chemical contamination during chemical warfare operations.
- Determined the contamination probabilities (and expected levels of contamination) for the critical sortie generation equipment.
- Developed a list of equipment materials for analysis during Phase II that had not previously been analyzed and were determined to have a high probability of contamination at levels causing degradation of those materials.

PHASE II

Battelle Memorial Institute (under subcontract to JAYCOR) performed materials hazard testing and weathering analysis [using chemical warfare agents soman (GD) and distilled mustard (HD)] with the materials identified in Phase I.

PHASE III

- Generated candidate air base recovery procedures involving contamination avoidance and/or decontamination.
- Analyzed the candidate recovery procedures to determine operational gains/losses based on sortie generation rates.

Originally, the objective of Phase IV was to develop a contamination control decision aid (based on the results of Phases I-III) to be used by air base recovery personnel. Later, the objective was modified to identify and characterize the chemical warfare information requirements of air base recovery personnel, since a decision aid was scheduled to be developed as part of the Fixed Site Detection and Warning System (FSDWS). Due to funding limitations and threat changes, Phase IV was stopped before completion. This document describes the incomplete Phase IV.

BACKGROUND

Making decisions during chemical warfare operations on an air base, e.g., whether or not to allocate resources for decontamination, requires much information from many sources. In order to make good decisions, the decision maker must have accurate, timely information about the chemical warfare environment and the status of the air base and its resources. Ensuring that decision makers have good information may require both improved technology for gathering information or improved procedures for disseminating information to the persons who need it.

This analysis was undertaken to identify and prioritize the chemical warfare information needed by air base recovery personnel, so that requirements for the FSDWS could be better defined. The 36th Tactical Fighter Wing and tenant units at Bitburg Air Base, Germany, were selected as the installation model for the analysis.

OBJECTIVE

The objectives of Phase IV of CCSA were:

- To identify the decisions and decision outcomes at each level of command at Bitburg AB during chemical warfare operations with respect to contamination control (CC), detection, identification, and warning (DIW), individual protection (IPE), collective protection, casualty handling, communications, resource management, rapid runway repair (RRR), and other areas.
- To identify the information required to make decisions at each level of command.

- To characterize the information flow between each level of command and between major work centers in terms of its source, destination, transmission media, transmission frequency, format, and classification.
- To depict by diagrams the decisions, decision outcomes, and information flows at Bitburg AB during chemical warfare operations.

APPROACH

JAYCOR's approach to achieving the stated objectives was as follows:

- Perform a literature review of all documents in the Chemical Defense Data Base (CDDDB) pertaining to command, control, communications, and intelligence (C³I) and base recovery after attack (BRAAT) activities in order to identify (a) possible decisions and decision outcomes at each level of command at Bitburg AB during chemical warfare operations and (b) the information required to make decisions at each level of command and at major work centers. This included review of Air Force Regulations (AFRs) and local Operations Plans (OPLANs) for Bitburg AB, as well as review of data collected by JAYCOR in previous studies.
- Design a questionnaire to be sent to persons having decision-making experience during simulated chemical warfare operations at Bitburg AB, either currently or in the recent past. Results of the literature review were used in developing questions for the questionnaire (which was designed to elicit more detailed information about the decision processes and information flow during chemical warfare operations).
- Identify persons having experience making decisions during simulated chemical warfare operations, either currently or in the recent past, and send them a questionnaire.
- Upon receiving the completed questionnaires, interview the persons by telephone, if necessary, in order to get more information or to clarify their responses.
- Compile the preliminary results of the literature review, questionnaires, and interviews to determine if data gaps existed. If so, determine a method of filling them.
- Organize the final results into a report and depict by diagrams the decisions, decision outcomes, and information flows at Bitburg AB during chemical warfare operations.

Only Steps 1 and 2 were completed before a work stoppage order was issued. Therefore, the report will only address the literature search and questionnaire development.

DISCUSSION

The first step in the literature review phase of this effort was to search the Chemical Defense Data Base (CDDDB) for documents pertaining to C³I and BRAAT activities, particularly in the areas of CC, DIW, IPE, collective protection, casualty handling, communications, resource management, and RRR. Most of the documents reviewed were of no value to this effort and others were of questionable value and/or questionable accuracy.

For example, a number of the reviewed documents contained diagrams of communication links between various work centers on an air base. Such diagrams implied that the communication links shown are (1) a complete set and (2) do not vary under any circumstances, neither of which we believe to be the case, drawing on our own observations of field exercises and the expertise of JAYCOR personnel who formerly served in U. S. Air Forces in Europe units.

Also, one of the reviewed documents contained a set of tables describing information requirements for air base postattack hazard management as derived from Army concepts. Again, drawing on our previous knowledge, we believed that these information requirements are not applicable to chemical warfare operations at an air base.

However, reviewing such documents provided enough information and insight to ask the correct types of questions on the questionnaires.

Using the results of the literature review, two versions of a questionnaire were developed to gather more detailed information about the decision processes and information flow particular to an air base during chemical warfare operations.

The "command version" of the questionnaire (Appendix A) was designed to be filled out by commanders and decision makers, particularly those in the wing operations center (WOC), the survival recovery center (SRC), and other command centers. (See Table 1.)

The "field version" of the questionnaire (Appendix B) was designed to be filled out by field personnel, including Damage Assessment Team (DAT) members, Disaster Preparedness Support Team (DPST) members, and sortie generation personnel. (See Table 2.)

Although many of the questions are the same on both versions of the questionnaire, there are some differences. The "command version" tends towards questions concerned with decision-making processes and the chemical warfare information required to make decisions. The "field version" tends towards questions concerned with how chemical warfare information impacts the way in which personnel in the field perform their jobs.

**TABLE 1. PROPOSED LIST OF COMMAND
VERSION RECIPIENTS**

AFSC	Title
0002	Wing Commander
0066	Vice Wing Commander
0026	CSG / Base Commander (and Deputy)
0036	Deputy Commander for Operations
4096	Deputy Commander for Maintenance
0096	Deputy Commander for Resource Management
*	SRC - Security Police Liaison Officer
0524	SRC - Disaster Preparedness Liaison Officer
*	SRC - Medical Liaison Officer
*	SRC - Civil Engineering Liaison Officer
*	SRC - Communications Liaison Officer
4054B	SRC - Explosive Ordnance Disposal Liaison Officer
0524	Disaster Preparedness Officer
24270	NCOIC Disaster Preparedness
A4916	Communications Squadron Commander
A5516	Civil Engineering Squadron Commander
A8116	Security Police Squadron Commander
A9356	Hospital Commander
A2524	Weather Squadron Commander
*	Air Base Operability Officer
4054B	Explosive Ordnance Disposal Officer
46470	Explosive Ordnance Disposal NCOIC
*	Command Post Senior Controller
19XX	Command Post Emergency Action Cell Officer

*As appropriate.

**TABLE 2. PROPOSED LIST OF FIELD
VERSION RECIPIENTS**

AFSC	Title
•	Disaster Preparedness Support Team(s) (DPST)
•	Damage Assessment Team(s) (DAT)
11XX	Flight Safety Officer
11XX	Fighter Pilot
122X0	Aircrew Life Support Specialist/Technician
14XX	Chief of Safety
14XX	Air Operations Officer
1916	Operations Management Staff Officer
1925	Operations Management Officer
201X0	Intelligence Operations Specialist/Technician
241X0	Ground Safety Specialist/Technician
242X0	Disaster Preparedness Specialist/Technician
251X0	Weather Specialist/Technician
25XX	Weather Officer
271X2	Operations Resources Mgt. Specialist/Supervisor
272X0	Air Traffic Controller
302X0	Weather Equip. Specialist/Technician
303X1	Air Traffic Control Radar Specialist/Technician
304X0	Ground Radio Comm. Specialist/Technician
304X4	Navigational Aids Equip. Specialist/Technician
306X3	Telecom Systems Specialist/Technician
324X0	Precision Measurement Equip. Lab Specialist/Technician
4016	Maintenance Operations Division Officer
A4016	Commander (AGS)
A4016	Commander (CRS)
A4016	Commander (EMS)
4016	Maintenance Supervisor (AGS)
4016	Maintenance Supervisor (CRS)
4016	Maintenance Supervisor (EMS)
4024	Maintenance Operations Center OIC

**TABLE 2. PROPOSED LIST OF FIELD
VERSION RECIPIENTS (continued)**

AFSC	Title
4024	Aircraft Maintenance Officer (AMU OIC)
X4054A**	Weapons Safety Officer
4054A	Munitions Maintenance Officer
423X0	Electrician
423X0	Aircraft Electrical Systems
423X1	Aircraft Environmental Systems
423X2	Aircrew Egress Systems
423X4	Aircraft Pneudraulic Systems
423X5	AGE Mechanic
423X5	AGE Repair/Inspection/Pickup/Delivery
42699	Aircraft Propulsion Superintendent
426X2	Jet Engine Mechanic
427X0	Machinist
427X1	Corrosion Control
427X2	Nondestructive Inspection
427X3	Survival Equipment
427X4	Metals Process Specialist/Technician
427X5	Airframe Repair Specialist/Technician
43199	Aircraft Maintenance Superintendent
43260	Aircraft Maintenance Manager
431X1	Tactical Aircraft Maintenance Specialist/Technician
43200	Aircraft Maintenance Manager
45100	Test Sta. and Comp. Manager
45199	Avionics Test Sta. and Comp. Superintendent
451XX	Avionics Test Sta. and Comp. Specialist/Technician
452XX	Avionics Systems Specialist/Technician
455X0	Photo-sensors Maintenance Specialist/Technician
461X0	Munition Systems Specialist/Technician/Superintendent
46200	Aircraft Armament Manager
462X0	Aircraft Armament Systems Specialist/Technician
464X0	EOD Specialist/Technician
465X0	Munitions Operations Specialist/Technician

**TABLE 2. PROPOSED LIST OF FIELD
VERSION RECIPIENTS (continued)**

AFSC	Title
472XX	Vehicle Maintenance
545X0	Refrig and A/C Specialist/Technician (possible RRR augmentee)
545X2	Heating System Specialist/Technician (possible RRR augmentee)
55199	Pavements/construction Equip. Superintendent
551X0	Pavements Maintenance Specialist/Technician
551X1	Construction Equip. Operator/Technician
5525	CE Officer (with RRR mgt. experience)
55299	Structural Superintendent (possible RRR augmentee)
552X0	Carpenter (possible RRR augmentee)
552X2	Metals Fabrication Specialist/Technician (possible RRR augmentee)
552X3	Structural Technician (possible RRR augmentee)
571X0	Fire Protection
A6016	Commander (Transportation)
603X0	Vehicle Operations Specialist/Technician (Drivers)
6054	Transportation Officer
605XX	Air Cargo Specialist/Technician
611X0	Service Specialist/Superintendent
622X0	Food Service
62XX	Services Officer (Mortuary, Shelter Stocking)
63100	Fuels Manager
6313/50	Fuels Specialist (R-9 Driver)
6317/90	Fuels Supervisor/Superintendent
A6416	Commander (Chief of Supply)
6424	Supply Operations Officer
6445	Inventory Management Specialist
645X0	Materials Store and Distribution Specialist/Technician
645X1	Materials Storage and Distribution (Pickup/delivery at AMU/Flightline)
702X0	Consolidated Base Personnel (READY)
703X0	Consolidated Base Personnel (READY)
732X0	Consolidated Base Personnel (READY)
80XX	Intelligence Officer
81100	SP Manager
811X0	Security Specialist/Supervisor
811X2	Law Enforcement Specialist/Supervisor

**TABLE 2. PROPOSED LIST OF FIELD
VERSION RECIPIENTS (continued)**

AFSC	Title
8124	SP Officer
902X0	Medical Services Specialist/Technician
93XX	Family/Aero Med Physician
9126	Bioenvironmental Engineer
97XX	Nurse
*	BRAAT READY Personnel
*	Shelter Management
*	Aircraft Battle Damage Repair
*	Combat Turn Director
*	Area Turn Director
*	EOD Reconnaissance
*	Tank Buildup
*	Flighline Expediter

*As appropriate

**X-prefix indicates current or previous safety officer experience.

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GLOSSARY

AB	Air Base
A/C	Air Conditioning
AFR	Air Force Regulation
AFSC	Air Force Specialty Code
AGE	Aerospace Ground Equipment
AGS	Aircraft Generation Squadron
AMU	Aircraft Maintenance Unit
BRAAT	Base Recovery After Attack
CC	Contamination Control
CCSA	Contamination Control Systems Analysis
CDDB	Chemical Defense Data Base
CE	Civil Engineering
COMM	Communication(s)
Contamination Control	Application of decontamination and contamination avoidance procedures to reduce the chemical hazard to personnel
CRS	Component Repair Squadron
CSG	Combat Support Group Commander, i.e., Base Commander
C ³ I	Command, Control, Communications, and Intelligence
DAT	Damage Assessment Team(s)
decon	Decontamination
DIW	Detection, Identification, and Warning

GLOSSARY (continued)

DPST	Disaster Preparedness Support Team(s)
EMS	Equipment Maintenance Squadron
EOD	Explosive Ordnance Disposal
GD	Soman, a semi-persistent nerve agent
HD	Distilled mustard, a semi-persistent blister agent
IPE	Individual Protective Equipment
MOPP	Mission-Oriented Protective Posture
NBC	Nuclear/Biological/Chemical
NCOIC	Noncommissioned Officer-in-Charge
OIC	Officer-in-Charge
OPLAN	Operations Plan
Perfect Information	Complete, accurate information about the chemical warfare environment which would allow a decision maker to make decisions with complete confidence
READY	Resource Augmentation Duty
RRR	Rapid Runway Repair
SP	Security Police
SRC	Survival Recovery Center
USAFE	United States Air Forces in Europe
VX	A persistent nerve agent
WOC	Wing Operations Center

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APPENDIX A
QUESTIONNAIRE FOR COMMAND PERSONNEL

INSTRUCTIONS

This questionnaire is divided into sections covering:

- Information Transfer
- Detection and Identification
- Warning
- Protective Posture
- Contamination Control

The questions are concerned with the information required to make decisions during chemical warfare operations.

It is not necessary to answer all of the questions.

CCSA PHASE IV QUESTIONNAIRE

Name: _____

Grade/Rank: _____

Duty phone: (_____) - _____ - _____

Best day/time to call: _____

(OPTIONAL) Home phone: (_____) - _____ - _____

(OPTIONAL) Best day/time to call: _____

Current Assignment

Unit/Organization: _____

AFSC: _____

Location: _____

Job title: _____

Most Recent (if not current) USAFE Assignment

Unit/Organization: _____

AFSC: _____

Location: _____

Job title: _____

Served from: _____ to _____

READY Information

Job title: _____

READY code (if any): _____

Description of duties: _____

INFORMATION TRANSFER

1. With respect to detection, identification, and warning (DIW); base recovery after attack (BRAAT); contamination control (CC); and protective posture decisions, what nuclear/biological/chemical (NBC) information would you receive?

How often? _____

From what source(s)? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you receive?

How do you record it?

2. What types of decisions are made from the information you receive?

Why? _____

3. What actions are taken?

Why? _____

4. What NBC information would you transmit?

How often? _____

To whom? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you transmit?

DETECTION AND IDENTIFICATION

NOTE: The concept of "perfect" information implies complete, accurate information which would allow you to make decisions and/or take actions with complete confidence.

"Perfect" information about the NBC environment might include exact knowledge of the following:

- The type of contamination (including chemical agent name)
- The amount of contamination
- The location of contaminated areas
- The location of clean areas
- The persistence of the contamination
- The toxicity of the contamination
- The hazards to personnel and/or equipment

5. How would having "perfect" information about the NBC environment affect the decisions you make (or could make) and/or the actions you take (or could take)? (i.e., How would your performance be improved?)

What types of information do you need that you would not normally receive, i.e., what constitutes "perfect" information about the NBC environment for your particular job?

6. What types of NBC information do you have which someone else (who does not have it) should have?

Explain, i.e.,

What information?

Who should have it?

Why should they have it?

7. Do you direct field personnel to perform a contamination survey (i.e., employ some form of detector) at their location during an attack or after an attack has occurred?

What type of detector is used? _____

When is it used (i.e., during, after, or both)?

Why? _____

What information does this survey method provide you?

How is this information used to make decisions? (e.g., decon/no decon, upgrade/downgrade MOPP)?

8. Is the NBC information obtained by a local contamination survey or received from other source(s) sufficient to make decisions concerning

(a) contamination control (e.g., decon/no decon, mark an area contaminated, mark a piece of equipment contaminated)

and/or

(b) MOPP upgrade/downgrade (e.g., wear full ensemble, wear mask only)?

If not, what other information is needed?

WARNING

9. What information is needed to dewarn (i.e., transmit "all-clear")?

How is this information obtained?

How is the dewarning communicated (e.g., radio, telephone)?

PROTECTIVE POSTURE

10. Are protective posture (i.e., MOPP) decisions made solely on the basis of the current base-wide alarm condition?

If not, what else is considered? _____

Where does the information come from? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you receive?

How do you record it?

11. Under what conditions would you reduce protective posture in some areas while retaining full protection elsewhere?

What information is needed?

Where does the information come from? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you receive?

How do you record it?

CONTAMINATION CONTROL

12. Given "perfect" information about the NBC environment, what types of contamination control decisions would you make? (e.g., decontaminate personnel, decontaminate equipment, avoid contaminated areas and/or equipment, do not employ decontamination, etc.)

Where does the information come from? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you receive?

How do you record it?

SUMMARY QUESTIONS

13. With respect to the decisions you make during chemical warfare operations, rate the following data items according to their importance in your decision-making process. Use the rating system shown below.

- 1 = Not important
- 2 = Somewhat important
- 3 = Important
- 4 = Very important
- 5 = Extremely important

- _____ detection of the presence of contamination
- _____ determination of the absence of contamination
- _____ identification of agent phase (e.g., liquid, vapor)
- _____ identification of agent type (e.g., nerve, blister, blood, choking)
- _____ identification of agent name (e.g., GD, HD, VX)
- _____ general quantification of agent (i.e., high, medium, low)
- _____ exact quantification of agent
- _____ general agent persistence (i.e., high, medium, low)
- _____ exact agent persistence
- _____ general agent toxicity (i.e., high, medium, low)
- _____ exact agent toxicity
- _____ weather data (e.g., temperature, wind direction, wind speed)
- _____ estimated risk (of becoming a casualty) associated with unzipping overgarment or removing gloves or removing mask
- _____ projection of cloud travel

- _____ general quantification of contamination on vehicles and/or equipment (i.e., high, medium, low)
- _____ exact knowledge of contamination on vehicles and/or equipment
- _____ estimated hazards to personnel and/or equipment
- _____ estimated duration of hazards
- _____ postattack monitoring of the NBC environment
- _____ other (specify) _____
- _____ other (specify) _____
- _____ other (specify) _____

APPENDIX B
QUESTIONNAIRE FOR FIELD PERSONNEL

INSTRUCTIONS

This questionnaire is divided into sections covering:

- Information Transfer
- Detection and Identification
- Warning
- Protective Posture
- Contamination Control

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It is not necessary to answer all of the questions.

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Best day/time to call: _____

(OPTIONAL) Home phone: (_____) - _____ - _____

(OPTIONAL) Best day/time to call: _____

Current Assignment

Unit/Organization: _____

AFSC: _____

Location: _____

Job title: _____

Most Recent (if not current) USAFE Assignment

Unit/Organization: _____

AFSC: _____

Location: _____

Job title: _____

Served from: _____ to _____

READY Information

Job title: _____

READY code (if any): _____

Description of duties: _____

INFORMATION TRANSFER

1. With respect to detection, identification, and warning (DIW); base recovery after attack (BRAAT); contamination control (CC); and protective posture decisions, what nuclear/biological/chemical (NBC) information would you receive?

How often? _____

From what source(s)? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you receive?

How do you record it?

2. What types of decisions are made from the information you receive?

Why? _____

3. What actions are taken?

Why? _____

4. What NBC information would you transmit?

How often? _____

To whom? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you transmit?

DETECTION AND IDENTIFICATION

Note: The concept of "perfect" information implies complete, accurate information which would allow you to make decisions and/or take actions with complete confidence.

"Perfect" information about the NBC environment might include exact knowledge of the following:

- The type of contamination (including chemical agent name)
- The amount of contamination
- The location of contaminated areas
- The location of clean areas
- The persistence of the contamination
- The toxicity of the contamination
- The hazards to personnel and/or equipment

5. How would having "perfect" information about the NBC environment affect the decisions you make (or could make) and/or the actions you take (or could take)? (i.e., How would your performance be improved?)

What types of information do you need that you would not normally receive, i.e., what constitutes "perfect" information about the NBC environment for your particular job?

6. During a wartime situation, what types of NBC information do you have which someone else (who does not have it) should have?

Explain, i.e.,

What information?

Who should have it?

Why should they have it?

7. Do you perform a contamination survey (i.e., employ some form of detector) at your location during an attack or after an attack has occurred?

What type of detector is used? _____

When is it used (i.e., during, after, or both)?

Why?

What information does this survey method provide you?

How is this information used to make decisions (e.g., decon/no decon, upgrade/downgrade MOPP)?

8. Is the NBC information obtained by a local contamination survey or received from other source(s) sufficient to make decisions concerning
- a. contamination control (e.g., decon/no decon, mark an area contaminated, mark a piece of equipment contaminated)
and/or
 - b. MOPP upgrade/downgrade (e.g., wear full ensemble, wear mask only)?

If not, what other information is needed?

WARNING

9. How are you informed that a chemical warfare attack is in progress or has occurred? (check all that apply)

- Loudspeaker system (i.e., Giant Voice)
- Radio from _____
- Telephone from _____
- Runner from _____
- Supervisor
- Co-workers
- Flags
- Automatic alarm signals
- Other _____
- Not informed of chemical warfare attack

10. How do you know that your work area is or is not contaminated?

- Self-determined using _____
- Loudspeaker system (i.e., Giant Voice)
- Radio from _____
- Telephone from _____
- Runner from _____
- Supervisor
- Co-workers
- Flags
- Automatic alarm signals
- Other _____
- Do not know if it is contaminated or not

PROTECTIVE POSTURE

11. Is it necessary for you to remove any item (e.g., gloves, mask) of your chemical protective gear in order to perform a specific task?

What item(s)? _____

What task(s)? _____

For how long is the item(s) removed? _____

Why? (e.g., safety, convenience, necessary to perform task)

CONTAMINATION CONTROL

12. Given "perfect" information about the NBC environment, what types of contamination control decisions would you make? (e.g., decontaminate personnel, decontaminate equipment, avoid contaminated areas and/or equipment, do not employ decontamination, etc.)

What information is needed? _____

Where does the information come from? _____

In what form (e.g., verbal, written)?

What media (e.g., radio, telephone)?

What is the classification of the information you receive?

How do you record it?

SUMMARY QUESTIONS

13. With respect to the decisions you make during chemical warfare operations, rate the following data items according to their importance in your decision-making process. Use the rating system shown below.

- 1 = Not important
2 = Somewhat important
3 = Important
4 = Very important
5 = Extremely important

- _____ detection of the presence of contamination
_____ determination of the absence of contamination
_____ identification of agent phase (e.g., liquid, vapor)
_____ identification of agent type (e.g., nerve, blister, blood, choking)
_____ identification of agent name (e.g., GD, HD, VX)
_____ general quantification of agent (i.e., high, medium, low)
_____ exact quantification of agent
_____ general agent persistence (i.e., high, medium, low)
_____ exact agent persistence
_____ general agent toxicity (i.e., high, medium, low)
_____ exact agent toxicity
_____ weather data (e.g., temperature, wind direction, wind speed)
_____ estimated risk (of becoming a casualty) associated with unzipping overgarment or removing gloves or removing mask
_____ projection of cloud travel

- _____ general quantification of contamination on vehicles and/or equipment (i.e., high, medium, low)
- _____ exact knowledge of contamination on vehicles and/or equipment
- _____ estimated hazards to personnel and/or equipment
- _____ estimated duration of hazards
- _____ postattack monitoring of the NBC environment
- _____ other (specify) _____
- _____ other (specify) _____
- _____ other (specify) _____