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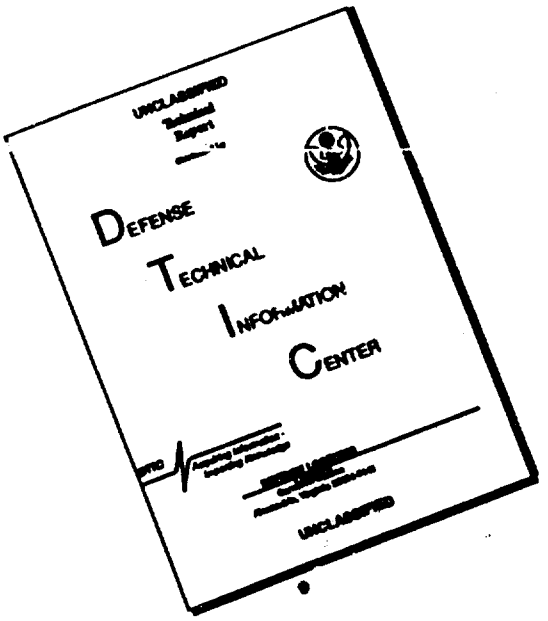


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U. S. ARMY TEST AND EVALUATION COMMAND
ENVIRONMENTAL TEST PROCEDURE

# ARCTIC ENVIRONMENTAL TEST OF CB ALARMS AND COLLECTIVE PROTECTION SYSTEMS



## 1. OBJECTIVE

The objective of this MTP is to provide a means for evaluating the performance of CB Alarms and Collective Protection Systems under arctic environmental conditions.

## 2. BACKGROUND

One of the greater deterrents to the development of nuclear, biological, and chemical equipment during the early stages of these technologies was the lack of appreciation of the effects of environmental conditions. This situation was due, in part, to a lack of knowledge concerning environmental effects. In recent years, extensive effort has been put forth by qualified engineers and other personnel to establish suitable test parameters for the environments to which equipment may be exposed. Several U. S. Army Commands and contractors to the government have been participating for a long period of time in a unified investigation to determine the extent of arctic environmental testing that is required for military equipment, to establish the most suitable method of accomplishing these tests, and to standardize the test procedure. The information contained in this MTP is the result of this combined effort. These results are the basis for arctic testing during development and evaluation of military nuclear, biological, and chemical equipment. Only through such testing and evaluation can the ability of equipment to withstand the effects of an arctic environment be determined.

## 3. REQUIRED EQUIPMENT

a. Test Support Equipment (Equipment required to conduct testing and determined primarily by the nature of the item being tested. Normally such equipment shall be found in the "Required Equipment" section of the applicable commodity MTP).

b. Instrumentation.

1) Stopwatches and electric timers.
2) DOP field test apparatus consisting of a DOP aerosol generator and a particulate detection unit.
3) Sequential samplers.
4) Vacuum pumps.
5) Calibrated orifices.
6) Chart recorders.
7) Toxic gas dilution apparatus
8) Thermocouples.
9) Differential pressure transducers.
10) Voltmeters.
11) Ammeters.







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12) Carbon monoxide test kits.
13) Flowmeters.

c. Laboratory Support Equipment (equipment required to provide data on agent concentrations and time-dosage relation for use in evaluating agent challenge subtests or to evaluate test item deterioration, effectiveness of decontamination agent penetration, etc.).

NOTE: Apparatus and chemicals in the above category are prescribed in references I-L, paragraph 4, References.

d. Meteorological Support Equipment.

1) Temperature measuring devices (thermometers, etc.)
2) Humidity measuring devices (psychrometers, etc.)
3) Atmospheric pressure measuring devices (barometers, etc.)
4) Precipitation measuring device
5) Solar radiation counters
6) Wind speed and direction measuring devices
7) Ozone concentration measuring devices

## 4. REFERENCES

A. AR 705-15, Operation of Materiel Under Extreme Conditions of Environments.
B. USATECOM Regulation 350-6, Education and Training.
C. MTP 8-2-503, Rough Handling and Surface Transport.
D. MTP 8-3-502, Battlefield Mobility/Man Portability, Man Transportability and Mode of Operation.
E. MTP 7-2-509, Air Drop Capability of Materiel (General).
F. MTP 7-3-512, Air Drop Capability (Suitability of Equipment for).
G. MTP 8-2-510, Decontamination.
H. MTP 10-4-500, Arctic Preoperational Inspection, Physical Characteristics, Human Factors, Safety and Maintenance Evaluation.
I. 135-305-1, Procedure for Chemical Analysis of Chemical Agents Tabun (GA) and Sarin (GB), U. S. Army Edgewood Arsenal Quality Assurance Directorate.
J. 136-300-52, Instruction Manual for the Installation, Operation and Maintenance of Dilution Apparatus, Toxic Gas, Q5, U. S. Army Edgewood Arsenal Quality Assurance Directorate.
K. 136-300-236A, Instruction Manual for the Installation, Operation and Maintenance of Dilution Apparatus, Toxic Gas, Q150 (Generator, Toxic Aerosol), U. S. Army Edgewood Arsenal Quality Assurance Directorate.
L. 136-305-6, (C) Procedure for Chemical Analysis of Chemical Agent VX (U), U. S. Army Edgewood Arsenal Quality Assurance Directorate.

## 5. SCOPE

### 5.1 SUMMARY

This MTP describes in general terms, the preparation, conduct, recording and reporting methods used for the arctic environmental testing of CB Alarms and Collective Protection Systems. Specific subtests include:

a. Preoperational Inspection and Physical Characteristics - The objective of this subtest is to determine:

1) If the test and comparison items are in proper condition for testing.
2) If the test item's physical characteristics conform to applicable criteria.

b. Agent Challenge Test - The objectives of this subtest are to determine the sensitivity and alarm response time of the alarm system to various concentrations of agents and to determine the ability of collective protection systems to provide and maintain filtered air under positive pressure at a level which precludes the infiltration of hazard levels of agents under arctic environmental conditions.

c. Purge Time Challenge - The objective of this subtest is to determine the time required for the test item to purge initial concentration of test agent solely as a result of scavenging by ventilation with purified air, under arctic environmental conditions.

d. Operational Reliability - The objective of this subtest is to determine the reliability, durability, and overall performance of the test item while being operated in an arctic environment.

e. Functional Suitability - The objective of this subtest is to determine whether the test item meets operational performance characteristics specified by appropriate test criteria when the test item is being used in an arctic environment.

f. Human Factors Evaluation and Safety - The objective of this subtest is to determine if all accessories and components of the test weapons enable safe and easy operation by test crews wearing the appropriate arctic winter uniform.

g. Maintenance Evaluation - The objective of this subtest is to determine if the test weapons meet maintenance and maintainability requirements as defined by QMR, TC, MC or other established criteria under arctic winter environmental conditions.

## 5.2 LIMITATIONS

This MTP is limited to general procedures and considerations applicable to arctic environmental testing of CB Alarms and Collective Protection Systems.

# 6. PROCEDURES

## 6.1 PREPARATION FOR TEST

### 6.1.1 General Preparations

a. Arctic winter environmental tests are normally scheduled from October through March (6 months). Tests, test comparison and support weapons

should be delivered to the arctic test center prior to 1 October.

b. TDY personnel will be used to augment assigned personnel and will be trained to the degree that they are as proficient using the test item as the troops who will use the test item.

c. Ensure that all test personnel are familiar with the required technical and operational characteristics of the item under test, such as stipulated in Qualitative Materiel Requirements (QMR), Small Development Requirements (SDR), and Technical Characteristics (TC), and record this criteria in the test plan.

d. Review all instructional material issued with the test item by the manufacturer, contractor, or government, as well as reports of previous tests conducted on the same type of equipment, and familiarize all test personnel with the contents of such documents. These documents shall be kept readily available for reference.

e. Record the grade, MOS, background, and training of all test personnel and ensure that all personnel receive new equipment training (NET) as required.

f. Record the following information:

1) Nomenclature, serial number(s), and manufacturer's name of the test items.
2) Nomenclature, serial number, accuracy tolerances, calibration requirements, and last date calibrated of the test equipment selected for the tests.

g. Select test equipment having an accuracy of at least 10 times greater than that of the function to be measured.

h. Prepare record forms for systematic entry of data, chronology of test, and analysis in final evaluation.

i. Prepare adequate safety precautions to provide safety for personnel and equipment, and ensure that all safety SOP's are observed throughout the test.

j. Record the prevailing meteorological conditions during the storage phase, as well as test conduct, to include:

1) Temperature
2) Humidity, relative or absolute
3) Temperature gradient
4) Atmospheric pressure
5) Precipitation
6) Solar radiation
7) Wind speed and direction
8) Frequency of readings
9) Source of data

k. Outfit all test personnel in appropriate arctic winter clothing as described in MTP 10-4-500.

### 6.1.2 Preoperational Inspection and Physical Characteristics

Prior to beginning environmental tests, a preoperational inspection and physical characteristics test shall be performed on the test item in accord-

ance with procedures outlined in MTP 10-4-500.

6.2 TEST CONDUCT

6.2.1 Agent Challenge Test

6.2.1.1 Agent Challenge Test, for Alarms

6.2.1.1.1 Alarm Response Time - The following procedures shall apply:

a. Select an alarm testing facility (laboratory) using the following criterion:

1) The test facility must be equipped with appropriate agent concentration generators, i.e., Q5 toxic gas dilution apparatus, MARS generator, etc.
2) The facility must be equipped with suitable chemical analysis apparatus to verify agent concentrations, and shall contain appropriate purging and decontamination devices.

b. Upon receipt, install the test alarm system within the facility in a manner that will simulate service usage.

c. Connect the alarm system to an appropriate power supply and/or the laboratory electrical supply, energize equipment, and adjust the alarm system detectors as prescribed in appropriate instructions.

d. Using appropriate apparatus (i.e., Q5 toxic gas dilution apparatus, MARS generator, etc.) subject the alarm system to a gradually increasing level of agent concentration until an alarm response is obtained.

e. Measure and record the alarm response time (± 1 second) on a suitable data form along with the identification number of the alarm.

f. Perform a chemical analysis to determine the agent concentration level and record the concentration level and method of analysis used to verify agent concentration.

g. Thoroughly purge and decontaminate the alarm system detectors as prescribed in appropriate instructions.

h. Repeat steps (d) through (g) above, for each type of agent concentration.

6.2.1.1.2 Quick Sensitivity Check - The following procedures shall apply:

a. Alarm systems shall be energized by means of an appropriate power supply or the laboratory electrical supply.

b. Prior to and subsequent to each subtest, the alarm system sensitivity shall be checked by determining the alarm response time to a representative concentration of a suitable agent.

NOTES: 1. The agent concentration level chosen shall be such that it will be slightly greater than the minimum detectable concentration found during testing outlined in paragraph 6.2.1.1.1
2. The above subtest shall be used to give an indication of

any adverse effects on alarm performance caused by particular tests or cumulative operating time.

c. Record in the test log the following data:

1) The identification number of the alarm
2) Concentration level of each agent
3) Alarm response time for each agent concentration
4) Method of analysis used to verify agent concentration

6.2.1.2 Agent Challenge Test for Collective Protective Systems

a. Perform the following preparations prior to beginning this test.

1) Select agents or agent simulants which will ensure that both the particulate and gas filters of the test item will be challenged during the test.
2) Make available, for use during the test, an appropriate disseminating apparatus for the dissemination of agents used during the test.
3) Place sequential samples in pairs in the following positions, if appropriate:

a) At the bottom of the protective entrance
b) Near the top of the protective entrance
c) Near the air inlet of the filters
d) Near the air outlet of the filters
e) Inside the crew compartment at several points
f) At several points around the outside of the test item
g) In the engine compartment

NOTES: 1. Suitable sequential samplers shall be used to determine the agent concentration and special consideration shall be given to the expected operating temperature of samples to ensure that they will remain operational and will not freeze. If required, special heating devices shall be available for use in heating samplers. For particulate agents, impactor (dry) samplers, in-line filters and liquid filled impingers, shall be used.

2. Calibrated orifices or other flow-rate measuring devices, shall be provided for the continuous monitoring and recording of the air flow rate of the test item. Thermocouples or equivalent devices will be used for the continuous monitoring and recording of the temperature of the air through the calibrated orifice. Recording differential pressure transducers or equivalent apparatus will be provided for the continuous monitoring of the pressure within the protective entrance, crew compartment and (if appropriate) the engine compartment. Recording voltmeters and ammeters will be provided for continuous monitoring of the voltage supplied to and the amperes re-

quired by the test item.

4) Place M-5 gas alarms (XM8 chemical agent alarms) in the following positions of the test item if appropriate:

a) Inside the protective entrance
b) Near the air outlet of the filter
c) Near the engine compartment

NOTES: 1. Test animals shall be placed in the protective entrance and in the crew compartment to simulate the presence of humans, if appropriate.
2. If the agent to be used is CS, men in the crew compartment of the test item will use the sniff test to detect its presence. The Test Officer or other qualified observer will record reactions of those performing the sniff test. Severity of symptoms will be especially noted. During conduct of the agent challenge the crew compartment will be monitored for carbon monoxide.
3. Before conduct of the agent challenge the Test Officer will ensure that all personnel in the test area wear appropriate protective clothing and masks. All safety SOP's will be strictly adhered to.

b. The test item shall be assembled and pressurized for 15 minutes prior to agent dissemination.

c. Energize all recording instrumentation and check crew compartment pressure for stability.

d. When stability has been reached, disseminate agent at a known rate and maintain the agent concentration at the required level.

e. Start samplers immediately upon beginning of dissemination and sample and record the amount and type of agent present.

NOTES: 1. Prior to the start of dissemination a background sample will be obtained.
2. If appropriate, (never in toxic cloud) a number (at least two) of exit and entry procedures shall be accomplished during this period using standard exit/entry procedure.

f. Cease sampling and dissemination of agent after specified period.

g. Continue to operate other recording instruments for 30 minutes after the cessation of dissemination and sampling.

h. Decontaminate the test item.

NOTE: This test shall be repeated using different operating modes of the test item if appropriate.

i. Record the following for each test mode:

1) The purity and amount of the agent used.
2) Results of observations of the test animals.

3) All recorded data (volts, amperes, CFM output, pressures, temperatures, etc.).
4) Analysis of the samplers.
5) Motion pictures of the entry/exit procedure.
6) Ambient temperature during trials.
7) Crew compartment temperature during trials.
8) Average wind speeds during trials.
9) Observed results and results of query of the men in the test item as to the detection of the agent by the sniff test.

6.2.2 Purge Time Challenge (Collective Protection Systems)

a. The following preparations shall be made prior to performing this test:

1) Personnel responsible for conducting this test shall ensure that all personnel in the test area will have protective masks available at all times.
2) A field test apparatus shall be obtained and made available for the dissemination and concentration measurement of the agent to be used.
3) An ample supply of agent DOP shall be obtained and made available for dissemination during this test.

b. Assemble the test item and pressurize for 15 minutes prior to agent dissemination.

c. Energize all recording instrumentation and check crew compartment for pressurization stability.

d. When stability has been reached disseminate the agent for the period of time required to obtain the desired concentration, and designate the time of agent dissemination completion as time Z.

e. Upon completion of the agent dissemination process, begin to purge the system by utilizing solely, the ventilation system of the test item.

f. During the purging process, mentioned in E, above, perform and record in the test log, the following data in the manner indicated below:

1) Measure and record the difference between the protective entrance pressure and the exterior pressure of the test item, at 60-second intervals from time Z until zero concentrations of agent are obtained.
2) Measure and record the difference between crew compartment pressure and protective entrance (airlock) pressure, continually from time Z., until zero concentrations of agents are obtained.
3) Measure and record the difference between crew compartment pressure and exterior pressure, continually from time Z., until zero concentrations of agents are obtained.
4) Measure and record the air output flow rate of the test item continually, from time Z., until zero concentrations are reached.
5) Measure and record the concentration of the agent (DOP) (versus time) during the period from time Z., until zero con-

centration of the agent is reached, continually.

6) Measure and record the voltage and amperage of the test item, continually from time Z., until agent concentration is reduced to zero.

7) Measure and record the temperature, wind speed and direction continually, of the arctic environment within which this test is to be conducted, from time Z., until concentration level has fallen below zero.

NOTE: The above subtest (6.2.2) shall be conducted before and after the operational reliability subtest.

6.2.3 Operational Reliability

6.2.3.1 Alarms

a. Emplace a representative number of alarms in the arctic environment without shelter for a total number of hours sufficient to provide an accurate analysis of reliability.

NOTE: Place remote units a descrete distance away from their respective alarms.

b. Energize alarms utilizing batteries or other sources of electrical power and maintain an operational log for each alarm to be tested, on an hourly basis.

c. Disseminate the agent, to be used during the test, in the vicinity of each alarm to be tested and record the type of agent used, agent concentration, and agent release time.

d. Measure and record the response of each alarm to the agent disseminated, to include the following:

1) Time of first response for each alarm.
2) Agent concentration and agent type measured at 30 second intervals until agent concentration reaches zero.

NOTE: If appropriate, the alarms shall be subjected to a representative number of cold starts to evaluate the ability of the alarm to be placed in operation at low temperatures. Data will be collected to evaluate warmup time and time to service the alarm. All units subjected to cold starts will be cold-soaked outdoors for a period of at least two hours prior to startup. Temperature ranges for cold starts will be dictated by appropriate test criteria.

e. Measure and record essential meteorological data, on an hourly basis, to include the following:

1) Air temperature
2) Precipitation profile
3) Wind velocity

6.2.3.2 Collective Protective Systems

a. Assemble the test item in a typical command post area and operate for a period of 24 hours. (Assembly and operation shall occur in an arctic environment).

b. During operation of the test item, launch a 15 minute CS attack in the immediate vicinity of the test item, utilizing burning type grenades. Record the time of the attack.

c. Determine the penetration of the test item, by the CS agent, in the following manner and record results of determination:

1) Following the CS attack, test personnel wearing arctic clothing and protective masks shall enter and exit the test item through the air lock, a minimum of 23 times, during the 24 hour period, according to standard entry/exit procedure.
2) While inside the test item, test personnel shall unmask according to unmasking procedure and perform an agent sniff test. Results of the sniff test shall be obtained through questioning of test personnel, and recorded in the test log.

d. Carbon monoxide concentration of the crew compartment of the test item shall be monitored on an hourly basis or less, if required, and results recorded in the test log.

e. At the completion of the first 24 hour period, the test item shall be readied for transport.

f. Upon completion of transport preparations, drive or transport the test items over appropriate roads for a minimum distance of 50 kilometers.

g. At the completion of the road haul, repeat procedures A through D.

h. Repeat procedures E, F and G above to obtain data for a third cycle.

i. During conduct of the test according to procedures A-H, record the following data in addition to that specifically called for in procedures.

1) Meteorological data to include air temperature, wind velocity, precipitation and ground temperature.
2) Written results of observations or queries of test personnel regarding the detection of CS based on development of symptoms.
3) Number of hours test items are operated.
4) Road type over which test items are transported and condition of road surface.

NOTE: If applicable, an attempt shall be made to conduct 65% of this subtest at temperatures between 0° F and -25° F, 25% of this subtest at temperatures between -25° F and -40° F and at least 10% of this subtest at temperatures below -40° F.

6.2.4 Functional Stability

a. The test item shall be tested and data recorded in accordance with the following MTP's:

1) MTP 8-2-503 (Rough Handling and Surface Transport).
2) MTP 7-2-509 (Airdrop Capabilities) and MTP 7-3-512 (Airdrop Capabilities).
3) MTP 8-2-510 (Decontaminator).

b. In addition to data specified in the above MTP's the following additional data shall be recorded:

1) Any noticeable effects of the arctic environment on testing
2) Meteorological data including the following:

a) Air temperature
b) Ground temperature
c) Precipitation
d) Wind velocity

NOTE: All subtests will be conducted under conditions which represent the manner in which the test items would be employed in the arctic. This includes the selection of appropriate terrain and/or meteorological conditions.

6.2.5 Human Factors Evaluation and Safety

a. Conduct all Human Factors and Safety tests in accordance with the applicable sections of MTP 10-4-500.
b. Conduct these tests concurrently with the operational tests (Agent Challenge, Purge Time Challenge and Operational Reliability and Functional Stability), described in this MTP.

6.2.6 Maintenance Evaluation

a. Conduct all maintenance evaluation tests (maintenance and reliability) in accordance with applicable sections of MTP 10-4-500.
b. Conduct these tests concurrently with the operational tests (Agent Challenge, Purge Time Challenge and Operational Reliability and Functional Stability), described in this MTP.

6.3 TEST DATA

6.3.1 Agent Challenge Test

6.3.1.1 Agent Challenge Test for Alarms

6.3.1.1.1 Alarm Response Time -

The following shall be accomplished:

a. Record time of agent dissemination.
b. Record concentration of agent at 30 second intervals following agent release.
c. Record the alarm response time required by the test item after

agent release for each level of agent concentration.

d. Record the type of agent used during this test.

6.3.1.1.2 Quick Sensitivity Check -

The following shall be accomplished:

a. Record the identification number of each alarm
b. Record the concentration level of each agent and agent type
c. Record the alarm response time for each agent concentration
d. Record the method of analysis used to verify agent concentrations

6.3.1.2 Agent Challenge Test for Collective Protective Systems

a. Record the purity and rate of flow of agent used.
b. Record the amount and type of agent measured by each sampler.
c. Record the results of observations of test animals.
d. Record all data such as volts, amperes, CFM output, pressures, temperatures, etc.
e. Record the concentration of "background agent" if appropriate.
f. Record average wind velocities and crew compartment temperatures during tests.
g. Record the observed results and results of query of the men in the test item as to the detection of the agent by the sniff test.

6.3.2 Purge Time Challenge (Collective Protective Systems)

a. Record the type agent used and initial agent concentration level.
b. Record the time of completion for agent dissemination (Z-time).
c. Record time at which purging began.
d. Record the difference between the protective entrance pressure and the exterior pressure of the test item at 60 second intervals from time Z until zero concentration of agent is measured.
e. Record difference between crew compartment pressure and protective entrance pressure (airlock) from time Z, continually, until zero agent concentration are reached.
f. Record the difference between crew compartment pressure and exterior pressure, continually from Z time until zero agent concentrations are reached.
g. Record the air output flow rate, continually, from Z time until zero concentrations are obtained.
h. Record the concentration of the agent versus time, continually during the period from Z time until zero concentrations are reached.
i. Record the voltage and amperage of the test item, continually from time Z, until agent concentration has been reduced to zero.
j. Record temperature, and wind velocity, continually from time Z until agent concentration has been reduced to zero.

6.3.3 Operational Reliability

6.3.3.1 Alarms

a. Record the type of agent used to conduct this test, agent concentration and agent release time.
b. Record the time of first response of each alarm.
c. Record the agent concentration and type as registered by the test item, at 30 second intervals from Z time until agent concentration reaches zero.
d. Record air temperature and wind velocity at test site.

6.3.3.2 Collective Protective Systems

a. Record the carbon monoxide concentration inside the compartment on an hourly basis.
b. Record meteorological data such as air temperature and wind velocity.
c. Record the responses of test personnel to the sniff test and responses to query.
d. Record the inc dents or occurrences affecting the operation of the test items.
e. Record the distance, length of time and road type relative to the road transportation phase of this test.
f. Record length of time equipment operated.

6.3.4 Functional Stability

a. Record information specified in applicable portions of the MTP's listed in 6.2.4.
b. Record any noticeable effects of the arctic environment on testing.
c. Record pertinent meteorological data such as air temperature, ground temperature, precipitation and wind velocity.

6.4 DATA REDUCTION AND PRESENTATION

6.4.1 Agent Challenge Test

6.4.1.1 Agent Challenge Test for Alarms

6.4.1.1.1 Alarm Response Time - Accomplish the following:

a. Determine from data recorded in 6.3.1.1.1, the average alarm response time for various concentrations of the test agent.
b. Compare the response time determined above, with values prescribed or established for the test item under arctic conditions, and determine whether the determined values are acceptable.

6.4.1.1.2 Quick Sensitivity Check

a. Determine from data recorded in 6.3.1.1.2, the alarm response time for each concentration of the test agents used.
b. Plot graph of response time versus agent concentration, for each agent used. (Agent concentration shall be plotted along the Y-axis and response time along the X-axis.)

c. Analyze the graph plotted in B above, and compare data to prescribed values and establish whether alarm sensitivity under arctic conditions is acceptable.

6.4.1.2 Agent Challenge Test for Collective Protective Systems

a. Determine from data recorded in 6.3.1.2, the average positive pressure inside the test item.

b. Determine from data recorded in 6.3.1.2, the peak concentration level, of each agent tested, inside the test item.

c. Determine from data in a and b, above, and from observations of animals recorded in 6.3.1.2 and query responses from test personnel, whether the test item can satisfactorily supply filtered air under positive pressure at a level which precludes the infiltration of hazardous levels of agents under arctic environmental conditions.

6.4.2 Purge Time Challenge

a. From data recorded in 6.3.2, determine the length of time required to purge the test item of various concentrations of the test agent(s).

b. Compare the determined purge time values with specified or prescribed values and determine if accaptable for arctic condition.

6.4.3 Operational Reliability

6.4.3.1 Alarms

a. From data recorded in 6.3.3.1, determine the % error between values for agent type, concentration level, and agent release time measured by verification instrumentation and the test item.

b. Compare errors with specified values or limits and determine whether the reliability of this test item is acceptable.

6.4.3.2 Collective Protective Systems

a. Determine from data recorded in 6.3.3.2 whether the test item adequately protects test personnel from a typical test agent under conditions of extended use in an arctic environment, and while being subjected to periodic transportation over arctic terrain.

b. A narrative description of findings shall be presented attesting to the operational reliability of the test item under the above mentioned circumstances.

6.4.4 Functional Stability

a. Reduce data in accordance with applicable portions of the MTP's referenced in 6.2.4.

b. Utilizing data reduced as above, and data recorded in 6.3.4, determine whether the test item meets specified requirements satisfactorily.

6.4.5 Human Factors Evaluation and Safety

Reduce data and prepare in accordance with MTP 10-4-500.

6.4.6 Maintenance Evaluation

Reduce data and prepare in accordance with MTP 10-4-500.